NTNU

Norwegian University of
Science and Technology

Co-creation as a Means to Align Conceptual and Mental Models in System Development:

An Exploratory Case Study of Older Adults as Users of Web-based Public Services

Hege Louise Borge
Andrea Leikvold

Master of Science in Informatics
Submission date: June 2018
Supervisor: Babak Farshchian, IDI

Norwegian University of Science and Technology
Department of Computer Science

Abstract

In 2014, the Norwegian government introduced the strategy "Digital by Default" (Norwegian: "digitalt førstevalg"), which means all correspondence with the public sector should become digital. However, the web services introduced by the public sector turned out to be difficult to use, especially to some groups in society. Older adults are a group of people that are easily left behind. The aim of this research was to understand how early and direct involvement of users is practiced today, and how a lack of user involvement can affect the cost of digitalizing public services. Another goal was to examine older adults' experiences in use of public digital services, and their support network.

An exploratory case study was conducted by observing older adults in their use of digital services and interviewing representatives from the target group. In addition, interviews with relevant stakeholders were held. These include SeniorNet Trondheim, the Learning center at Trondheim public library, the Ministry of Local Government and Modernization and developers and designers of the public services. A co-design workshop with the target group was also conducted. This resulted in a prototype of a new design of digipost.no, followed by a usability test and evaluation to compare the designs.

The findings from this research show that older adults have physical limitations making it challenging to use the web-based public services, and that they are dependent on support. Specific recommendations when designing for older adults were identified. In current practice, users are involved in the development process through usability testing to verify the usability of the solutions. When involving users directly in the design process, this study shows that new solutions can be discovered. These solutions are closer to the users' mental models and will provide more intuitive systems. This entails less cost related to the introduction of new digitalized services. In order to utilize the direct involvement of users it is important to have good tools to make the contributions evident. The theory of conceptual models and mental models indicated in this study to be a proper tool for the task. By investing time and money to create intuitive systems from the beginning, this will increase economical gain in the end. This requires less resources for further development of the design, teaching and follow-up services and provided support for the users that are left behind. It will also increase the sense of achievement and independence. Early and direct involvement can provide large economical savings for society, and simultaneously improve the situation for individual citizens.

Keywords: digitalization; older adults; direct involvement; co-creation; conceptual models; mental models; web-based public services; user-experience

Sammendrag

I 2014 innførte regjeringen "digitalt førstevalg", som innebærer at all offentlig kommunikasjon skal skje digitalt. Det viser seg at de digitale tjenestene som det offentlige tilbyr er utfordrende å bruke, spesielt for noen grupper i befolkningen. Blant annet eldre står i fare for å bli stående utenfor. Målet med forskningen var å forstå hvordan tidlig og direkte involvering av brukere praktiseres i dag, og hvordan mangel på dette kan påvirke kostnaden av å digitalisere. Det var også et mål å kartlegge eldres opplevelser i bruk av offentlige digitale tjenester, samt støttenettverket rundt dem.

En utforskende casestudie ble gjennomført ved observasjoner av eldres bruk av digitale tjenester, intervju med relevante interessenter deriblant Seniornett Trondheim, Læringssenteret på Trondheim folkebiblioteket og Kommunal- og moderniseringsdepartementet, samt intervjuer med eldre, og utviklere av tjenestene. Det ble også gjennomført samskaping med målgruppen, prototyping av nytt design, brukertesting og evaluering.

Funnene fra forskningen viste at eldre har begrensninger som gjør det vanskeligere å bruke dagens offentlige digitale tjenester og at de er avhengig av hjelp. Det ble derfor laget spesifikke anbefalinger som gjør designet bedre for eldre. I dag involveres brukerne i utviklingsprosessen gjennom brukertesting som verifiserer om designet er godt nok. Ved å involvere brukerne direkte i designfasen viser denne studien at nye løsningsformer kommer frem. Disse løsningsformene er nærmere knyttet til brukernes mentale modeller og vil bidra til mer intuitive systemer som vil føre til mindre kostnader knyttet til innføring av nye digitaliserte tjenester. For å sikre utnyttelse av den direkte brukerinvolveringen er det viktig å ha et godt verktøy for å gjøre bidraget tydelig. Teorien om konseptuelle og mentale modeller indikerer i denne studien å kunne bidra som et slikt verktøy. Ved å ta seg tid og råd til å lage intuitive og brukervennlige systemer fra begynnelsen vil dette spare samfunnet i det lange løp. Da trengs mindre ressurser til forbedring av designet, til opplæring av brukere og hjelp til de som faller utenfor. Det vil også ha effekt på individnivå ved større mestringsfølelse og beholdt selvstendighet. Tidlig og direkte involvering kan gi store økonomiske besparelser for samfunnet, samtidig som det bedrer situasjonen for den enkelte.

Nøkkelord: digitalisering; eldre; direkte involvering; samskaping; konseptuelle modeller; mentale modeller; offentlige webtjenester; brukeropplevele

Preface

This master thesis sums up our research done during the autumn and spring semesters of 2017/2018 for our final year at a master's degree in Informatics with specialization in Interaction Design, Game and Learning Technology at the Department of Computer Science at the Norwegian University of Science and Technology (NTNU).

The idea for the project came from our interest in the field, the rapid digitalization and the wish for doing something useful for the community.

Acknowledgement

We would like to thank our supervisor, Associate Professor Babak A. Farshchian for valuable feedback. Babak has supported us through the process and advised us regarding the methodology, framing and contribution. He also helped us structure our thoughts and the collected data when needed. We are also thankful for the feedback and discussions with Associate Professor Yngve Dahl regarding the planning of our courses and workshop, and also related to our theoretical contribution.

We would like to thank SeniorNet Trondheim and the employees at the Learning center at Trondheim public library for the cooperation and help with finding participants to our research. We are also grateful that the Professors Rønning and Sølvberg at the Department of Education and Lifelong Learning at NTNU, Frode Pettersen from Trøndelag county library responsible for Nationally selection for digital competency, Stian Lindbøl from the Ministry of Local Government and Modernisation responsible for the public Management and eGovernment (Difi) and the designers and developers at Digipost, Helsenorge, NAV, DNB and Skatteetaten take time to talk to us and participate in the study. We would also like to thank our families and friends for the support through the process.

Last but not least, we would like to thank all the participants from the target group of this research.

Trondheim, 2018-06-01

Hege Louise Borge and Andrea Leikvold

Contents

List of Figures

List of Tables

1. Introduction

This chapter serves as an introduction to the master thesis. It contains the motivation for the study, the scope, and the contributions. It also presents the research questions and an outline of the thesis.

1.1. Motivation

The Norwegian society is approaching an almost complete digitalization of everyday life (Rønning and Sølvberg, 2017). In 2014 the government introduced the strategy "digital by default" (Norwegian "digitalt førstevalg"), which means all communication with the public sector should become digital (Hornnes et al., 2014; Digital agenda Norway, 2012). For those who are incapable of dealing with the digital world, there should be alternatives. To get assistance you have to reserve from digital correspondence with the public authorities. The problem is that the information and the application form for refusing is available online. There are indications showing that opting out will not be an option in the future. Norwegian Labour and Welfare Administration (NAV) stopped sending information about pension by mail, but were forced to restart the service (Bugge, 2016). The huge focus on digitalization makes it increasingly important to master the digital world in order to be able to cope with everyday life (Rønning and Sølvberg, 2017). A digital divide is the consequence of groups of people being left behind (Friemel, 2016; Cresci et al., 2010). This divide is increasing as a result of more and more public services going digital. It is critical to ensure large groups are not excluded both to reduce societal cost resulting from digital divide (Macedo, 2017).

The goal of the authorities concerning the digitalization of the public sector is to save money, become more efficient, provide better service and keep up with a global digital evolution. The vision is to simplify everyday life and increase productivity (paper, 2015). The aim is also to approach the concept "working customer", where the inhabitants conduct self service, and the producers allocate their resources on other areas (Rieder and Voß, 2010). However, not all citizens have the required skills (Dunkel and Voß, 2004). There are also several challenges with the authorities' desire to increase efficiency and save money. In addition to the risk of leaving people behind, reality is that people in general have a negative attitude towards changes (Bovey and Hede, 2001). To measure if a change is successfully completed, economical gain has been a common metric (Brenes et al., 2008). However, research has shown an indication for using

the involved participants' experiences of the transformation as a suitable metric for measuring success (Tvedt et al., 2009). This is likely to increase economical gain in the end. Paraphrasing Hartson and Pyla (2012): a more cheaply developed product does not necessarily imply larger profit margins in the end. To understand all aspects of the inhabitants' experiences of digitalization, it is important to include users in the development of new web services (Sanders, 2003). This is rarely done today (Svanæs and Gulliksen, 2008). It is also necessary to evaluate the cost and consequences when not including the users.

It turns out the digital services offered by the public authorities are challenging to use. This makes the transition to the digital world more difficult. This hurdle has economical consequences. If a large portion of users end up needing additional services, follow-up, and technical help, the cost might outgrow the gain. Naturally there is also the cost associated with each user as they are left behind, not being able to participate in the services provided in the new digitalized world. Thus, it is important to make the systems work for as many users as possible. This means the web services have to be better than they are today.

To be able to make user friendly systems, it is important to understand the needs of the users. This is most effective without many intermediaries and should be done early in the process (Courage and Baxter, 2005). Co-creation turns out to be a good solution (Sanders and Stappers, 2008). When involving the users directly in the design process together with the designers, the end product will become better (Sanders, 2003). When the users are making design suggestion themselves, more relevant ideas are brought on the table which gives the designers access to the users' unspoken ideas and feelings (Sanders, 2003). The ideas appearing are experience based (Sanders, 2003). The users relate their needs on how they prefer to use the system, which is important to take into account to ensure the system will actually be used when it is finished. The more complex the systems gets, the more important direct involvement becomes (Sanders and Stappers, 2008). Previous research indicates a positive effect of using co-creation in making more user friendly systems (Steen et al., 2011). It could also be interesting to include the theory of Norman and Draper (1986) to use co-creation to help bridge the users' mental model and the conceptual model of the system.

When developing digital services, the conceptual model for the system is developed before the implementation of the system (Johnson and Henderson, 2002). Without enough insight in the users' needs, there is a large chance the conceptual model does not match the users' understanding of the system. In other words, the mental model differs (Norman and Draper, 1986). The user's mental model is developing when the user gets to know the system (Norman and Draper, 1986). However, if the system is close to the user's mental model from the beginning, less adjustments are required both for the mental model of the user and adjustments of the user interface of the system, subsequently.

This gap is likely to be decreased with the use of direct involvement where the users co-design the conceptual model together with the designers. Structural changes when the system is being developed is less cost-effective than doing the changes before the system is developed (Nielsen, 2003; Stappers, 2006). It will be necessary to investigate how the development process of the web-based public service is performed today to be able to say something about necessary further steps.

The number of older adults has increased over the past years, and is expected to grow over the next decades. It is expected that compared to 2015, the amount of people aged 60 and above will be more than doubled by 2050 (United Nations, 2015). The use of the internet and computer-based systems has evolved proportionally with this growth, and has led to older adults having less experience than the emerging future generations. Older adults are a group of people that are easily left behind in the digitalization due to a lower level of general digital competence, a lower ability to learn new things, and lack of motivation (Rønning and Sølvberg, 2017; Knudsen, 2018; Statistics Norway, 2017). It is a huge difference between being intrinsically or extrinsically motivated (Ryan and Deci, 2000). The intrinsic motivation gives a higher quality of the learning and performance due to the motivation arising from the person's desires. Extrinsic motivation may be influenced by a feeling of being forced to take action, and this negatively affects performance (Deci and Ryan, 1985). It is thus a great advantage to be intrinsically motivated.

In today's society, almost everyone uses digital tools every day in school or at work. This provides regular practice. Also, help from colleagues, fellow students, or IT support is in most cases readily available given the need. Retirees are less likely to use digial tools as often (thus practice is irregular or even nonexistent), and rarely have the same means of support. Research shows older adults wish for more follow-up during ICT training (Helsedirektoratet, 2018). This is also something the research team discovered through communication over SeniorNet and, anecdotally, through own experiences with family members.

To ensure social inclusion and prevent future economical backlash, it is important to include older adults as much as possible in the development process. If people with low levels of digital skills are included in the design and improvement of digital services, the quality will also increase for the rest of the population (Fisk et al., 2004).

It is clear that older adults have to become digital in order to cope with the development of today's society. It is frequently studied how to best include this group in the evolvement of the digitalization (e.g.: Hornnes et al. (2014); DAMVAD (2015); Damodaran et al. (2014); Helsedirektoratet (2018); Rønning and Sølvberg (2017)). To understand the situation, it is necessary

to understand their view of the situation, what seems most challenging to them, and pinpoint why it is difficult to use the digital systems. It is known that co-creation has a positive effect when designing for users, but how is it to include older adults directly in the design process? Will this make it easier for them to participate in the digital evolution?

1.2. Scope

This exploratory case study focuses on older retired adults in the age range 67-89 years old and their experiences and involvement in the development and use of web-based public service in Trondheim, Norway. The target group is older adults who are members of SeniorNet Trondheim or seek help from the learning center at the public library in Trondheim. Each member in the target group wants to learn more about using online services. All of them are able to use a computer or a tablet to check e-mails and go online to different extents, but struggle in using online public services.
To understand the user group and the situation, the case study also contain a review of related literature and interviews with other stakeholders; the learning center at Trondheim public library, board members of SeniorNet Trondheim, Ministry of Local Government and Regional Development, Trøndelag county library, experts in the field of digitalization and older adults and developers and designers of public web services.
The web services focused on in this case are digipost.no, helsenorge.no, nav.no, altinn.no and online banking. The first two are further studied and digipost has ended up as the main case in this project.

1.3. Research Questions

This master's thesis will, through a case study, focus on how direct inclusion of older adults in an early stage of the development process will affect their experience of using the web-based public service. The aim with this research was to understand how early and direct involvement of users is practiced today, and how lack of involvement can affect the cost of digitalizing public services. Another goal was to examine older adults' experiences in the use of public digital services, and their support network.

The following research questions were defined to include the objectives for the study:

- 1) What are the costs related to the digitalization of web-based public services?
- 2) How do older adults experience the use of web-based public services today?
- 3) How are older adults involved in the development of web-based public services in Norway today?
- 4) What role does co-creation play in the development of web-based public services?

1.4. Contributions

The contributions resulting from this thesis are listed below.

Contributions to theory:

- An exploratory case study
  - Older adults' experiences and observed use of web-based public services
  - Studying older adults during a learning situation
  - Including perspectives from different stakeholders
  - Investigation of the development process of public web systems today
  - Combining several methods: interviews, observations, questionnaires, co-design and usability testing
- Combining the theories of conceptual- and mental models, together with the theory of co-creation in the context of the public web services

Contributions to practise:

- Investigation of the cost of not including the users early and directly in the development process
- An example of direct involvement through a co-design workshop and the resulting contribution
- A list of recommendations when designing for older adults
- A list of recommendations for the design process
- The benefits for the authorities and the individual user when including the users directly in the development process

1.5. Outline

The thesis is organized as follows:

- **Chapter 1** - Introduction: Introduce the case, the area of concern and motivation for the study, and present the research questions.
- **Chapter 2** - Background: Introduce central concepts and present related literature.
- **Chapter 3** - Methods: Describe the research methodology used when planning and conducting the research. This chapter also contains the framing and the case study design.
- **Chapter 4** - Case: Contains a description of the web services studied and the stakeholders involved in the research.
- **Chapter 5** - Findings: Presents the findings from the study through data collection and analysis.
- **Chapter 6** - Discussion: Contains a discussion of the results and the contributions to the research questions. It also contains a discussion about limitations and recommendations for future work.
- **Chapter 7** - Conclusions: Summarize the value of the study.

2. Background

This chapter presents relevant literature for the case study. This includes literature about co-creation, conceptual- and mental models, motivation, and also literature regarding older adults in the digitalization and how to design for older adults.

Web services developed today are considered as more complex than before, and the designers therefore need to capture all aspects of the users in order to deliver usable systems. A User-centered design approach identifies only the observable and explicit knowledge, whereas with participatory design the tacit knowledge can also be explored. This is further evaluated in section 2.1. In the context of participatory design, it is important to notice that the connection of the conceptual- and mental models play a prominent role in which the systems become intuitive or not. The theory of conceptual- and mental models is presented in section 2.2.

Considering the older adults and their use of web services, there are many factors affecting their involvement in the digitalization, like the digital division, physical barriers, the design, demographics, attitude, self-efficiency and the motivation, as seen in section 2.3. The last mentioned factor involves the intrinsic and extrinsic motivation which has effect on the performance, willingness and the learning outcome of a task. All these factors will be further specified in section 2.4.

2.1. From User-centered Design to Co-creation

Design processes are continuously in change. In the last few decades there has been a shift from a User-centered design approach to a participatory design approach. According to Sanders and Stappers (2008), these two approaches are considered as two different areas within the landscape of Human-Computer Interaction (HCI).

User-centered design (UCD) is an approach which emerged around 1970s and 1990s by Donald A. Norman and Stephen W. Draper. They announced the importance of having focus on the users and the usability of the user interface of the system, as many of the systems at that time consisted of long and difficult user manuals on how to make use of the systems (Norman and Draper, 1986). In the articles from Sanders (2003) and Sanders and Stappers (2008), UCD is said to focus on designing **for** users. According to Mahr et al. (2014), users are considered as

important sources to first-hand knowledge of needs when designing a system. With usability tests they were able to address whether the system was usable for the intended user group.

In UCD, the users are only in dialogue with the researcher who ensure that their needs are met. Designers and researchers often work independently. The researchers make analysis and reports from qualitative research of the users, and the designers develop prototypes through the findings in the reports (Sanders and Stappers, 2008). This process is visualized in Figure 2.1 as the "classical" part.

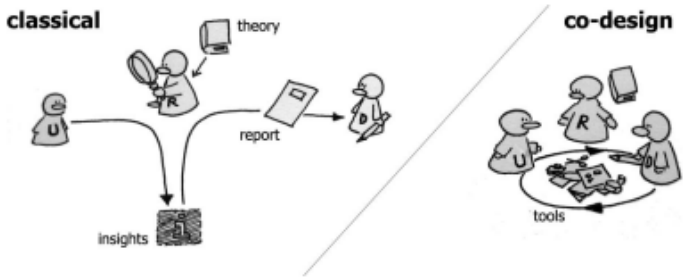


Figure 2.1.: Classical user-centered design vs. co-design (Sanders and Stappers, 2008)

User-centered design (UCD) is proven to be effective when designing concrete products to consumers (Sanders, 1992). Today, systems are more complex than earlier, as they are developed to capture future experiences for the users to take part in, rather than concrete products (Sanders and Stappers, 2008). This requires more knowledge about the user group and context, and considerations around the purpose of designing a system needs to be addressed earlier in the design phase (Sanders and Stappers, 2008).

To be fully aware of the users mindset, it is not only the explicit knowledge; hearing what the users say, do or use, that is important (Sanders, 1992; Cain, 1998). The tacit knowledge, involving how they feel, know and dream for the future design, is also an important aspect as the designer can empathize more with the user (Polanyi, 2009). Participatory design can be an approach to gain insight in the tacit knowledge (Sanders, 2003).

Participatory design (PD) is an approach dated back to 1970s and originated in Scandinavia, but has in recent years become more prominent in the field of interaction design (Ehn, 1988; Spinuzzi, 2005; Sanders and Stappers, 2008). Pelle Ehn was one of the pioneers within the research area of PD. PD focuses on designing **with** the users, whereas future users of a system are part of the design process. PD can be used to bridge the users tacit knowledge with the researchers abstract knowledge (Spinuzzi, 2005). PD aims to move from being in dialogue with the users, like in UCD, to involving the stakeholders of a product directly in the design

process (Ehn, 1988).

Co-creation and co-design are two terms often used within PD. Sanders and Stappers (2008) refer to these terms as growing in the field. Co-creation is a broad term that refers to any collaborative creativity, involving collective creativity between two or more people (Sanders and Stappers, 2008). Sanders and Stappers (2008) further state that co-design is an instance of co-creation and involves: The collective creativity of collaborating designers and untrained participants in a development process (Sanders and Stappers, 2008). As to their similarities, this thesis refers to co-creation as the entire process of direct involving the different stakeholders and users and to co-designing, whereas co-design is referred to a specific co-design workshop with untrained users.

The early phase of the co-design process is called fuzzy front end or pre-design, as seen in Figure 2.2. Sanders and Stappers (2008) refer to this phase as chaotic, many different activities to consider and simply ambiguity. This phase is considered as critical for designers and researchers to obtain information from the users, in order to proceed with ideas that reflects the users requirements. In Stappers (2006), different measures on how to tackle the chaotic situation in pre-design are reported. Stappers states:

> "These developments imply that designers need more knowledge and skills about more subjects; that they need to consult more people and collaborate with more people; that they need to try out things and make necessary mistakes as early as possible, where recovery is still affordable" (Stappers, 2006).

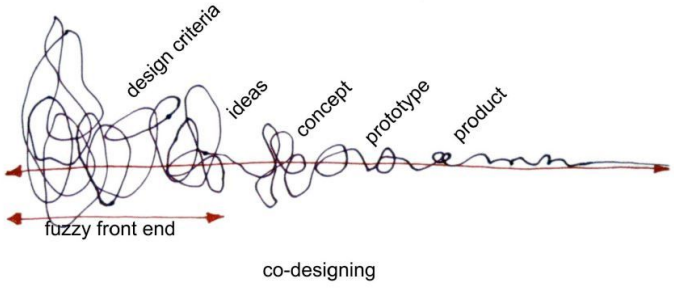


Figure 2.2.: The process of co-designing (Sanders and Stappers, 2008)

In PD the users are considered as a part of the design team and they get the ability to use their creativity to make their own solutions (Clement, 1996). This contrasts with the UCD approach where the users can influence the design through dialogue with a researcher. An illustration of the difference between UCD and PD is visualized in Figure 2.1.

The designers in PD take the role as facilitators in addition to being co-designers. The facilitating role involves in providing the users with the proper tools and mindset in the design

process (Sanders and Stappers, 2008). Everyone can be part of a co-design team, because when having different perspective, collaborating increases the creativity, innovation (Trischler et al., 2017; Steen et al., 2011; Somech and Drach-Zahavy, 2013), and can provide higher quality of the service (Steen et al., 2011).

Steen et al. (2011) also reflect on the longer-term effects when using co-design. Increased satisfaction, loyalty and better relation between the users and the service providers are stated as the most beneficial effects. It should be clear that a successful design needs to be measured by the satisfaction of the users, as this tells us if the system will be used or not. As Nielsen (2003) stated: "project cost is measured in money, and usability is measured in increased use, more efficient use, or higher user satisfaction".

In relation to co-creation, the terms conceptual-and mental models are relevant. Co-creation could help bridge the gap between the conceptual model and the user's mental model by bringing the user and the designers together in the design process. Conceptual and mental models will be presented in the next section.

2.2. Conceptual Models and Mental Models

According to Norman and Draper (1986), every system could be described using three models; The developer or designer's model, the user's model and the actual system. The designer's conceptual model is called the design model, the user's model refers to the user's mental model, and how the system actual is, is called the system image. The connections between the different models is visualized in Figure 2.3.

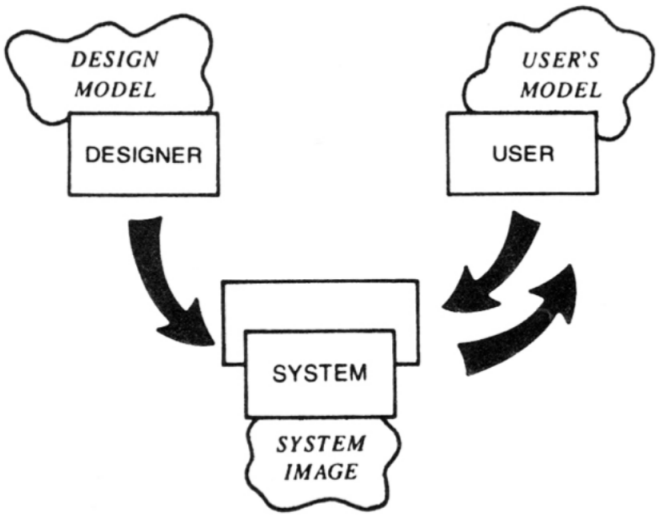


Figure 2.3.: The designer's model, the user's model and the system image (Norman and Draper, 1986)

The designers of a system have their own idea of how the system should be, called the design model. This is the conceptual model of the product. This is how the designer intend the system to be (Norman, 2013). This model is communicated to the user through the interface they could interact with, which is the system image. The user interacts with this system image and then creates a user's model, called mental model, of how the system works. The user's mental model is developed while the users learn to use the system.

A conceptual model is a high-level, simplified explanation of description of how a system work (Johnson and Henderson, 2002). This is often referred to as the designer's model and include both structural and functional aspects of the system (Stone et al., 2005). The conceptual model is based on the designer's understanding of the area, technology and environment. The designer need to know the users needs according to know which requirement to include in their model.

Mental models are models in people's minds of how they think things work, formed through experiences, instructions and training. These models help us understand the world. People often have different mental models of the same thing (Norman, 2013). The same person could even have different mental models of different operations of the same item. It could even be a conflict between this single person's models (Norman, 2013). The mental model is developed while interacting with the system. When the user learns how to operate the system, the user's mental model will hopefully approximate the designer's conceptual model (Matz, 2013). As Carey (1986) defines it:

> "A mental model represents a person's thought process for how something works (...) They help shape actions and behavior, influence what people pay attention to in complicated situations, and define how people approach and solve problems" (Carey, 1986).

The system image is the actual product or system (Stone et al., 2005). It could also be supporting documents, training, etc. (Stone et al., 2005). The system image present the functionality to the user. This should communicate the conceptual model from the designer so that the user could create a accurate mental model.

The designer expect the user to have the same model as them, but this is often not the case. When using a system, the user can not talk to the designers, so they have to use the information they have available to understand the system. It is the designer's responsibility to communicate the information in a way that makes the product understandable and usable for the user (Norman, 2013). The designer's role is to develop the conceptual model in a way that makes it easy for the user to develop a mental model that match those models as best as possible (Matz, 2013).

A good conceptual model is most important when things goes wrong (Norman, 2013). When the system image is not communicating the way it works, due to bad conceptual models from the designer, the user end up with a wrong mental model. This leads the user to try to operate the system in a way that the designer did not intend, which leads to errors and confusion for the user (Norman, 2013). As Norman (2013) said:

> "Good conceptual models are the key to understandable, enjoyable products: good communication is the key to good conceptual models" (Norman, 2013).

Before starting to implement the system, or even design it, you should start by designing the conceptual model for the system (Johnson and Henderson, 2002). This modelling is an essential activity when designing information systems (Peugeot, 1995). The conceptual model uses metaphors, concepts, relationships and mapping which helps the designers to connect the system to things that are already known by the users.

Which aspects that are already known by the user depends from person to person. Therefore it is important to know the users while designing conceptual models (Sanders, 2003). The best way to make sure the user know the aspects of the conceptual model and make sure the conceptual model match the mental model of the user's, is to include the users in the development of the conceptual models.

2.3. Digital Divide in the Use of Public Digital Services

In February 2014 the strategy referred to as "digital by default" was introduced by the public sector in Norway. This involves that digital communication should be the source of correspondence between the public sector and the Norwegian citizens. This strategy was carried out to decrease financial expenses, environmental benefits, to give users independence of time and place, and to move towards a more efficient society in general (Hornnes et al., 2014). The establishment also leads to an emerging self-service (Rieder and Voß, 2010) in ICT systems. People are more involved in creating value to themselves, other customers and to the service, as often referred to the term working customer (Rieder and Voß, 2010). Resources earlier used on providing value to the customer can be spent more efficient, and the customer becomes more self-efficient as they no longer are dependent on a service provider. The problem with the working customers is that some customers may not have the needed skills (Dunkel and Voß, 2004).

Many user groups find it difficult to interact through a web service, as in the study by Slettemeås (2014), it was estimated in 2013 that one million citizens in Norway had difficulties with using digital systems. Over 400 000 of these consisted of older adults who felt left out due to the digital everyday life (Statistics Norway, 2018; Knudsen, 2018). Today, many public enterprises

focus on targeting 80 percent of the citizens, and the remaining 20 percent that are not managing the systems gets other alternatives (Hornnes et al., 2014). These alternatives often require financial expenses and are more time consuming.

The increased digitalization of the public sector causes a digital divide between the once managing the use of digital services and those who are not (Friemel, 2016). The research by Friemel (2016) also talks about different levels of digital divide. "First-level" digital divide refers to the access gap, which involves not having the necessary equipment available, like a computer or Internet (Dutton and Blank, 2014; Friemel, 2016; Philip et al., 2017). The "second-level" of digital divide involves not having the needed skills and control (Friemel, 2016). Friemel (2016) also refers to a third level, called the "grey divide", which means that the feeling of being excluded depends on their degree of computer usage in a working situation before they retired (Kania-Lundholm and Torres, 2017; Friemel, 2016). Examples of these different levels are presented in Table 2.1.

Table 2.1.: Levels of digital divide

Levels of Digital Divide	**Example**
First-level	If people do not have the necessary equipment to manage the use of ICT. For instance if they do not have a computer or do not have access to Internet, they will naturally not be able to take part in the digital society.
Second-level	If the users do not have the sufficient skills to manage the use of ICT. For instance when people do not know how to retrieve information from a web service or to use a computer in general.
Grey-divide	If the prior education or working situation involved working with ICT, it will be beneficial and reduce the digital division. As example if people have worked as crafters they have worked less with ICT than office workers.

The Norwegian society is experiencing an increased number of older adults. The number of people over 67 years is expected to double by 2060 (Slettemeås, 2014), which is why this age group is a focus in the thesis. According to both Hornnes et al. (2014); Rønning and Sølvberg (2017), the older adults experience diverse challenges with the use of ICT. To be able to fully participate in society, people are now dependent on managing the use of a computer (Rønning and Sølvberg, 2017). The democratic rights to participate in society becomes restricted to their level of digital competency (Hornnes et al., 2014). Often the older adults blame themselves (Nielsen, 2013). This shows the importance of including the older adults to participate in the digitalization of web-based public service (Hornnes et al., 2014).

In the research done by Difi in 2014, it was found that older adults wish to take part in the digital everyday life, but in order to do so they are dependent on getting help. As the collaboration and information sharing between two people on web services today often happens asynchronous. There are no restrictions of people being online at the same time, which can make it more difficult to get needed help. Many older adults mainly rely on their family or friends for help and assistance (Slettemeås, 2014; Hornnes et al., 2014; Procter et al., 2014).

Digidel is a project from the Ministry of Local Government and Modernization where the focus is to raise the competence of how to teach ICT competence in the municipal sector in Norway to help them teach the older generation and others who feel left behind in the development process (DAMVAD, 2015). The DAMVAD (2015) report lists actions which can help raising the digital competence among the inhabitants. Among others, one aspect listed is that new and simplified versions of existing digital services should target the entire population. However, it is not mentioned how these systems should be implemented to make sure they are simplified and that they target the entire population (DAMVAD, 2015).

The research by Vassli and Farshchian (2017) involving ICT among older adults shows that fear of the unknown, violation of privacy, trust, memory and cognitive abilities and interaction design are considered as barriers of acceptance for the older adults. According to Demiris et al. (2004), many web interfaces are not designed with considerations to functional limitations that comes with age, like poor eyesight, motor skill diminishment and cognitive declines like memory (Hornnes et al., 2014; Arch and Andrew, 2010; Nilsson, 2003). The physical capability in general will decrease with age, and they will have more trouble by operating systems (Kose, 1998).

To account for the different barriers and challenges, adjustments to the design is considered as one measurement (Vassli and Farshchian, 2017; Patsoule and Koutsabasis, 2014; Ellis and Kurniawan, 2000). In the research done by de Almeida et al. (2015); Fidgeon (2006); Nielsen (2013), specified recommendations of how to design for older adults were reported. It was found that the clickable areas and fonts in the web service should be large to increase the clickability for those who tremble, and to provide better readability for those with poor eyesight (de Almeida et al., 2015; Fidgeon, 2006; Nielsen, 2013). The space between elements on the interface contributes to raise the overall understanding of the web service, whereas de Almeida et al. (2015) specified this space to be a minimum of 44 pixels. The terminology of the written information should be understandable for all users, avoiding the use of technological language, professional terms, and rather use easy and educational language (Fidgeon, 2006; de Almeida et al., 2015; Chadwick-Dias et al., 2003). The icons visualized on the interface should be presented along with descriptive text (de Almeida et al., 2015). It is also important that the web service structure the content clearly and simplified, by avoiding the display of secondary functions (de Almeida

et al., 2015; Fidgeon, 2006). Pop-ups and error messages should be positioned in the middle of the screen as it makes it easier for the older adults to identify them (de Almeida et al., 2015; Chadwick-Dias et al., 2003). Information visualized in the edges of the screen or outside the current vision, will limit the older adults total overview of the page (Chadwick-Dias et al., 2003). Return function should be available in all pages of the web service (de Almeida et al., 2015). Colours with contrast should be available in all pages as many older adults suffer from poor eyesight (de Almeida et al., 2015). de Almeida et al. (2015); Fidgeon (2006) also state the importance of providing features for tips and help.

Some of these recommendations refer to the principles in the universal design standard. The goal of universal design is to design usable products and environments for everyone, regardless of age and abilities to the greatest possible extent (Keates et al., 2012). In Norway, the government have decided that all web services, both private and public, should be universal designed by the beginning of 2021. All new ICT solutions that are developed after July 1, 2014, should be designed within the standards of universal design (Agency for Public Management and eGovernment, 2018). Designing for older adults and disabled will increase the usability for them and still maintain the usability for the younger generation and experienced users (Johnson and Kent, 2007; Fisk et al., 2004).

There are multiple reasons why ICT are challenging and not used by many people in the older generations (Friemel, 2016). One factor is the demographics, which involves people's education, job, age, gender and disabilities (Peacock and Künemund, 2007; Selwyn et al., 2003). If the older adults frequently used ICT in their education or job it will be beneficial later in life. The prior knowledge from education or job also affects the level of "grey-divide" in society (Friemel, 2016). Disabilities affects the involvement as many experience physical challenges with the use of computer systems. The technology should facilitate usability regardless of any disability, age or gender.

There are also individual factors regarding their eager to take part in ICT, involving interest and motivation (Damodaran et al., 2014; Rønning and Sølvberg, 2017), in addition to their individual attitude to the digitalization (Macedo, 2017). It is important to make sure that the older adults have confidence in the use of technology and that they still can maintain their independence (Hernández-Encuentra et al., 2009). The engagement in the use of the ICT is also important. The technology offers them to be more self-efficient, as people are able to complete tasks online. This can be a challenge for many older adults as they are not familiar with this type of interaction (Rønning and Sølvberg, 2017; Damodaran et al., 2014).

Also, the intrinsic and extrinsic motivations are factors that are crucial as they influence the older adults way of coping with their digital life and ability to gain new competencies (Rønning

and Sølvberg, 2017). As Damodaran et al. (2014) discovered, the intrinsic motivation can be a factor to overcome these challenges. This will be further evaluated in the next section.

2.4. Intrinsic and Extrinsic Motivation

The term motivation relates to people *being moved* to do something, as stated in (Ryan and Deci, 2000). Their willingness, interest and desire plays an important role. In Deci and Ryan (1985) Self-Determination Theory describes two prominent phenomena of motivation: intrinsic and extrinsic.

Intrinsic motivation relates to the individual genuine interest and willingness of doing a task for the inherent satisfaction by doing it (Ryan and Deci, 2000). Ryan and Stiller (1991) define intrinsic motivation as follows: "a natural wellspring of learning and achievement that can be systematically catalyzed or undermined by parent and teacher practices".

Extrinsic motivation refers to the willingness to do a task in order to attain an instrumental value (Ryan and Deci, 2000). External pressure and anxiety can be a driving force to be willing to do a task (Ryan and Deci, 2000; Rønning and Sølvberg, 2017). Having extrinsic motivation can affect the performance negatively. It differs from intrinsic motivation, where the people's willingness comes from motivation "within" and because the task itself is enjoyable. Three important aspects affecting the extrinsic motivation are the internalization, integration and identification. The internalization refers to the individual adoption of the valuable outcome of a task, the integration involves that people integrate the importance of the task with its value of doing it. Lastly, the identification means that the person has obtained personal interest in the task (Ryan and Deci, 2000).

Intrinsic motivation gives a more efficient learning as people have the willingness to perform the task, rather than doing an effort to complete the task based on extrinsic motivation (Rønning and Sølvberg, 2017).

3. Methods

This chapter presents the framing of the study and the choice of research strategy. It also contains how the research was performed, what data generations methods that were used and the how the data was analyzed.

3.1. Conceptual Framework

To create the conceptual framework for the research, a review of related research from the literature was conducted. See Section 3.3 for more information. The framing of the project was developed throughout the process due to the exploratory approach. The final framing is shown in Figure 3.1.

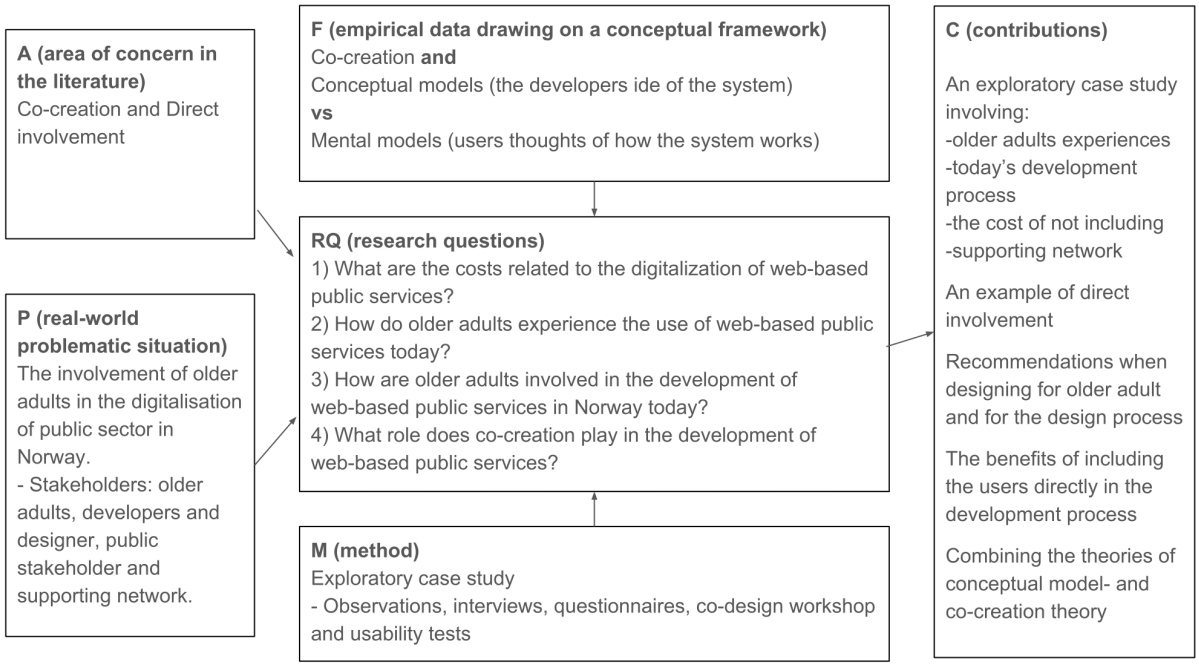


Figure 3.1.: The conceptual framework for this research

The framing was designed using the framework developed by Mathiassen (2017). This framework was chosen to keep a focus on the research's contribution through the entire process. The research questions (RQ) should be based on real-world problematic situation (P) and related area of concern from the literature (A). Drawing on the framing (F) and the method (M) the

data is collected and analyzed. All this lead to a contribution (C). The contribution could be to both A, P F and M. This research aimed to contribute to P and F.

Through the research process different framings were considered. I Both having affordance or awareness was considered as alternate framings. The two considered framings are visualized in Appendix C. The framing with co-creation and conceptual- and mental models have also evolved over time to fit the research. This was optimized through the analyses of the data and new insight. Earlier research has found an effect using co-creation (e.g. Steen et al. (2011)). However, the research team did not find any research done which investigate the link between co-creation and conceptual- and mental models. This indicated that it may be interesting to do research with this framing to hopefully find new contributions.

The strategy chosen for the research process was an exploratory case study. This is further described and argued in the next section.

3.2. Research Strategy

The exploratory case study approach described by Yin (2003) was used in the beginning of this research. This aims to empirically investigate a real-world context, and it is especially suitable when looking at a phenomenon in depth. According to Yin (2003), there are three types of case studies; explanatory, descriptive and exploratory. Exploratory case studies are normally used to understand a research problem where there is little literature on the topic. Descriptive case studies are in depth analyses of a phenomenon and its context. Explanatory case studies aim to explain why something happens. The exploratory approach was chosen as the researchers want to get to know the problem area, target group and illuminate all aspects of the problem area. The aim was to understand the situation of older adults in the digitalization of public sector, and their use of web-based public service in depth with an inductive approach. The goal was to get a comprehensive understanding in order to have a basis to find the contribution. The research team did not find other research investigating the older adults in the actual use of public services, and the exploratory approach has been described as especially suitable when here is little previous research on the topic. Throughout the research process, when the insight and understanding of the problem area increased, the researchers wanted to use theory to explain why things happening. Thus, research strategy changed to a more explanatory approach.

A case study was chosen in favor of other strategies as it was considered the most appropriate for the aim of the research. The study aimed to find causes, develop new explanations and further develop theories. Case studies and ethnography have been suggested as appropriate strategies for such research (Oates, 2005). When using an ethnographic approach, the researchers try to

blend into the life of the studied group over time. This was not suitable for a master thesis. The research strategies of survey, action research, experiment were not suitable, as these strategies aims to confirm earlier developed theories. Design and creation (Oates, 2005) was also ruled out, as the research team did not aim to develop new IT products or artifacts.

An inductive approach was chosen to be able to see what theory that emerged through analyses for the field work, and try to put pre-assumptions aside (Langdridge, 2006). This helped the research team to be open minded and able to discover new input without being too focuses on prior findings. The research team analyzed the first findings to find out the next necessary step in order to get a better understanding of the problem area. This helped finding whats support what already found as well as finding new explanations which could strengthen the study. It was also desired to illuminate the case from different angles and include different stakeholders. The aim was to find out just enough about something before heading to the next, and then go back if more investigation turns out to be necessary. The data collection and data analysis were done iteratively as visualized in Figure 3.2. This is a normal approach in case studies (Klein and Myers, 1999).

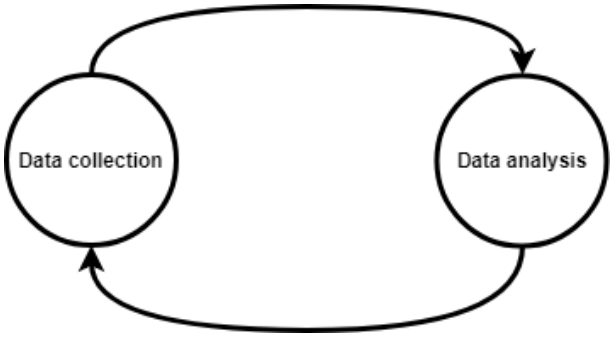


Figure 3.2.: Data collection and data analysis process

To get a better understanding and a more comprehensive case study, several data generation methods were included. They were conducted in parallel when the research team found it necessary. Several times new questions came up after more insight and analyses. Then the research team were doing another round of data collection from the necessary resource.

3.3. Literature Review

The literature review was conducted to get an overview of previous research done in the field, in order to find gaps where further research is needed. It was also done to get a better understanding of the problem area and make sure the research was already done in advance. This also helped framing the research. The areas of concern were co-creation and direct involvement, the digitalization of public sector and older adults related to this, designing for older adults, conceptual and mental models, awareness, affordance, service dominant logic, working customer,

gamification and empowerment. The literature studied on all this topics have been influencing the case study, the researcher's insight and the focus in the latest stage of the research.

Google Scholar and the database Scopus were the main resources to find relevant academic articles. The keywords used in the search were among others: "digitalization and older adults", "ICT and older adults", "design of user interface and older adults", "co-creation with older adults" and "digital divide". When searching for older people, synonyms like "seniors", "elderly", "older adults" were used. In addition, keywords from the theory of information systems, like "co-creation", "co-design", "user-centered design", "participatory design", "universal design", "conceptual models", "mental models", "awareness" and "affordance" were included in the search. Combinations and connections in the literature were also looked for, like a connection between conceptual- and mental models and co-creation.

To make sure the literature review was reliable, the research team were looking for how many citations the articles had, and who were the authors responsible for the publication. The researchers also received reliable articles from the supervisor and other experts in the field, as well as further looking at bibliography used in those articles to find new reliable articles.

3.4. Data Generation Methods

Seven data generation methods were conducted in order to answer the research questions: 1) Study of documents, like web services 2) Observation of the target group, 3) Interviews with target group and stakeholders, 4) Questionnaires 5) Co-design workshop with target group, 6) Prototyping and 7) Usability tests. All the data generation methods conducted have contributed to the co-creation carried out in this research. The data generation methods used is shown in Figure 3.3. The methods are further described in Table 3.1, Table 3.2 and Table 3.3 and the following sections.

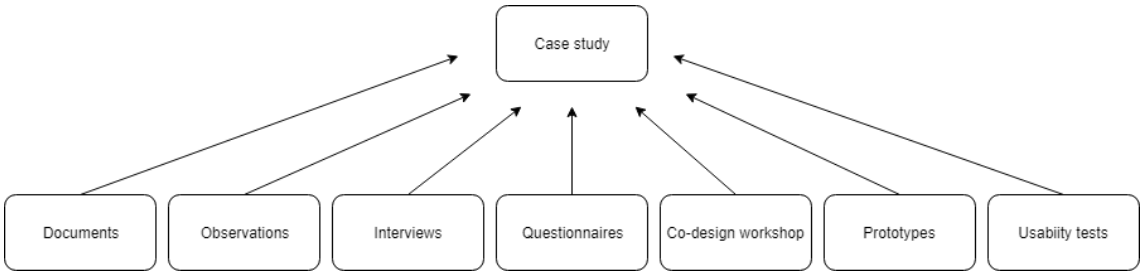


Figure 3.3.: Data generation methods used in the case study

The participants from the target group were recruited through SenriorNet and the learning center at Trondheim Public library. The recruiting were done by sending an email to the members asking for participants. The first respondents were included in the selection. More women than

men chose to attend the different activities. However, the research had male participants in all the conducted activities.

3.4.1. Documents

It is important to look for existing documents prior to initiating the research (Oates, 2005). The research team reviewed different articles news papers, white papers and websites to investigate the area of concern. Some of the relevant documents are mentioned in the introduction and background section of this thesis. The case study explored five web sites; digipost.no, helsenorge.no, altinn.no, nav.no and dnb.no. The cases are further described in Section 4.3. Two web sites; Helsenorge.no and digipost.no were further investigated. Later, digipost was used as main case of exploring the effect of co-design and co-creation during development of web services for older adults.

In addition, the research team analyzed the web services chosen in the case from a researcher's perspective, with basis in theory from previous literature of older adults. The analyses were done from an awareness perspective and an affordance perspective, since this was the two framings investigated at that stage. An example of the analyses is shown in Appendix B. The analysis was done to raise understanding of the support of awareness and affordance in web-based public service today and to get a better understanding of the web sites and possible problems from the beginning. This made it easier to understand the challenges the participants were facing when the research team observe, even though other problematic aspects were seen through the observation of the target group.

Table 3.1.: Data generation methods: observations

Data generation methods	**Description**
Observations	Observations were done on the target group to explore their habits, challenges and experience with the use of web services and their attitudes towards the digitalization. In addition to the observations listed below, the interviews with the target group were divided into two parts, one interview about their experiences and one where the researchers observe the attendees use of a digital public systems.
SeniorNet: Computer café	SeniorNet Trondheim offer data cafés where older adults could come to get one-to-one help with their digital problem.
Gulhuset	Six participants. The attendees brought their problems and got one-to-one help to solve them. Four hours, no recordings.
Hornemansgården	Six participants. The attendees brought their problems and got one-to-one help to solve them. Two hours, no recordings.
Courses	The courses were used to observe the participation and address their use and challenges.
Trondheim Public Library: Cloud services	Five participants. The lecturer present the topic and let the attendees ask questions. Two hours, no recordings.
SeniorNet: Public digital services	Eighteen participants. The lecturer present the topic and let the attendees ask questions and discuss the topic. Two hours, no recordings.
Trondheim Public Library: Public digital services	Seven participants. The lecturer present the topic and let the attendees ask questions. Two hours, no recordings.
Research team: Helsenorge	Eleven participants. The attendees were solving exercises related to the web site helsenorge.no while the research team observe. Discussion of experiences and challenges afterwards. Two hours, audio recording of group discussions, some experiences through the course and audio recording of the plenary discussion in the end of the session.
Research team: Digipost	Twenty participants. The attendees were solving exercises related to the web site digipost.no while the research team observe. Discussion of experiences and challenges afterwards. Two hours, audio recording of group discussions, some experiences through the course and audio recording of the plenary discussion in the end of the session.

Table 3.2.: Data generation methods: interviews

Data generation methods	**Description**
Interviews	Interviews were done to get a better understanding of the situation from the different stakeholders point of view.
Public stakeholders and supporting network	Stakeholders involved in the study.
Learning center at Trondheim public library	Semi structured interview with a representative from the service for older adults from Trondheim Public Library and Trondheim municipality. Multiple small sessions throughout the study lasting 15-30 minutes, without audio recordings.
Professors in the field of digitalization and older adults	Semi structured interview with two professors who had investigated older adults and digitalization through interview with old adults from SeniorNet Trondheim.
Trøndelag county library	Semi structured interview with a representative also responsible for Nationally selection for digital competency. One hour interview without recordings.
Ministry of Local Government and Modernization	Semi structured interview with a representative also responsible for Public Management and eGovernment (Difi). One hour interview with audio recording.
SeniorNet Trondheim	Unstructured interviews with board members of SeniorNet Trondheim. Multiple small sessions throughout the study lasting 15-30 minutes, without audio recordings.
Target group	
Person 1	Semi structured interview about digital experiences, observation by the research team in the use of NAV. Two hour session without recordings.
Person 2	Semi structured interview about digital experiences, observation by the research team in the use of Helsenorge. Two hours and ten minutes audio recordings.
Person 3	Semi structured interview about digital experiences, observation by the research team in the use of Digipost and Helsenorge. One and a half hours audio recordings.
Person 4	Semi structured interview about digital experiences, observation by the research team in the use of the tax system in Altinn. One hour and ten minutes audio recordings.
Person 5	Semi structured interview about digital experiences, observation by the research team in the use of Digipost and the tax system in Altinn. One hour and ten minutes of audio recordings.

Table 3.3.: Data generation methods: questionnaires, co-design, prototyping and usability tests

Data generation methods	**Description**
Interviews	Interviews were done to get a better understanding of the situation from the different stakeholders point of view.
Developers and interactions designers	
Digipost	Semi structured interview with the two interaction designers responsible for the design of digipost.no. One hour and ten minutes of audio recording.
Helsenorge	Semi structured interview with the head of design at The Norwegian Directorate of eHealth who are responsible for the design of helsenorge.no. Multiple short correspondences.
Norwegian Labour and Welfare Administration (NAV)	Unstructured interviews with developers and designers at NAV. Multiple short correspondences.
Skatteetaten/Altinn	Semi structured interview with the head of user experience. Multiple short correspondences.
DNB	Semi structured interview with two concept developers. Two interviews lasting one hour each without audio recording.
Questionnaires	Questionnaires were given to the attendees from the target group to make them express their experiences in written.
Course: Helsenorge	The participants were asked to answer a questionnaire with opened ended questions about their experiences with the system.
Course: Digipst	The participants were asked to answer a questionnaire with opened ended questions about their experiences with the system.
SUS	The participants were asked to answer a questionnaire with five response options on a Likert scale about their experiences with the system. This were used on both courses held by the research team, all interviews with the target group and after the usability testing.
Co-design workshop	Seven participants. The co-design workshop was divided into three sessions. One session the attendees divided into two groups were to define and prioritize functionalists of digipost, one session where the two groups were to design how digipost should look like, and the last session where the groups present their results for each other and gave feedback. Four hours, audio and video recording.
Prototyping	The research team made two prototypes, one based on the present design of digipost.no and the other based on the results form the co-design workshop with the target group.
Usability tests	Five participants tested both prototypes in different orders. Afterwards the participants were interviewed about their experiences with the systems. Ten minutes of usability test, ten minutes of talk about experiences and one SUS questionnaire for each test. The usability tests where audio recorded and eye tracked. The interview part were audio recorded.

3.4.2. Observations

Observations were performed to get the needed background of how the target group use of the web systems and to identify challenges encountered during usage. When people talk about their usages and their level of experience and challenges with the use of systems, it is likely that they are saying what they think the interviewer want to hear due to social desirability (Podsakoff et al., 2003). Through observation it will also be discovered other things than the participants reporting (Oates, 2005). This includes things they have not thought about themselves, or not noticed. Combined with the observation, the participants were also elaborating on their experiences. All the attendees were told why the researchers were present and the aim of the research before the session started. The observations were done in the users everyday environment, considered as a comfortable and familiar arena, which evoked honest and trustworthy observations. As the researchers were in a different age group than the target group and on a significant higher level of digital experience, it were impossible to blend in with the observed participants.

When conducting observations some factors are important to keep in mind to increase validity. Selective recall; where the mind remember some things, but forget other, and selective perception; where the mind notice some things and ignore others, and accentuate perception, where the mind is more sensitive to specific things due to previous experiences (Oates, 2005). When the researchers are aware of the source of errors it is easier to avoid them. Two observers also help decrease these biases, but they are still likely to affect the results. The research team aimed to observe each participator together, but due to limited resources, this was not always possible. The researchers aimed to write down quotes from the attendees when possible instead of only write their understanding in own words. After each session, the researchers reflected on their assumptions and what they took for granted, to try to avoid this affecting the data more than necessary. When the researchers obtained an increased understanding of the problem area, it was desired to observe different participants doing the same thing and combine these observations with the knowledge gained in interviews, to aim for triangulation of the data (Oates, 2005).

It has been important for the research team to keep a good cooperation with all involved stakeholders and everyone who have contributed to the research. SeniorNet and their members have been valuable cooperators. In return the research team have tried to give back by teaching the members in use of web services. All observation were done through a teaching situation, where the attendee learn from the session while the researchers were able to observe. Instead of telling the attendees what to do, the researchers invited the participants to try by themselves. When a participant got stuck, the researchers asked open ended questions to make the participant uncover the answer themselves. Only if the attendee was about to give up or do something which may cause an drastically error, the researchers were giving help to keep them back on track. The attendees were told about the teaching technique in advance. As the researcher took the role as

teachers, it was easier for the participants to forget the observation and interact like they normally do. This is closer to the participant-observer type of observation, where there researcher aim to be accepted, as this makes it easier to learn what they do and how they feel (Oates, 2005).

Figure 3.4 visualize one of the observation sessions that where located in one participant's home using digipost.no. The researchers were sitting on each side of the participant while observing the attendee in use of the digital service.

Figure 3.4.: Observation session where a participant is trying to use digipost.no

Courses

To be able to observe a larger selection of the target group interact and talk about web services, especially web-based public service, the research team attended three course held by the learning center at the library and SeniorNet Trondheim. In those sessions, the research team were attending as complete observes (Oates, 2005), and took notes from what they heard and observed.

To be able to observe the use of the public web services chosen in this case study in a larger scale, two courses were planned and conducted where members of SeniorNet where participating. The courses were conducted with the aim of large-scale exploration of the usability, experiences and challenges of helsenorge.no and digipost.no.

The research was in contact with Associate Professor Yngve Dahl at the Department of Computer Science at NTNU, to learn from his experiences with the structure the courses as observation sessions with older adults and to receive feedback on the planned program. The researchers made observation guides prior to the observation of this sessions. This made it easier to know

what to keep in focus and what was necessary to investigate throughout the sessions. Before the course started, the participants were informed about the research project and where asked to will out a consent paper. This is further described in Section 3.6.

The courses were performed in three parts. The first part was an introduction, where the research team presented the web-service with functions and possibilities. The older adults were divided into groups, where the aim was to lead the older adults to the proper mindset of digitalization. The researchers then provided post-its for each person, where they wrote one good and one bad experience with web services. Afterwards they shared what they had written with the rest of the group and the researchers. The main part of the course was an exercise session. The older adults tried to solve tasks from a task sheet made by the researchers, while the researchers did observations. The task sheets and the schedules is shown in Appendix F. The third part was to evaluate the web service and a summary. Finally, a plenum session where the researchers sum up the overall experiences of the system and the participants were able to correct the researchers to fits their experiences and add other experiences and opinions, was conducted.

At the helsenorge.no-course, the supervisor for the research team attended the course as a third observer. This made it easier to observe all the participants. Since the attendees were divided into three groups the observers observed one group each. At the digipost.no-course, the supervisor where not able to attend and the research team were not able to find alternative replacements. The attendees were divided into four groups, while the researchers walked back and forth between two groups each.

3.4.3. Interviews

The research team started the field work with conducting interviews with various stakeholders, in addition to interview and observe the target group. The interviews were an important method for generating through the entire data collection. Later in the process, developers and designers from the web services in the case study were interviewed as well.

Most interviews were semi-structured, which is a planned and flexible conversation aiming to obtain descriptions and understand experiences or phenomena (Kvale et al., 2009). The interview guides evolved throughout the study to seek new information. Some example of the interview guides are available in the Appendix E. Interview notes and quotes were collected during the sessions. Both of the researchers attended all the interviews, one researcher had the task of leading the interview sessions, with the responsibility of progress and asking questions, and the other researcher had the task of observing the interview session, with the aim of collecting notes and quotes. If given permission, the interviews were audio recorded. This made it easier to transcribe afterwards. Reflections after the interviews were also written down.

The most important stakeholders interviewed in this research, their role in the context and why they were include is described in Chapter 4. This include SeniorNet Trondheim, the Learning center at Trondheim Public Library, Experts in the Field of digitalization of older adults, Trøndelag County Library and the Ministry of Local Government and Modernization in Norway.

The research team have also been in contact with the Public Management and eGovernment (Difi) about the study and their experiences with older adults and other groups who have been left behind. The researchers have also been in contact with the voluntary organization Sjetne voluntary central. Sjetne has a project called "Effort for others" (Innsats for andre) where students at the secondary school helps older adults with ICT related problems. This project was not further prioritized as the scope of the case study.

It was interesting to explore how interaction designer and developers of these web services investigated work when designing and implementing these web services. The aim was to investigate the design processes and how they involve users, and older adults in particular. The findings were then connected to the actual user experiences found in the observation sessions.

Interview with Target Group

Interviews with the target groups were performed with the aim to get in-depth understanding of their experience with web services and to talk about the challenges occurring during the observation sessions. This helped the research combine what the participants were saying compared to what they were doing, which gave a better understanding.

Five older adults were recruited through the membership of SeniorNet in Trondheim. The participants decided where they wanted to conduct the interview, whereas some welcomed the research team to their homes, others wished to meet in a public area. They were asked to choose one or two of the focused web services as basis for the interview.

The interview consisted of two parts. The first part involved questions regarding the interviewees individual experiences about digitalization and the use of web services, whereas the other part was an observation session consisting of questions with regard to the chosen web service in specific and their corresponding experiences.

3.4.4. Questionnaires

The participants at the courses held by the research team were asked to answer a questionnaire in order to give anonymous feedback about their experiences with the use of the systems. Also, at each session where one of the targeted web services were used, the attendees were asked to answer a System Usability Scale (SUS) form. The SUS form was included to measure the level of usability of the system for the target group. The questionnaires is shown in Appendix G.

3.4.5. Co-design Workshop

The research team organized a co-design workshop with the target group. The aim was to let the older adults show their desires and needs through prototyping their preferred low-fidelity design of a web service. By letting the older adults co-design a prototype, they were able to express all the aspects of their needs, their thought process and logic (Sanders, 2003). This way, they are making a conceptual model for a new version of the service, which match their mental models.

When deciding the case for the co-design workshop, the research team was considering either helsenorge.no or digipost.no. Helsenorge.no is a broad service with many different features, while digipost.no is a concrete service with fewer features. Digipost was the web service with the least functional user interface through the SUS scheme completed by the target group in the courses about digipost.no and helsenorge.no, shown in Figure 3.5. Eventually, digipost.no was chosen as the case for the co-design workshop.

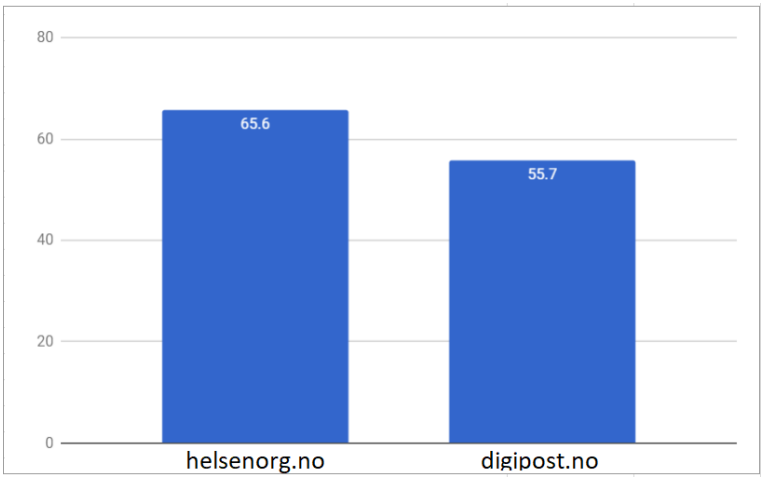


Figure 3.5.: SUS results of helsenorge.no and digipost.no

The researchers were in contact with Associate Professor Yngve Dahl to learn from his experiences with workshop with older adults and assistance regarding how to conduct and structure the workshop in the most efficient way. Notes from one of the meetings is shown in Appendix H.3. There are numerous methods to choose when designing a co-design workshop. To obtain more

insight in how to do a good co-design workshop and which methods that suited the aims for the session best, the research team studied various literature, such as: Dahl et al. (2014); Kanstrup et al. (2017); Hanington and Martin (2012); David and Edwin (2013).

Framing and Planning

The research team started with framing the workshop, as Yngve recommended (David and Edwin, 2013). This helped the research team fully understand what they wanted to investigate in the co-design workshop. The framing, plan and schedule and other related material is shown in Appendix H.1 and Appendix H.2. First a selection of people was made, by defining their personal characteristics and demography. Secondly, the goals were created where David and Edwin (2013) recommended to use the "5W's": "what", "which", "how", "when", "who", "where" and "why" to create a comprehensive list. Then, the research team developed three hypothesis targeting the problem areas with the use of the goals, and these hypothesis was further used as basis to find the proper methods. The activity objectives where identified by stating the goal of the activity, the hypothesis it would address and how this would help to fulfill the research objectives. The activity inputs were explored, involving who the users were, what information and knowledge the researcher bring into the activity and also which tools would be used. The research team investigated various methods used in different research to find the most suitable. Three methods were selected as these three reflected the hypotheses and goals: "Idea generation/brainstorming", "Bull's eye" and "Fill in the blanks" (Hanington and Martin, 2012). "Idea generation/brainstorming" was chosen to launch creativity among the participants and to see what they want to have in an end product. "Bull's eye" was chosen as the research team found it interesting to see which prioritization the older adults made with digipost.no and to help the attendees decide which features would be most important to them. Fill in the blanks was chosen as it could provide the older adults with low restrictions that hopefully could lead to creative designs.

All this contributed to the overall planning, and the next step for the researchers was to schedule the workshop. As learned from Yngve, it is crucial to have a strict plan for time slots, and stick to it throughout the entire workshop. Especially when working with older adults, as they might get tired and lose motivation if the workshop does not stick to the specified times.

Execution the workshop

Seven participants were recruited from SeniorNet. The session was performed at the user experience lab (UX-lab) at the Norwegian University of Science and Technology (NTNU). The workshop started with an introduction to the schedule, the aim of the session and how to collaborate when creating a design in cooperation to avoid misunderstandings between different stakeholders and parts of the production. The plan for the workshop is shown in Appendix H.2.

The participants were divided into two groups and allocated into different rooms. The rooms were organized with a video and audio recorder, along with all the necessary writing tools for the workshop. The attendees were also given design elements printed on paper if they got stuck in the sketching. One group used this offer. After the different workshop methods were conduct, all the participants attended a common session were the ideas and prototypes were presented for each other while the other group gave feedback. The co-design workshop could also be viewed as a group interview.

(a) Group A in action

(b) Co-design workshop presentation

Figure 3.6.: Co-design workshop

Appendix H.5 shows some of the notes from the retrospective after the co-design workshop.

3.4.6. Prototyping

With the results from the co-design workshop and all the insight earlier in the study as basis, the research team developed two prototypes using Axure. One of the prototypes were a copy of digipost today, whereas the other was developed with the findings from the co-creation with the older adults. The reason for making a prototype for the existing web service was to have the possibility to compare the two prototypes at the same level for the target group. The prototypes were only functional prototypes without the possibility to store input data. It was a potential risk that the participants would have more trouble comparing a simple prototype with an up and running website.

A lot of times, the developers and designers do not know how to use the results from co-designing. This makes the value of the user involvement small. In this research, the prototypes were made as an example to have the possibility to test the prototypes further and to see what other users from the target group would think and how they would interact with the prototypes,

and also how they would compare them. Prototypes could also be considered as documents, but since they are developed through the study, it was put as a separate data generation method.

3.4.7. Usability Tests

Usability tests were conducted on the two developed prototypes with five older adults recruited from SeniorNet. The number of five were decided due to Nielsen (2012) recommendation for usability test. The usability tests were conducted to be able to investigate whether the use of co-creation could make the system easier to use and to see if their mental models seemed to be closer to the conceptual model developed by other representatives from the target group, or closer to the model developed by the designers. The aim was to compare how the systems worked for the attendees from the target group, how they experience the prototypes and their comparison. The participants had not attended to the former co-design workshop, but three out of five had some previous knowledge by the use of digipost. One participator were using the existing digipost regularly.

The tests were performed in two different rooms, one room with a computer with eye tracking, and the other with video and audio recording. The eye tracking was conducted to observe how their gaze changed between the two prototypes and understand the usage better. The research team started the session with the "10 steps of usability test" (seen in Appendix J), with among others informing on how the participants should try to think out loud, their possibility to quit whenever they feel without any reason and the equipment used in the test. One of the usability tests is shown in Figure 3.7.

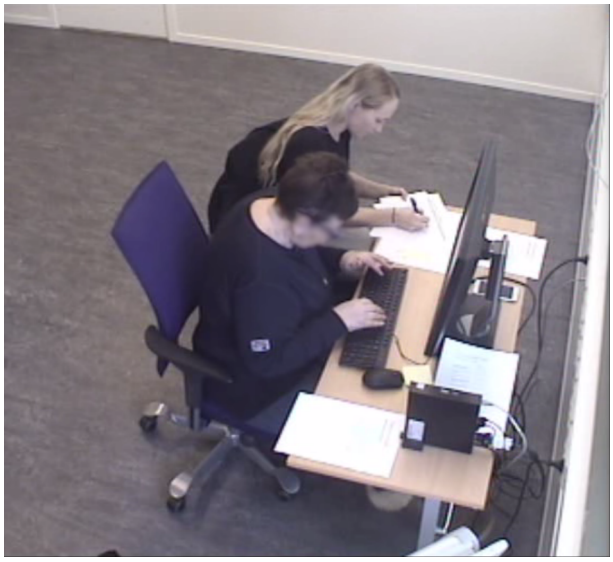


Figure 3.7.: Usability test

Each attendee completed a test of both prototypes. The orders of the test were planned, so some attendees were testing the existing version first, whereas others were testing the new prototype

first. This was chosen to try to compensate for the learning effect as best as possible. The reason why the same person were asked to test both prototypes were so they could compare the two prototypes. The levels of ICT skills also varied among the attendees, which makes it harder to compare the attendees than the prototypes. The actual test consisted of a list of task the participants should try to complete. The same task were given for each prototype. In the end of the test the researchers asked some predefined questions about the users experience and follow-up questions related to the observation. After each usability test, the participants were asked to fill out a SUS scheme for each prototype. The tasks given, planned questions and SUS scheme is found in Appendix J. The observation guide is found in Appendix D.3. The usability test could also be seen as a combination of observation, interviewing, thought reflection and filling out questionnaires.

3.5. Data Analysis

The data was analyzed using a qualitative approach. All interviews were transcribed and the researcher wrote observations and thoughts under- and right after each session. A retrospective where the researchers discussed their experience and findings was also documented after each session. All of the data collected was studied in detail before each document was coded.

As described in Section 3.2, the data generation and data analysis were done iterative and in parallel, where the data collected was analyzed to know what data to collect next, in order to have enough information to do a thorough analysis. This helped the research team to be open minded and at the same time collect useful data that helped them answer the questions that came up. One example from a analysis session early in the case study is visualized in Figure 3.8. This show an analysis of the data collected on older adults experiences positively (to the left) and negatively (to the right) with digitalization mapped after themes.

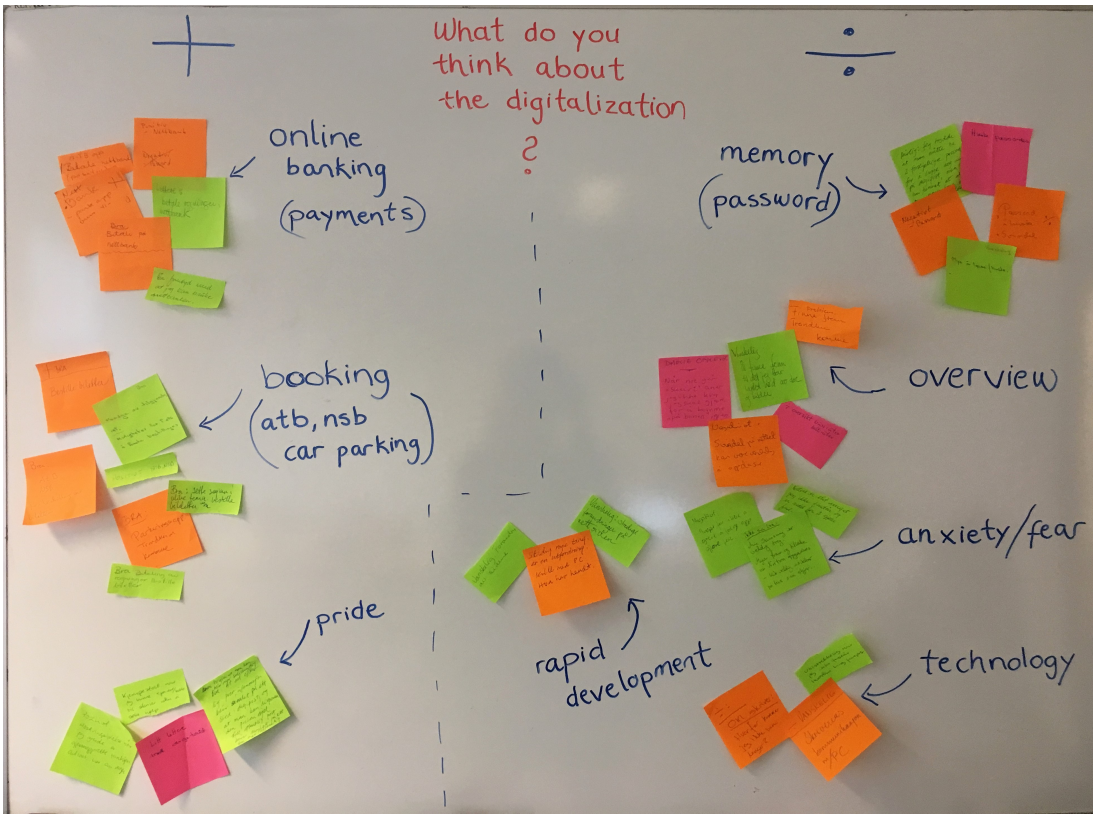


Figure 3.8.: Analysis of collected data

A thematic analysis was conducted (Oates, 2005). The analysis conducted had an inductive approach. The researchers tried being open mind and let the data speak to them. First, all data collected were divided into three segments; one with data that was not relevant to the case study, one with describing information (such as information about the history of SeniorNet or the web services) and the last with data relevant for the research. The two last segments were further analyzed. The data was categorized and afterwards, the categories were examined across the data material. The categories were further refined and combined based on the material from all relevant sources. The next step was to look patterns in regard to the interconnections between the segments and categories. Afterwards, the research team looked for themes based on the categories developed.

With a large and rich amount of data collected, it is important to have a good structure in order to discover the findings that are most important and how the research contribute the most. How to structure and present the findings is therefore an important step to evolve over time. All the findings and analysis were brought to a meeting with supervisor Babak Farshchian where the themes were decided. The students had put together a list of possible themes, together with an overview of all the data sorted with relevant data combined with categories from each data generation method and a combined list, a list of more than 95 quotes and a list of more than 60 relevant articles sorted by themes (for instance articles which contains physical limitations of older adults or about designing for older adults). The list of possible themes included cognitive

limitations, motivation, mastery of everyday life, basic computer knowledge society perspective, help, communication and supporting network, design, overview and terminology. Some of the data brought to the meeting is shown in Appendix L.2. In the meeting, six themes were decided: the right to reserve, coping with digital everyday life, supporting network, technological solution, development process and political aspect which further evolved to a socio-economical aspect. These themes were again structured under three different levels: individual level, group level and system level. These themes and levels are the base for the findings chapter, and all data is structured under these levels and themes. Some of the main steps in the analysis is shown in Appendix L.

3.6. Ethics

Before the collection of data started, the project was reported to Norwegian centre for research data (NSD) and approved as shown in Appendix A. The students designed the application and all related material, and the supervisor gave feedback before the application was submitted. To ensure a good experience from the participation in the project, the participants were thoroughly informed by the start of the session. Since the target group were asked to tell about their own experiences in their private life, it was important to protect their well-being and make them comfortable in the setting.

The attendees from the target group were informed both orally and in writing before each sessions related to this research. The information was about the project, what information that were collected, how the data was stored, anonymized and deleted after the end of the project. The participants were informed thoroughly that they could withdraw from the study at any time without giving any reason. They were also told that the project was approved by NSD and given the contact information to the researchers in case they had questions or wanted to withdraw form the study afterwards. They were also asked to sign the written consent form (found in Appendix A). The participants were asked to give their permission to audio record the interviews and discussions in the courses. Only one attendee was reluctant to the recording. This person's interview was not recorded and neither included in the data collected. All data have been treated confidentially, and all recognizable material will be deleted by the end of June 2018.

Throughout the research process, the researchers realized it would be useful to video record the co-design workshop and the usability tests using eye tracking to better be able to analyze the data afterwards. A change request was send to NSD which contained the desired change and how the data would be protected. The approval of the change request can also be found in Appendix A. The participants in the co-design workshop and the usability test were also

informed about the video recording and asked to approve this as well before the recording was started.

3.7. Sharing Findings and Contribution

When doing research it is important that the knowledge gathered through the study is shared with interested stakeholders and others that could benefit from the findings. This could include both contribution to the practical field studied, and to the theory. To share this research's contribution, the research team sent an abstract to the conference "Omsorgskonferansen 2018" as a potential speaker. This is the national conference for health care research in Norway held once a year. This conference was aimed for, because of the theme they had selected as their focus. The theme was co-creation or "interaction in practice", and this research were sent to the category "Interaction between the providers and the receivers". The abstract sent to the conference can be found in Appendix M.

The research team also wants to arrange a session with SeniorNet Trondheim after the delivery of this thesis where the purpose is to share the findings with the target group, inform about the future steps and desired contribution, and see if they have feedback to the results.

The research team aims to make a research paper of the master thesis after the delivery.

4. Case Description

The digitalization of public sector has increased in recent years, and many older adults struggles to master the new everyday life. The study investigates the situation in Trondheim, Norway. Different stakeholder are involved in this context. The Ministry of Local Government and Modernization allocates financial resources for increased digitalization of public sector and resources to educate the once who struggle. Trøndelag County Library and the Learning Center at the public library performs the education on behalf of the authorities. SeniorNet is a voluntary organization with a supplementary service due to the increasing demand.

The web-based public service: helsenorge.no, digipost.no, nav.no, altinn.no, and also online banking by DNB, was used as cases to explore how the older adults experience the use of these services. The development processes in this services today were also investigated. Digipost.no and helsenorge.no were further chosen as the main cases due to the target group's request.

This research especially investigate what the cost of not including the older adults, and how PD, like co-creation, in the development of web-based public service can provide positive effects both for the authorities and for the older adults. To accomplish this, there was important to examine the older adults' in use of the services, and the development process of the web-based public services.

4.1. Stakeholders

The research team were in contact with several stakeholders in the case study. By investigating the case from different perspectives, the research team got valuable information and were able to do a thoroughly analysis of the case.

4.1.1. SeniorNet

SeniorNet is a non-governmental association established in 1997 and has since then, worked with including older adults in the digital everyday. The organization consist of 1100 volunteers who aims to support, teach and guide older adults with the use of ICT. They offer both social and academic networks for their members (seniornett.no, 2018). A screenshot of their web page

is shown in Figure 4.1 and presents the ability to become a member and the benefits of becoming a member. Today the association consist of 200 local initiatives from all over Norway. It is also one initiative in Spain. Members of SeniorNet are within the age-range of 55-90 years, and they are motivated to learn more about ICT. In collaboration with supervisor Babak Farshchian, the research team chose to collaborate with SeniorNet Trondheim as they were a suitable target group. This gave easy access to meet the older adults to acquire knowledge about the target group and their experience with web-based public services.

SeniorNet Trondheim offers Computer café and courses to their members. Every Monday and Friday members have the ability to gather at a Computer café where they get assistance with computer-related challenges. Every third week SeniorNet arrange a course where the assistants teach their members about a specific topic.

The research team worked closely with SeniorNet in this research, and SeniorNet Trondheim become an important cooperator. The board members of SeniorNet Trondheim told about their role, aims and offers to the members the experience level of their members, experiences told by members and observations they have done. They also offered the researchers to attend their events and recruiter attendees to the research.

In return, the research team provided one-to-one education for the members of SeniorNet in computer cafés and through educational observation sessions in the interviews, and they educated the members in the use of digipost.no and helsenorge.no through two courses.

Figure 4.1.: The web page of seniornett.no

4.1.2. The Learning Center at Trondheim Public Library

The Learning Center at the public library in Trondheim provides courses and guidance for digital competency from employees working at the library. They also arrange one-to-one guidance (Trondheim biblioteket, 2018). These services are available for all citizens; older adults,

immigrants, and other people who need digital support. A screenshot of their web service is shown in Figure 4.2 and presents information about the service they provide .

The research team contacted the learning center to gain insight in their role in the public digitalization, which services and offers they were aware of, and also to acquire more knowledge about the target group. The learning center at the library turns out to be an interesting source in the study, with insight in the target group and offers for them to learn. Information about their offers, voluntary organization's offers were given by the staff. Additionally the research team were introduced to a representative in the Trøndelag County library. They also told the researchers about their experiences with older adults, invited the researchers to attend courses held by the library and invited to recruit attendees to the research from their visitors.

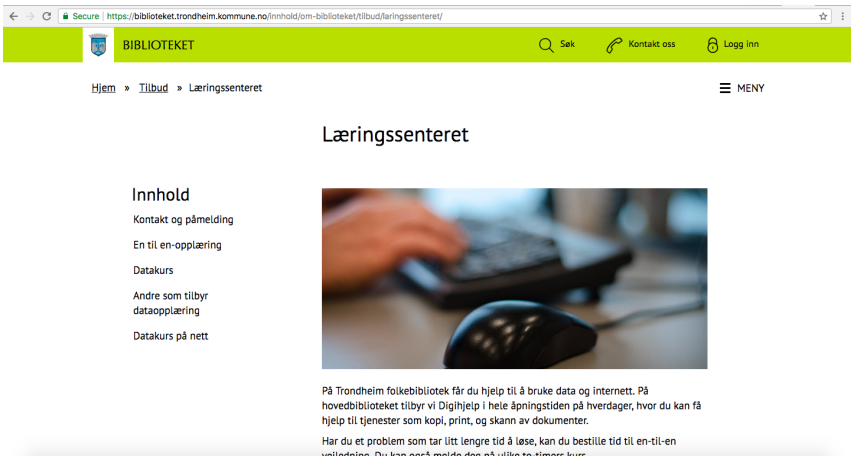


Figure 4.2.: The web service of the Learning Center, Trondheim public library

4.1.3. Trøndelag County Library

Trøndelag county in one of 18 counties in Norway. Frode Pettersen represents Trøndelag County Library and is engaged in the Nationally Selection for Digital Competency in Norway. He possess hands-on knowledge from his fieldwork on digital competency with older adults. He is currently working with establishing manuals and guidance groups for increasing the digital competence in the municipalities in Norway, specially in Trøndelag county. The aim with contacting Frode Pettersen was to understand the county's role in the digitalization and what the authorities do to help them. In this research, Frode contributed with valuable knowledge about the county library's measures to include the older adults, and also insight in the future aspects of digitalization of the public sector.

4.1.4. Ministry of Local Government and Modernization

Norway is a constitutional monarchy, which means that the king has symbolic power, and the democratic parliamentary is led by the Prime Minister and the Cabinet governs the country. The

Cabinet consists of 17 ministries, whereas the Ministry of Local Government and Modernization is one of them. The Ministry is responsible, among other areas, for the policy of ICT and public sector reform, and is the highest authority regarding information and communications technology (ICT) and governance policy in Norway (Kommunal-og moderniseringsdepartementet, 2018).

Stian Lindbøl represents the Ministry of Local Government and Modernization. He works in the Department of National IT Policy and Public Governance and has the responsibility for the supervision of the Public Management and eGovernment (Difi). He is also the project manager for digital inclusion. The research team contacted Lindbøl to gain insight in the of Ministry's knowledge and role in this problem area. Future expectations of the digitalization of web-based public services in Norway were also discussed. Stian contributed with knowledge about the political perspective. This concerned challenges with and measures to the low digital involvement among older adults, the Ministry of Local Government and Modernization's focus area and point of view.

4.1.5. Experts in the Field of Digitalization and Older Adults

Professor Astrid M. Sølvberg and Professor Wenche M. Rønning from Department of Education and Lifelong Learning at Norwegian university of science and technology, campus Dragvoll were about to publish a study of older adults' coping with digital everyday life (Rønning and Sølvberg, 2017). The older adults studied were members of SeniorNet Trondheim which makes it extremely important to get to know their research and findings to get to know the problem area and avoid doing things that were already done.

4.2. Target Group

Due to major differences in knowledge and competency of ICT among the older adults, it was important to find the proper target group to focus on. The research team wished to focus on the older adults that were in the possession of using web-based public services, but were not able to master the web-based public services properly. The struggles of mastering the web-based public services may be because of their low level of competence and physical limitations, and the weak usability of the systems. The choice of target group entailed that the research team reached out to older adults who were to some extent familiar with the use of web services. The target group was recruited from SeniorNet in Trondheim and the Learning Center at the library. Within the target group the ages ranged from 67-89 years, and all participants were located in the area of Trondheim.

All the participants were familiar with the use of ICT, but several participants were on a low

level of experience with the use of web-based public services. Even though several participants struggled with opening a web page or an attachment to an email, everyone had in common that they mastered the use of online banking. As the participants were recruited through courses they attended in SeniorNet or at the Learning Center at the public library, all were motivated to learn more about technology and web services.

4.3. Web Services

The web services selected in this case study are all examples of services which is necessary to master in the digital society. All the services provides secure login using BankID.

4.3.1. Digipost

Digipost is a digital mailbox provided by the Norwegian mail service, Posten Norge AS (Posten Norge AS, 2018). Posten is own by the Norwegian Ministry of Transport and Communications and has monopoly in delivering letters in the country (Posten Norge AS, 2018). Digipost is developed in cooperation with hired consultant companies like Bekk Consulting and other partners. Digipost.no provides ability to send and receive mails, both corresponding with the public sector and private communication, archiving documents and images, organizing receipts and pay invoices by connecting digipost to the online banking system (digipost.no, 2018). The inhabitants have one other options for online mailbox. This is called e-Boks and is developed in Denmark (e boks.com/norge, 2018).

Digipost.no was chosen as a relevant web service to explore as it relates to the digitalization of public sector. In Figure 4.3 the mail box in digipost.no are visualized.

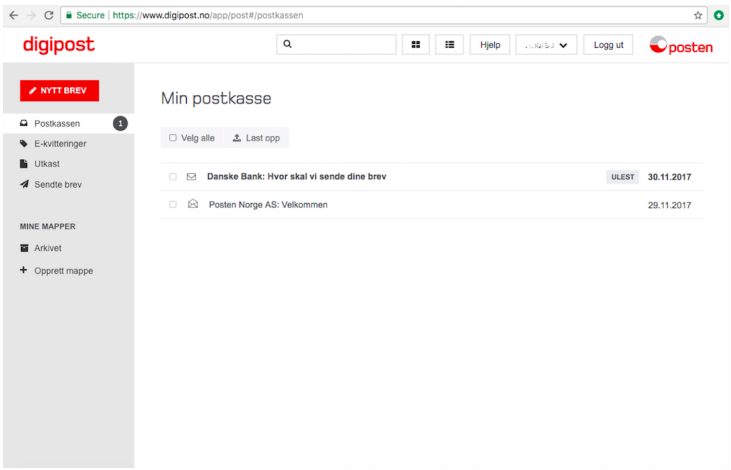


Figure 4.3.: digipost.no

4.3.2. Helsenorge

Helsenorge.no is the online public health portal in Norway. The content on the web service is provided by stakeholders in the health sector, while the Norwegian Directorate of e-health operates and develops the web service. Figure 4.4 shows a screenshot of the user interface of helsenorge.no today, with the possibility to see the current doctor, messages, appointments and prescriptions.

In the web service, people can get quality assured information about health related themes and information regarding their private health, like prescriptions, "kjernejournal" (their core journal), correspondence with doctor and more (helsenorge.no, 2018). Helsenorge.no is the only web portal for public health in Norway which combine health related services from different instances.

Helsenorge.no was chosen because of it being an interesting web service for the older adults to control their personal information, and also because they have monopoly on collecting all health-related information linked to a person, at one platform digitally.

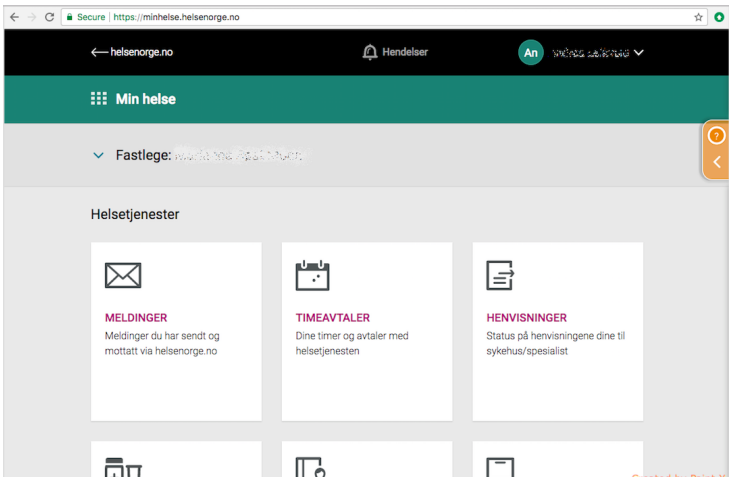
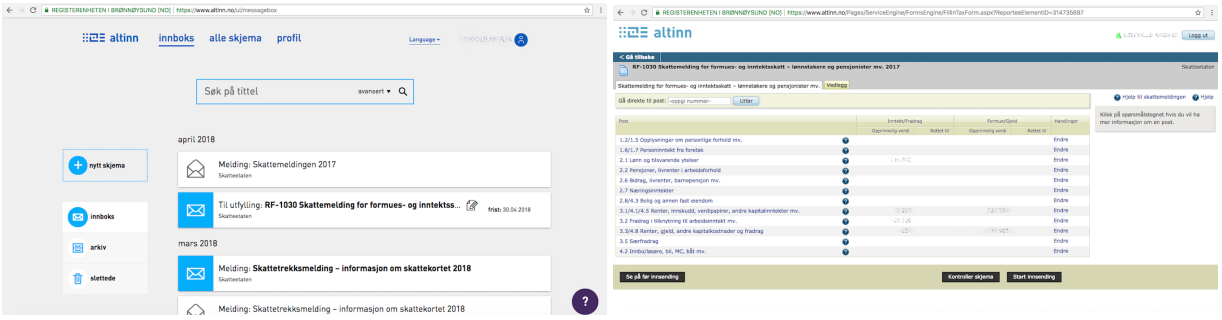


Figure 4.4.: helsenorge.no

4.3.3. Altinn

Altinn is a public digital portal managed by the Brønnøysund Register Center. Altinn is used by the Norwegian Tax Administration (Skatteetaten), who collect taxes in Norway, to send the inhabitants their tax return and where the inhabitants can check and edit their taxes. The inhabitants could also change their residential address through the system, etc. (altinn.no, 2018). The message system is visualized in Figure 4.5a, while the tax system in altinn.no is visualized in Figure 4.5b.

The tax system in Altinn.no was explored as it is the only online option for retrieving status and information about taxes and edit the taxes. The design is therefore important to consider as it should target all Norwegian citizens.



(a) The message system in altinn.no

(b) The tax system in altinn.no

Figure 4.5.: altinn.no

4.3.4. NAV

Norwegian Labour and Welfare Administration (NAV) is an agency partly owned by the central government and partly by the municipalities in Norway. One third of the national budget are administered by NAV, which are allocated for supporting child care, sickness, pensions and unemployed people (nav.no, 2018). The retired inhabitants in Norway get their pension payment from NAV, which the users could see in NAV's online system. The first page when choosing "person" at nav.no is shown in Figure 4.6.

Today it does not exist any other option for NAV and it is highly relevant in the public digitalization as it should provide usable services for all Norwegian citizens. This became the motivation for exploring NAV.

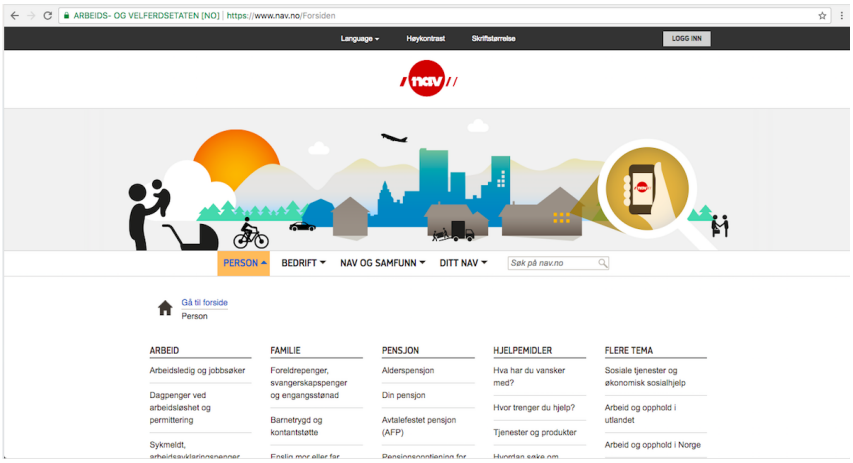


Figure 4.6.: nav.no

4.3.5. DNB

The The Norwegian Bank (DNB) is the largest financial service group in Norway and offer online bank service as one out of many services available on the market (dnb.no, 2018).

In their online banking service people are able to do payments, cancel accounts, have a overview of balance, search for loan and insurance, among other features (dnb.no, 2018).

DNB was chosen due to the importance that surprisingly many older adults manage the use of online banking. For those who do not master the online versions, banks provides large fees. An example from the web site dnb.no is shown in Figure 4.7. The figure presents the view when logged in to an account.

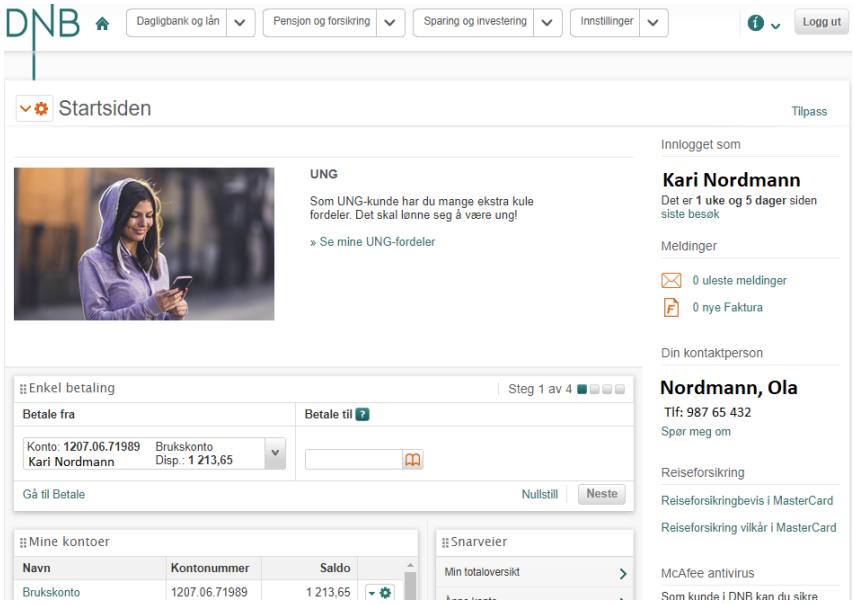


Figure 4.7.: dnb.no

5. Findings

The findings are based on all data generation methods performed in the project. Through analysis the findings were structured into three main dimensions; 1) Individual Level, 2) Group Level and 3) System Level. Six themes were identified within these dimensions; the right to reserve, coping with digital everyday life, support network, technological solution for older adults, development process and socio-economical aspects. The Figure 5.1 shows this structure. All the quotes presented in this chapter are translated from Norwegian into English, and further included with approval from the participants. The original quotes is reachable are Appendix K.

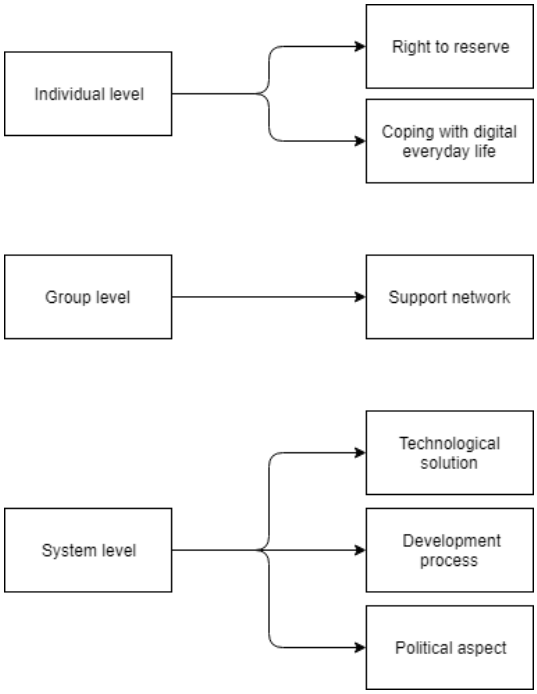


Figure 5.1.: Overview of structure in findings

5.1. Individual Level

This dimension describes the users experiences and challenges with the digital everyday life and web-based public service in specific.

5.1.1. The Right to Reserve

Today, people have the right to reserve from digital correspondence with the public sector. The reservation require that people actively take part in the reservation online, which in itself becomes a challenge as they have problems with using the web services.

In the interviews with representatives from Trøndelag County Library and Ministry of Local Government and Modernization, they stated that there will be increased digitization of the public sector. This will benefit the users as they can access their information related to correspondence with the public authorities independently from time and space. The society will beneficial economically and working resources can be used more efficiently. However, it is not that easy for all citizens to enter the information and do their communication with the public sector online. When asking about the future aspects regarding the possibility of reservation from digital correspondents with the public sector the representatives stated:

> "In the future, there will be limited possibilities to reserve the right to refuse from digital correspondence". (Representative, interview with Ministry of Local Government and Modernization).

Through interviews with the members of SeniorNet, they seemed to understand the need for technological solutions in society. Although, everyone expressed that they feel forced by the government to take part in the digitalization, without having the prerequisite to manage the new technology.

> "We are not allowed to refrain". (Participant 1, target group interview).
>
> "What really scares me, is the rapid development, and that the authorities control the pace. Elderly are in some way sidelined, and this is something I do not like". (Participant 3, target group interview).

Also, in the field work with older adults completed by DNB, the older adults expressed a feeling of losing control over their private information as a consequence of needing help to handle the new technology provided by the public sector.

> "If the older adults are not able to handle their personal economy due to digital solutions, they will feel less empowered". (Representative, interview with DNB).

5.1.2. Coping with Digital Everyday Life

The older adults experience many challenges regarding the new era of digital correspondence with the public sector in their everyday life. In the interview with the Learning center at the public library in Trondheim, they pointed out three main reasons behind the challenges that older adults experience with the digitization.

> "It is a combination of challenges due to skills, the courage to try and challenging systems". (Representative, interview with the Learning center at Trondheim Public Library).

As a consequence of becoming older, new challenges occur. In the interview with Professor Rønning and Professor Sølvberg, it became evident that many older adults do experience challenges like physical fitness, eyesight and cognition when using web services.

> "A participant in our research thought that the computer was not working properly. It was found that a minor message regarding a software update was visible in the corner of the screen. This was difficult to see due to the participant's poor eyesight". (Interview with Professor Rønning and Professor Sølvberg).

> "Another example was a case shown in The Daily Review on Norwegian television about a man with trembles. He was not able to use the web services provided by the public sector due to his physical limitations. His wife was handicapped and had no ability to help. This case was sent to the authorities, but their reply was that the man could go on a course to learn". (Interview with Professor Rønning and Professor Sølvberg).

> "Colours visible for an old eye? That's black and white. Not colours like green. If there is a background colour it's harder to read". (Participant 53, co-design workshop).

One attendee said in one of the courses:

> "I have friends who can't manage to send a SMS". (Participant 17, helsenorge.no course).

Memory and repetition seem to be closely linked together. The older adults participating in the observation sessions and the interviews often highlighted problems regarding their ability to remember previous steps done on the web services. Several of the participants referred to a frequently used technique to cope with this problem:

> "I often write things down, like passwords and different steps of a task. Yesterday, I forgot my password, but I think I found it again". (Participant 4, target group interview).

It was frequently found that the older adults wrote notes to remember how to complete different tasks in the web services. One example of a participant's notes of how to send a letter in digipost is presented in Figure 5.2.

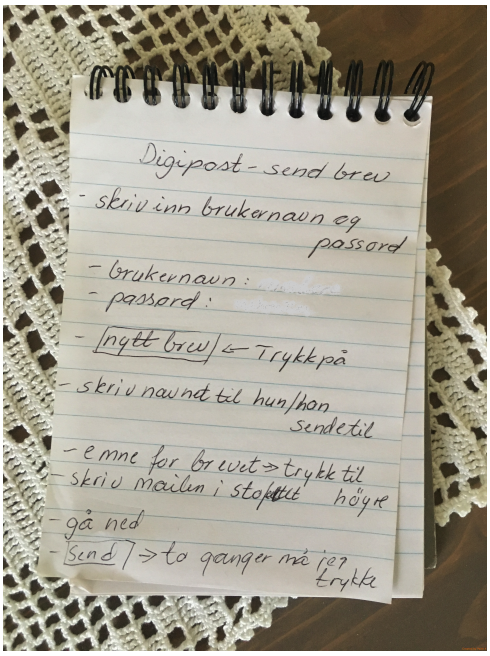


Figure 5.2.: Note with steps

The example is a detailed description of all the stages necessary to send a letter using digipost.no. The description also includes what are written on the buttons in the web solution, since the participant did not think "new letter" was the same as "send new letter". She was thinking of refreshing the mail box when looking for new letters while seeing the button "new letter". The description also includes details of where to insert the content of the mail. The owner of the note did not find the "send" button while trying the system. She then wrote a reminder to scroll down to see the content outside the current window. It was not logical to have to press the "send" button more than once to send the letter. Especially since there was no pop-ups stating this. Just a change in the ending of the word on the button.

When the research team asked the attendees why they wrote things down, they explained it as a necessity to remember what to do next time. It was evident in the interviews that this technique could become a challenge.

> "If someone shows me how to do it, I write it down in order to remember it the next time. In some cases I misplace the notes and then I can't complete the task the next time". (Participant 3, target group interview).

As a consequence of not managing the use of technological equipment and web-based public service in particular, the targeted group also experienced fear. As one stated:

> "I am scared of having my personal information shared on the Internet. Often I wonder who gets access to this information and I cannot know if I am being hacked". (Participant 15, helsenorge.no course).

Another aspect of the fear they experience is the uncertainty of what to do when a warning occurs on the device.

> "Yesterday a warning appeared on my computer with a frightening message. I chose not to use the device anymore, until I got someone to fix the problem" (Participant 1, target group interview).

Despite the range of everyday challenges, the findings also show that the older adults participating in this research are motivated to learn. Partly because they feel forced by the government, and also because they wish to manage their private information themselves as they used to before. Some of the participants said:

> "I feel very brave trying to use the computer, without doing so, I feel left out in society." (Participant 3, target group interview).

> "I do everything I can to stay updated." (Participant 2, target group interview).

The research team observed that even though the participants are motivated to learn, they tend to give up rapidly when challenges occur. A frequently mentioned problem was due to design changes on the web services. As one participant stated:

> "I am not very good at trying new things. For instance when a web service changes. My notes do not match anymore, which makes it difficult to understand what to do." (Participant 3, target group interview).

As discovered by observation, the participants did not always understand the logic of the web services. An example is when a participant in the interview tried to type the subject of the letter into the "to"-field in digipost, without realising that she was typing where the receivers name should go.

> "The suggestions will disappear when I continue to write, right? (Participant 35, digipost.no course).

The participant could not manage to solve the problem by herself and was about to give up. When the research team helped unveil the problem, the participant reacted with laughter and said:

> "I feel lucky to get assistance from you, because I would have given up if not". (Participant 35, digipost.no course).

5.2. Group Level

This section involves the role of the support network surrounding the older adults, and how getting help could be a challenge.

5.2.1. Support Network

Findings from interviews and courses with target group show that many older adults need help when using web-based public systems.

> "When I get an opportunity to receive help, I use it". (Participant 7, Computer café at Gulhuset).

When asking the participants who they got help from, many of them had relatives and family assisting them.

> "I am lucky to have grandchildren helping me, but they are so quick when solving the problem that I struggle to remember how they fixed it . They solve the problem for the time being, but the next time it occurs, I have no idea how to fix it, and I feel just as helpless as the previous time". (Participant 12, Hornemansgården).

As discussed in the interview with Professor Rønning and Professor Sølvberg, this is becoming a privatized problem. The older adults relies on their relatives and voluntary organizations like SeniorNet in being able to solve their problems with the web services. The older adults participating in this research have expressed their appreciation for supporting networks like SeniorNet and the Learning center at the library. The learning center offer courses and one-to-one help for all citizens in the municipality.

> "We offer digital support for all our citizens, but we are aware that the elderly is the largest group that utilize these services". (Representative, interview with the Learning center at Trondheim Public Library).
>
> "Everyone has the possibility to receive two one-to-one sessions each. After completing two sessions we send them to SeniorNet. Unfortunately, we don't have the capacity to offer more than this". (Representative, interview with the Learning center at Trondheim Public Library).

The Ministry of Local Government and Modernization and the local authority thought the most important thing when helping the older adults were to make sure the courses are held with high quality.

> "We are focused on raising the competency for those working in the municipalities, libraries, other service provider, and voluntary organizations. This way they would be able to provide better assistance for people who need it, with the aim of decreasing the digital divide in society. The county library also provides courses directly for the inhabitants in Trøndelag county in cooperation with the public library". (Representative, Interview with Trøndelag county library).

However, as SeniorNet stated, a good course is maybe not enough.

> "We have seen that when we invite members to attend courses, some aren't left with much knowledge. Therefore we encourage them to attend multiple courses in addition to the first one. They need hands-on experience. We also motivate them to practice at home". (Representative, interview with SeniorNet).

It was found that not everyone had the possibility to receive help when needed. This could be due to not being aware of the available help that is out there. It could also be that they need help when to organizations like SeniorNet or the Learning center at Libraries are not open. It could also be that they are not able to identify what they needed help for. In order to understand what they do if they could not get help from SeniorNet, the library or family, the research team asked the older adult if they found the help function on the web service useful. No one would use the Q&A delivered from the web service, due to too much text. One answered that she uses the chat, but most of the older adults identified themselves with one participant's statement:

> "I presume that someone is available to help me if I call the phone number provided". (Participant 18, helsenorge.no course).

5.3. System Level

This level introduces the findings regarding technological solution of web-based public service for older adults, how the development processes are conducted today and how it can be improved. It also contains the socio-economical aspects of digitalization.

5.3.1. Technological Solution for Older Adults

This theme introduce aspects by the design which is important to consider when designing web-based public services for older adults. In the co-design workshop, it became evident that older adults are focused on the logical structure of the web service:

> "What I try to illustrate here is a design structured for people from 60 to 80 years old. I think it is more understandable and easy to use. Different people, like crafters and office workers, should also be able to use digital mailbox, regardless of their previous knowledge. I am a craftman and I haven't used ICT much in my work. I often imagine things like this picture. But this is different to the structure I often see in web services today. They presents the information mostly in text. For me the illustration I made makes more sense than how it is today". (Participant 55, co-design workshop).

It turns out that the logical structure found through co-creation in this research is an activity-based structure, where related actions in the web service are clearly presented together, rather than taxonomy-structured lists and navigation menus.

> "It is something with the logic in your head. How you think. I am thinking in activities when it is something I am about to do online. It seems like it's often a special order you have to follow, a kind of procedure. But it is not always the one making the procedure who find the smartest solution". (Participant 52, co-design workshop).

The participants are not familiar with the meaning of symbols used for web. As one stated:

> "I like the visual solutions. But I think the best is to combine figures and text". (Participant 50, co-design workshop).

It is difficult to understand if an element or text is clickable. This is something that was noticed by the participants.

> "It is easier to understand what's clickable when it is underlined". (Participant 14, Hornemansgården).

It is important to focus on the most important content of the web page. Everything that is not necessary should be removed, in order to make it easier to find relevant information.

> "The content needs to be clear without too much information at one place. This can prevent that people give up before they actually try to do a task". (Participant 51, co-design workshop).

In the interviews and observation sessions it were evident that the terminology on the web services should be understandable to increase the usability. Computer technical language or professional terminology makes it harder to discover correct information.

> "I cannot understand what this sentence means" (Participant 8, Computer café at Gulhuset).

Through observations of the older adults in use of the web services, it was found that because of functional limitations due to age, like trembling and poor eyesight, challenges occur. This is something the web services need to facilitate for. As one of the participants said:

> "It is a lot easier to click on large and oblong buttons, than these small once. If I fail to hit the button, I may sit there and wait to see if something happens because there are difficult to notice whether I clicked or not". (Participant 2, target group interview).

The overview of the web interface turns out to be an important topic regarding usability for older adults. The research team identified that many participants struggled with getting an overview of the entire user interface of the web services. An example is the usability test of the current prototype of digipost.no. With the use of eye tracker, it became evident that the participants

focused on the information visual on the current interface without thinking of scrolling down for more information. Another example from this usability test, was that several participants did not look at the menu located on the left side when asked about finding "Min mappe", an example is visualized in Figure 5.3.

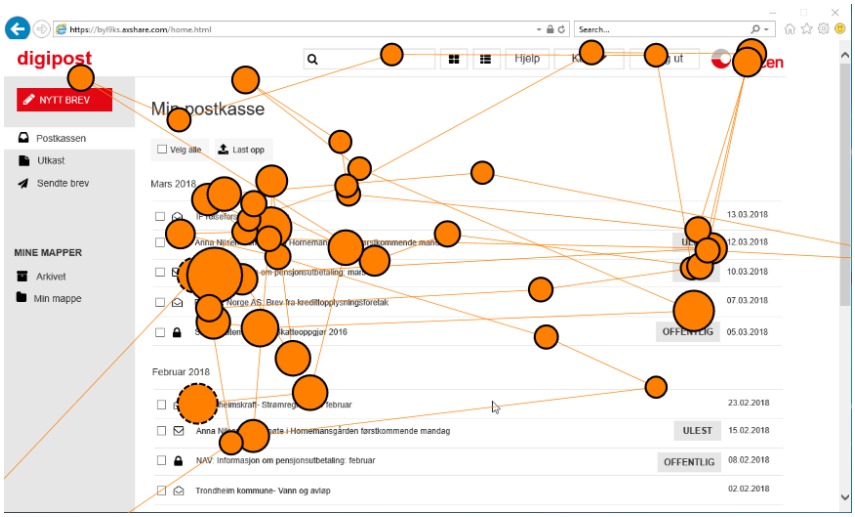


Figure 5.3.: Eye tracking of current digipost.no - Overview

When asking the participants why they found it difficult to use this menu, many of them answered that it is easier to discover the content visual in the middle of the screen. As seen in Figure 5.4, they identified the menu more efficiently by using their profile located in the middle as reference point to all activities.

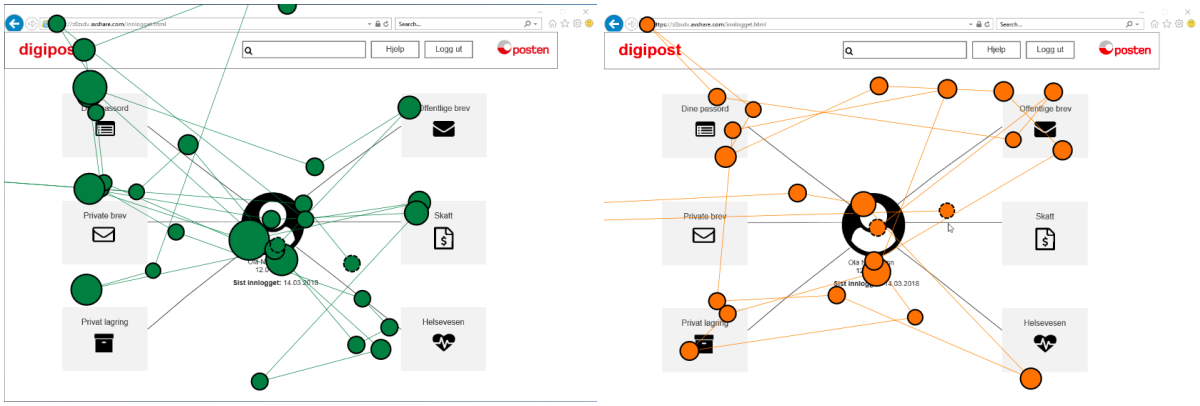


Figure 5.4.: Eye tracking of co-created digipost.no - Overview

Pop-ups were not seen as they were small and did not appear in the middle of the screen. For instance, when the participants downloading a file, the downloading banner at the bottom of the page where not detected.

In the interview with DNB, the representatives told the research team that they had a focus on including the older adults in the online banking world. At the time of this study, they were

investigating a possibility of a "super easy" online banking designed just for older adults. Based on interaction with the target group, the solution should only include the most important features the users need in their everyday life, with big buttons and easy navigation.

5.3.2. Development Process

This theme presents the findings of how the development process of web-based public service are today, and an example of how direct and early involvement of users can increase the usability for older adults. Today, the developers of the public services include the users at the end of the development process. This happens when the systems are already developed, to validate if the system is possible to understand.

> "In 2016 we were running a usability test of the entire existing user interface". (Designer, helsenorge.no).
>
> "Direct involvement? Yes, through usability testing". (Designer, digipost.no).

However, some designers talked about service design as an approaching focus area in the pre-design phase.

> "The users are involved through interviews in the insight phase, when the goal is to develop customer journeys and service design. They are normally not included in the design phase". (Designer, Skatteetaten).

Through interviews with public sector, it became evident that the prior mentality of the design process was to create systems targeting the average web user.

> "The mentality has been that one size fits all in the entire public sector. We are trying to change this mentality". (Representative, NAV).

This mentality is now changing according to representative, Ministry of Local Government and Modernization. What work for someone, may not work for others.

> "We are going in the right direction, but it will be a process before all private and public companies have implemented solutions which keeps elderly and handicapped needs in mind". (Representative, interview with Ministry of Local Government and Modernization).

Designers from helsenorge.no acknowledged the need for increased involvement of users. However, due to financial restrictions the activities for user involvement becomes limited.

> "We are trying to include user insight early by running smaller service design projects. This could be the base for designing concepts we can sell to the shareholder in the health sector. Hopefully this will encourage them to order systems who set the inhabitants need in focus. However, projects like this is hard to get funded. (Designer, helsenorge.no).

None of the developers and designers from the public sector mentioned the need for direct involvement of end users in the early stage of concept development or through the process of designing the user interface. When looking at the concrete cases in this research, the observations and SUS results from the interviews and courses shows that many had problem when using the studied web-based public service.

> "This systems are difficult to use for new users". (Participant 52, co-design workshop)

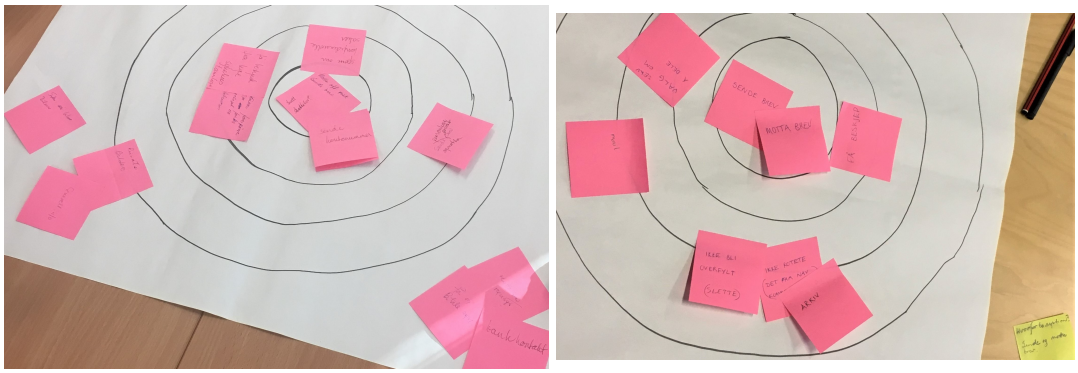
It was found that by co-designing with the intended users, the researchers could access all aspects of the older adults' situation in detail. Several participants had no prior knowledge with digipost.no. To identify what would be important in the solution and what they should create, the participants had to understand the requirements of this system. The attendees discussed which functions they considered as the most important and which layout would be the most logical. They questioned each other and discussed different alternatives for further design.

> "Tax and health correspondence were earlier sent by mail. Now they have own message systems online. Why can't this messages be sent to the digital mailbox? There is too many places you have to check to be updated about your incoming messages". (Participant 49, co-design workshop).
>
> "What's the most important to include in digipost.no? Security! The information you are sharing could be sensitive and have to be stored a safe place". (Participant 53, co-design workshop).
>
> "It needs to be easy to find back to what you received a year ago. A solution of doing it in a more systematic way is to receive the mails separately, since some of them are related to NAV and other to taxes, etc". (Participant 51, co-design workshop).

By letting the attandees speak freely and discuss in groups, the research team could observe their actions, listen to their opinions and see visualizations of their ideas. The participants realized the value of co-designing.

> "Now we are going to make it better and easier to use". (Participant 54, co-design)

Through co-design, the researchers identified major differences between the design of digipost.no today and the co-created design. The first part of the workshop discovered the most important features to be included: private communication and correspondence with the public sector should be secure, private archive for important documents and notification for new letters received. Figure 5.5 show the Bull's eye prioritization for the two groups.

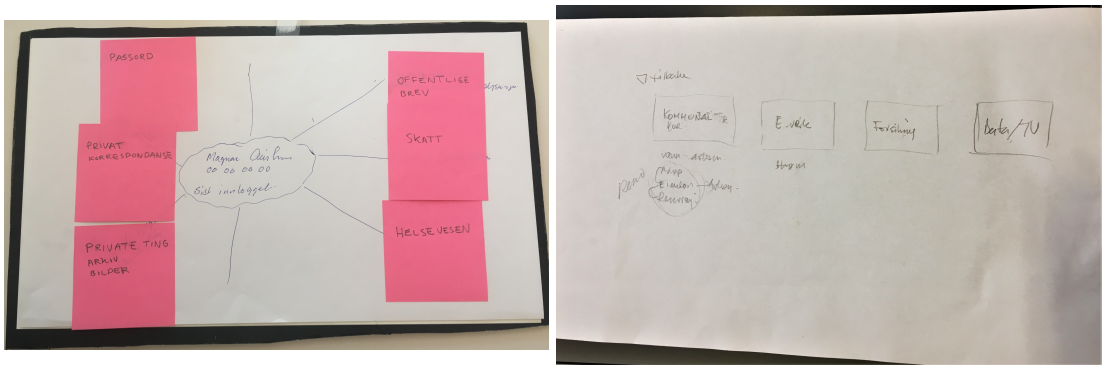


(a) Bull's eye group A

(b) Bull's eye group B

Figure 5.5.: Bull's eye prioritization from group A and group B

In the designing part of the workshop, the most important finding was the way the participants structured the content in activities. Other aspects of the design was to increase the size of buttons and text, understandable terminology, images and text together. It was also important with a better structure by reducing the information on each page to avoid unnecessary distractions. The prototypes developed by the groups were quite different. However, the groups were presenting their ideas for each other and gave feedback on which aspects from each prototype they liked the most. This made it easier for the researchers to know how to combine the results. Some sketches from the prototype made by group A is shown in Figure 5.6.

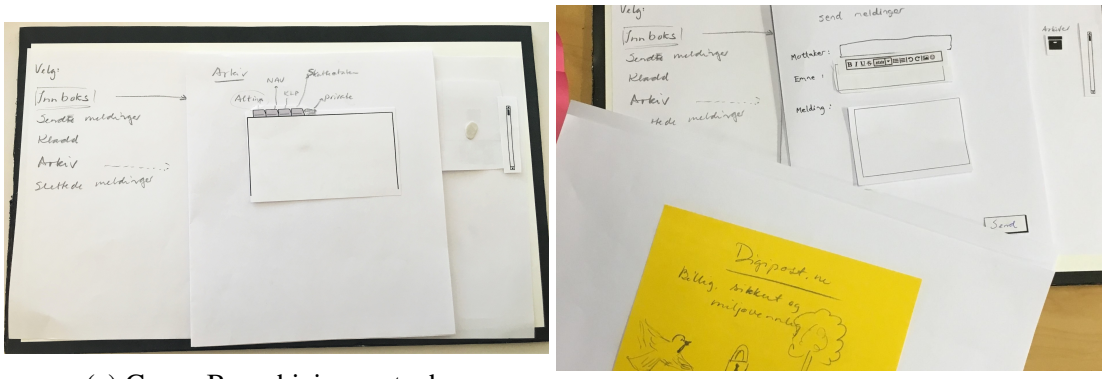


(a) Group A: home page

(b) Group A: filtering and sorting

Figure 5.6.: Sketches of group A's prototype

The figure to the left show how the attendees wanted to structure the features and how they thought in activities. They also wanted to divide the screen into private communication and correspondence with the public sector, where what they viewed as most important, correspondence with the public sector were put to the right. The most important features in their opinion should be visualized in the top of the screen. The figure to the right show their desire of arranging the correspondence with the public sector into different sections automatically in a archive format. This way of structuring the information digitally, provided the older adults with metaphors to their existing way of organizing documents and correspondences in paper. Some sketches from the prototype made by group B is shown in Figure 5.7.



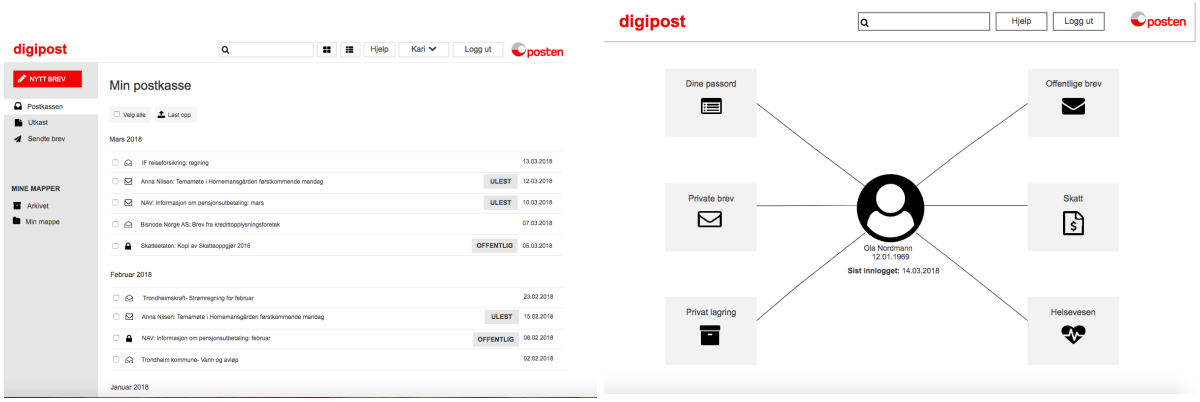
(a) Group B: archiving metaphor

(b) Group B: use of symbols

Figure 5.7.: Sketches of group B's prototype

The figure to the left shows again the archive metaphor from the real world. This were similar to group A's solution for correspondence with the public sector. The figure to the right involves the participant's focus on combining symbols and text to better understand where to find what they are looking for and its function. More sketches made by the participants from both groups can be found in Appendix H.4.

The prototypes created based on the results from the co-design workshop and other insight in the target group's needs, were quite different structured than the one based on the design of digipost.no today. The co-designed solution also has less information on the home screen focusing on starting from the center of the screen to the desired activity. The two prototypes are presented in Figure 5.8. Several screenshots from the prototypes are visualized in Appendix I.1 and Appendix I.2.



(a) Current design of digipost

(b) New design of digpost developed from co-design with users

Figure 5.8.: Prototypes of digipost

To evaluate the designs developed from the co-design workshop, a new group of older adults participated in a usability test. The two prototypes, design of digipost.no today and the co-created design, showed that the co-created design had a significant higher usability score, as

visualized in Figure 5.9. More details from the SUS results is visualized in Appendix J.4.

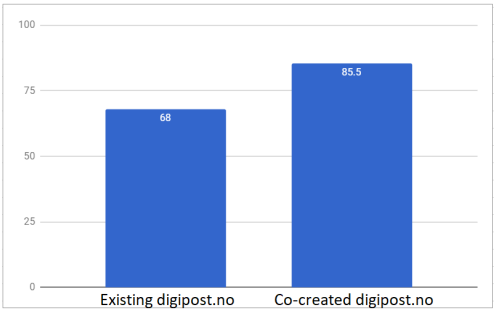


Figure 5.9.: SUS results from usability tests

The participants stated that the existing solution had too much information on the front page. Several navigation bars made it difficult to get an overview. The focus on activities and starting point in the centre of the screen were a prominent statement for the co-designed prototype. The participants at the usability test had some feedback regarding the co-designed prototype:

> "I think that this system was very easy to use. I often use mind maps, and this structure was similar to that". (Participant 60, usability test).
>
> "The system was logically structured, having myself in the center and all the activities in boxes around". (Participant 61, usability test).
>
> "What I liked most with the tabs on the top, was that they showed the different public stakeholders separately, instead of having the mails in a long list. This provides a good structure and it is easier to find what you are looking for". (Participant 63, usability test).

The findings from the usability tests show that by co-creating the design of digipost with older adults, researchers and designers can gain better insight of the mental models from the target group. This helps to create more suitable conceptual models for the system which matches the users' mental models better.
The researchers experienced that it did not demand a lot of resources or time to involve the target group directly in the process of developing the conceptual model and design of the system. However, it is important to notice that the older adults struggle with understanding how to design web solutions. This makes the facilitation from the designer and researchers important.

5.3.3. Socio-Economical Aspects

This theme involves the focus on the digitisation of public departments, the financial allocations and processes in the Norwegian authorities.

In the interview with the representative from the Ministry of Local Government and Modernization it was found that digitalization of the public sector will provide economical, environmental

and efficient benefits for the Norwegian society. He also stated that there will be less ability to reserve from digital correspondence with the public sectors in the future.

NAV stated that their focus in digitalization of public sector:

> "Value for the users and for society, and to get more out of the money. NAV holds 1/3 of the state budget of Norway which means 500 billions". (Representative, NAV).

The designers and developers of the web-based public service shared the view of the representative from the Ministry of Local Government and Modernization:

> "We want to save both money and the environment". (Designers, digipost.no).

The designers also focus on the user's interests. The developers at for instance digipost.no need to understand different stakeholders of the system, both the private end users and employees in the public departments:

> "For the employees in the public sector, this makes it easier to communicate with the end users". (Designers, digipost.no).
>
> "For the end users this makes it easier to have everything located together on one secure platform, instead of having to log on to several different places". (Designers, digipost.no).

They further specify the need for involvement of users through more frequent usability tests:

> "It is not an ideal digipost today. The hierarchy in the public sector makes the process slow". (Designers, digpipost.no).

However, the designers and developers of helsenorge.no explained their process of prioritizing the features for the system:

> "In short, helsenorge.no is a voluntary project, where we receive orders from the shareholders in the health sector to finance our work. The investments provides guidelines from different white papers". (Designers, helsenorge.no)
>
> "We have to focus on making the health services more efficient, due to the increased number of elderly in the up-coming decades. Therefore the needs and requirements of the citizens are lower prioritized". (Designers, helsenorge.no).
>
> "The decisions made by the Norwegian Parliament and the Ministry of Finance, and the considerations for legislation, juridical and fiscal plays a much greater role than the users' wishes in what being prioritized". (Representative, Norwegian Tax Administration).

This provides consequences for helsenorge.no, as they need to develop their system piece by piece based on orders, which the participants in this research noticed:

> "Why is "critical information" and "kjernejournal" (core journal) separated? They involve the same information. Confusing!". (Participant 23, helsenorge.no course).

The departments tries to save money by ordering systems without allocating enough money to involve the users in the concept development.

> "We didn't have enough money for usability testing the first couple of years when creating this digital solution. Even though we know it would have made a more valuable service". (Designers, helsenorge.no).

As the representative from Trøndelag county library stated in the interview, it is important to acknowledge that this can marginalize some groups in the digital everyday life.

> "We are about to get a group of digital illiterate in the Norwegian society. The most vulnerable are mainly older adults above 65 years old, first-generation immigrants from non-western countries, but also people without paid employment because of medical reasons, cognitive- or physical disabilities". (Representatives, Interview with Trøndelag county library).

As Difi said, the groups that suffer from digital exclusion, is not only older adults and immigrants, it also applies to people in the younger generation.

> "It isn't only the oldest generation who is left behind. We are about to get a group of young people who dropped out of school in secondary school or high school to repair cars, etc. They also struggles in how to use the digital solutions, but this is not a challenge that often got the focus". (Representative, Agency for Public Management and eGovernment).

6. Discussion

The discussion is based on the findings presented in Chapter 5, and is divided into six main claims which are further discussed. The chapter also contains some implications for design and process recommendations and a discussion of the research contribution, the limitations of the study and recommendations for future work.

This research investigates older adults' experiences with use of web-based public service today, how the developers and designers involve users in the development of these public web services and discuss the cost of not involving the users directly and early in the design of web-based public service.

6.1. The Older Adults Feel Marginalized

Earlier research indicate that the older adults have a feeling of being left out in society (Rønning and Sølvberg, 2017; Hornnes et al., 2014; Slettemeås, 2014). Their challenges and needs were not taken into account when the decision was made to digitalize the Norwegian society.

The challenges derived from the increased digitalization creates a digital divide between citizens (Friemel, 2016). Some benefit from becoming digital, but the digital illiterate and other groups experience themselves as burdens in the digital everyday life (Hornnes et al., 2014).

Even though the older adults still can ask for a reservation against online communication with the public sector, this is not an easy process for them. The reservation have to be done online and is not easily accessible for people who are not used to web services. However, as shown in this research, the ability to reserve is likely to be a temporary service. If this service disappears, it will increase the cost for the public authorities in the future, as many older adults will experience decreased mastery of their own lives. They will in an earlier stage of their life be dependent on getting help with tasks they still manage by themselves, which may lead to lower the empowerment among the older adults, as the representatives from DNB and Rønning and Sølvberg also indicated.

It is important to notice that most of the public services involved in this study are services without any competitors. This means that when the authorities decide to digitalize, people need

to accept the change, and deal with the solution provided by the public authorities. In the open market, there are normally many different end products, and the inhabitants can choose the one they like the most. This ability to choose creates a competition between the providers where the one with the best deal wins the most customers. Due to the digitalization, the providers have realized the importance of offering a digital system that is easy to use and gives a good user experience. This perspective is not as important in the public sector, where they normally do not have any competitors. When looking at the web services in this case, both NAV, Helsenorge and Altinn are services without any competitors. Digipost have one competitor, while there are several options when it comes to online banking. The competition between the banks may be a reason why so many older adults struggle with the use of different public services, while they still manage to use the online banking system. Another reason may be the motivation and interest. Everyone want to control their own money, while other services may not feel that important. The motivation aspect will be further discussed.

It is seen that the motivation behind the older adults' involvement in the digital everyday is based on both their extrinsic and intrinsic motivations (Deci and Ryan, 1985; Ryan and Deci, 2000). As findings from this study shows, many older adults feel forced to utilize the public digital services. This leads to a dominating extrinsic motivation. They also find it difficult to engage in the public web services, and they experience heavily pressure from the government, public departments and their supporting networks. This pressure is unavoidable and the instrumental value of becoming digital is something that the older adults need to accept and deal with. This relates to the findings from Rønning and Sølvberg (2017). The problem with this, is that the older adults find it difficult to internalize, integrate and identify their inner values and desires with the instrumental value of becoming digital. In this research it was seen that many older adults often chose to give up when challenges occurred. As Nielsen (2013) also reported, the older adults has a larger likelihood of giving up compared to younger people. This may be explained by their dominating extrinsic motivation, as they do not feel ownership and cannot identify with the use of public web services. It will therefore be important that the government allocate resources to increase the intrinsic motivation and thereby attain less resistance against the digitalization by the older generations.

This problem also applies to other user groups as Difi said. Also groups of younger people with low digital competency, find it difficult to understand the systems and terminology. Another aspect is that many of them simply do not find the need for the digital systems. The public departments need to find new ways of customizing their systems to fit their users. The practice today is that the systems are created on the basis of targeting at least 80 percent users, whereas the remaining 20 percents gets other services (Hornnes et al., 2014). If several groups are falling aside, it easily becomes more than 20 percent of the users who need other services. This may lead to large expenses for the government as they need to arrange teaching, follow-up lessons

and have available contacts for the large amount of people who deviate from the "normal" user. The more users that end up falling aside, the higher cost for the government and society.

There are several examples (Knudsen, 2018; Bugge, 2016; Nordskag, 2017) where the older adults have tried to voice their concerns both through media and by reporting directly to the government. This has not, however, resulted in sufficient action by the government. For instance, the authorities replied in media that older adults will get used to finding the information online (Bugge, 2016). However, it is not that simple. For instance in the example about the trembling man that Rønning and Sølvberg refers to described in Section 5.1.2, the authorities recommended him to attend a course instead of trying to understand the actual problem.

The involvement of older adults in the digital life is a complex problem. This research indicated that the main challenges with the use of web services were a combination between: skills, courage to try and challenging systems. The problem also tend to include functional limitations, motor skill and cognition that makes it difficult to use the digital services. This is supported by previous research (Demiris et al., 2004; Rønning and Sølvberg, 2017; Vassli and Farshchian, 2017; Arch and Andrew, 2010; Nielsen, 2013; Fidgeon, 2006).

Limitations due to age, like physical challenges involving trembling, stiffness, poor eyesight and slowness (Arch and Andrew, 2010; Nielsen, 2013; Fidgeon, 2006), along with cognitive limitation involving memory (Arch and Andrew, 2010; Nielsen, 2013; Hornnes et al., 2014; Nilsson, 2003; Vassli and Farshchian, 2017), hinders and may prevent the older adults to take part in the digitalization of the public sector. When the public sector force the citizens to use these systems, they need to offer systems that account for these natural limitations of becoming old. As Nielsen (2013) stated, limitations due to age will happen to everyone.

The older adults in this study experienced fear towards the digitalization. The fear noticed, in this study, was related to their uncertainty of how information in web services are stored and secured by the web service provider, especially regarding their personal information. This contributes to the findings in de Almeida et al. (2015). Also the fear of making a mistake during interacting with the web services was challenge for the older adults.

Despite all these challenges, the older adults acknowledged the necessity to digitalize to improve the efficiency of the public sector to be able to handle the large upcoming group of older adults. The public web services provide the older adults with many possibilities, for example accessing and editing information about their health in helsenorge.no and accessing their mailbox through digipost.no, independent from time and space. To be able to utilize these possibilities, it presupposes that the web services are facilitated for the challenges of becoming old. The older adults also acknowledged that the digital solutions could become a tool that could help

them in their everyday life. Also, when they manage to master a digital solution, this gives a feeling of mastering which could be a positive aspect in their life. This sense of achievement may increase their intrinsic motivation which may increase their willingness to learn and again makes it easier to use the systems. The participants in this study try to stay motivated to learn, but the rapid development of digital solutions are difficult to cope with. When they eventually have managed the use of a service, the service is updated and they need to start all over again, which feels demotivating.

6.2. The Training and Follow-up Services is a Privatized Problem

When the new web-based public service were developed, the needs of the users were not the main focus. The systems are consequently not reflecting the users needs. This becomes especially problematic for the older adults as they are more dependent on help, which was evident in findings from the observation sessions and interviews. Even though the Learning center at the library provides some help, there has been discovered that the private organizations and the families need to take the main responsibility for the education and follow-up service.

Most of the older adults who participated in this research, told that they mostly got help from their families, especially from their experienced grandchildren. The problem is that the grandchildren often fix the problem without teaching their grandparents how to solve the problem. This causes a low learning outcome and the older adults are consequently not able to complete the task by themselves next time.

Fortunately, the politicians have realized the importance of raising the digital competency among the less digital people in society. Due to this, the authorities deliver more help for those who needs it. Digidel is a project that has gotten increased financial support from the authorities (DAMVAD, 2015) to further invest in competency, both for employees in the municipalities and also to offer services for the citizens. There is much focus on education through courses in the digidel project, and less considerations regarding the provision of concrete help with everyday problems. It is seen through interviews and observations that the individual everyday problems are the problems that restricts them the most.

It is therefore fortunate that initiatives like SeniorNet and the Learning center at the library offers one-to-one assistance. However, not all municipalities provide these services, and the library in Trondheim has a maximum restriction of two one-to-one appointments for each person. After these, people are referred to the voluntary, non-governmental organization SeniorNet. The authorities save money with this restriction, but it provides no guarantee that everyone get

the needed help. Today, there are not enough resources within SeniorNet to cope with the large amount of older adults needing help.

As found in the interview with SeniorNet, few older adults actually utilize their teaching services. The reason for the low utilization may be that the older adults are unaware of them existing, as they are announced online. This is unfortunate for those who find themselves in the "first-level" or "second-level" of digital divide (Dutton and Blank, 2014; Friemel, 2016; Philip et al., 2017). Another reason involves the challenge of knowing what to ask for. This may be challenging, as their low competence in ICT makes it difficult to know where to begin their questioning. This relates to the "second-level" of digital divide as they do not have the needed skills to manage the use (Friemel, 2016). This study also found in the courses and co-design workshop that their prior jobs and educational backgrounds affected their level of digital knowledge. Some of them had used ICT in their previous working situation and did not require much help. Others had less knowledge and required more help. The last mentioned group are considered as part of the "grey-divide" (Kania-Lundholm and Torres, 2017; Friemel, 2016).

If a system is generally difficult to use, it may be difficult to ask for help as they feel embarrassed and vulnerable in the situation. The research team experienced far more women attending the teaching courses than men. It could be that men have the courage to try and to fail, and it may also be that they are too proud to ask for help. This either leads to them letting their wives handle the work, or that they master the use and do not need help. The services that SeniorNet offer are naturally restricted to time slots, as they are a voluntary organization. In Trondheim they provide teaching sessions two times a week, but during the holidays the services are not available.

It was seen in the interviews with the older adults that the problems often occurred when they tried to use the computer at home where no one was able to help them. Many expressed that huge problems could occur as they accidentally did something wrong or clicked on links in a spam email. This was something that the research team experienced during an interview, where a woman tried to click on a link in a spam email the day before the interview. She decided to turn off the computer and did not have the courage to open it until she got help. The problem was that this issue occurred some weeks before Christmas, when SeniorNet had vacation, so she could not get the needed help if it was not for this interview. A consequence would be that she would not be able to pay her bills until after the vacation, and are dependent on getting help from family or neighbours.

Another important aspect is that they are scared of doing something wrong when they interact with the public web services, as it can provide serious consequences. For instance they do not want not do something wrong with regards to their health information or their taxes. SeniorNet

has therefore asked the public services to develop a "dummy-profile" for their members to practice. This seems to be a greater job for the service providers than expected, as they need to fill in suitable information about the older adults in order for them to relate to the content, have confidence in the system and to understand what to do.

The services that this study examined, often has available help functions. Chat is an up-coming feature, but not for the older adults. They prefer to call a phone number to make themselves understood. This is often expensive and they need to be patient due to long queues.

6.3. The Solutions are not Designed for Older Adults

An intuitive design of the web page makes the system easier to use (Norman, 2013). This decreases the need for help when using a system. It will also hopefully not be that necessary to memorize the stages in the process of using the system, or make lists for how to use the system, if the older adults could find back to it and do it by themselves from the beginning.

As seen in the web services in this study and several previous studies, the design of the web services are not developed to target older adults (Nielsen, 2013; Fidgeon, 2006; Chadwick-Dias et al., 2003; de Almeida et al., 2015). When co-designing with older adults, new and radically different designs were created, which revealed their challenges regarding small elements, logic and mindset, and the overall structure of the systems. Through observations with the older adults in use of digipost.no and altinn.no, the researchers found that the web services need to account for physical limitations like trembling and poor eyesight which clearly made it difficult to click and see elements that were too small. With all the different findings in mind, the research team created a list of recommendations to keep in mind while designing web pages for older adults, discussed in Section 6.3.1. When designing for older adults, the design will not become less usable for the rest of the inhabitants (Fisk et al., 2004). The public authorities would benefit from this, as when the web services are useful for a larger group of people, the need for training and follow-up services may decrease.

In the observation of older adults in this research, it was seen that information visualized in the outer edges of the screen and outside the current screenshot (reachable by scrolling) was not identified. Many of the participants had high resolution on their screen, as the web elements were too small in the standard preview. This limited their total overview of the web page, which caused them to miss some of the information, as seen in Figure 5.3 from the usability test.

Possible solutions for creating design for the least digital group in society, may be to introduce a platform-based way of developing design of public web services. This can provide several

possibilities, whereas 1) create the ability for open-source API, where third-parties can develop competitive designs of public web services, and 2) a possibility to show a "super easy" solution of the web service for those who prefers that.

The "super easy" solution of online banking introduced by DNB includes only the necessary features and a clean and well-structured design, which was targeted to incorporate the least digital users into online banking. This solution differentiate with the idea of universally designed web services, as Universal Design (UD) focuses on providing the same design for everyone, regardless of age or abilities (Keates et al., 2012). Even though, UD has important elements, it may not in all cases be the best solution. Older adults participating in this study expressed that they would rather like a design customized to their demands and needs, and were not bothered by others having another design.

6.3.1. Implications for Design

Based on the findings from this research, a list of recommendations for designing for older adults was made:

- Large clickable areas.
- Space between clickable elements.
- Use terminology that is easy to understand for everyone.
- Icons should be presented along with descriptive text.
- Activity focused structure which gives a logical overview of the service.
- Simplify the design by avoiding unnecessary distractions.
- Pop-ups need to occur in the middle of the screen to make sure the user discover it.
- Clear and explanatory error messages in the middle of the screen.
- Return-button needs to be available, easy to access and at the same place at all pages.
- Ability to have colors with contrast as older adults may have poor eyesight.
- Use metaphors that are known for everyone as it increases the understanding.

The recommendations "larger clickable areas" was supported by (de Almeida et al., 2015; Nielsen, 2013; Fidgeon, 2006). de Almeida et al. (2015) also discovered the importance of having space between elements, icons and descriptive text together, appearance of elements in the middle of the screen, explanatory error messages, contrast colours and return-button when designing for older adults. Simplified design and easy-understandable terminology was also identified as important in this study, as well as by de Almeida et al. (2015) and Fidgeon (2006).

This research provided some new recommendations, which may be interesting for further research. The older adults seem to have a different mindset, as seen in Figure 5.8 from the co-

design workshop. They often use relating activities to structure their navigation and their mind. This contradicts with structure of the web-based public service today, which are structured in a taxonomy structure with different categories. Another recommendation is to use familiar and known metaphors when designing for older adults, as it increased the understanding of the web service. de Almeida et al. (2015) and Fidgeon (2006) provided some additions to the mentioned recommendations. One interesting point was the helping feature that all web services should provide for their users. However, this was not found in this research as the participants did not utilize the help functions. The other recommendations were considered to be beyond the scope of this research.

It is important to keep in mind that the recommendation list developed in this study is not a template that could be used without examining the target group for a specific case. As the recommendation list is only a small part of this study, it could only be used as an example that shows indications based on the experience in this case study. To create a more comprehensive list, it would be necessary with a study with recommendations for design as the main goal of the research and with more specified activities for this, with a larger selection. Regardless of how thoroughly the list is further developed, it is important to keep in mind that all recommendations need to be specified for each service to find the best solution. The future users of the system should also be included in the development of the specific design of the service.

Even though the example from the usability test in this research found a significantly higher score for the prototype developed through the co-design workshop, it is important to notice that this is only an example of what some users prefer through a simple test. The research team do not know if they would have used the solution over time. This is something that cloud be interesting to look deeper into in a future study.

6.4. The Users are not Involved in the Design Process

The DAMVAD (2015) report stated that the digital public systems needs to be improved and simplified. But how could they make sure the systems will be improved without saying anything about including the users in the process?
This statement is divided into two different sub statements which will further discuss the user involvement.

6.4.1. The Designers and Developers Test their own Ideas and Solutions

In the development process of web-based public service today, it was found that the designers and developers of all public web services, in this research, includes their users mainly through usability tests. These test are made to verify whether the concepts and prototypes are good

enough, or if small parts or aspects have to be adjusted and further developed.

However, this approach of including the users do not provide the ability to test if it actually is a good solution or if there could be other concepts or solutions which would be better. It can also be difficult for the participants at the usability tests to criticize the design because the design is already developed to some extent. As mentioned in Section 5.3.2, there has been more focus on including the users early in the pre-design phase and in the development of user journeys. It is important to include the users in the pre-design phase, in order to fully understand the needs and mindset of the end users (Sanders and Stappers, 2008). Today, the involvement is first and foremost done through findings from other research, but also through questionnaires and interviews, rather than directly through a workshop, etc. One aspects that has been prominent among the developers of the public web services is that they are not focusing on having direct involvement with users. This can be the reason that many of the developers and designers are basing their work on reports from researchers and questionnaires. The researchers are intermediaries in these reports which creates room for interpretations. For each intermediary, the risk of misinterpretations in the reports becomes higher (Courage and Baxter, 2005).

By using questionnaires and interviews a more thoroughly insight in the users' needs and other important aspects of their requirements, can be provided. However, these methods are not enough as they cannot identify their thoughts and feelings regarding what is logical and intuitive for them in the overall design. The explicit and observable knowledge can be identified with the use of questionnaires and interviews. Tacit knowledge is not included (Cain, 1998; Sanders and Stappers, 2008). Even though designers and developers of the public systems acknowledge the need for better inclusion, none of them reflected on the use of co-design as a suitable approach. When co-designing with the users, concrete suggestions are created. These suggestions show their way of thinking both about the structure of the web service and different details of what they know, feel and dream, in order to create a good design. In other words, the tacit knowledge (Sanders, 2003; Polanyi, 2009) can be revealed in addition to the explicit and observable knowledge which they can express with words in an interview or observation session (Sanders, 1992; Cain, 1998). Designers often think differently than the users of a system, and the designers can learn a lot by including users in a co-design session (Fisk et al., 2004).

In the co-design workshop conducted in this study, it was found that the participants found it more logical with a design structured around activities. Even though the research team had analyzed the web service themselves, done interviews and observations of older adults in use of the system, they did not consider an activity-based design as an alternative. This showed that the research team were able to address the older adults' tacit knowledge by the use of co-design. By including the users in shaping the design, diverse solutions will occur. If these solutions are combined with the designer's ideas, the creativity and innovation will increase (Trischler et al.,

2017).

Previously, the mindset by the developers and designers has been "one size fits all", but this has changed to involve that "what works for me, may not work for you". However, the developers and designers of the public web services interviewed, do not have specific target groups. With specific focus on a target group, preferably the group with the most digital challenges which in this case are the older adults, design would generally also target the rest (Fisk et al., 2004). If users are not involved at all, it will only be the users who are in the same group as the designers who will be included, and enormous cost could follow.

By including the users, the resistance against not using the web services may decrease, and the acceptance may increase as their needs are more precisely met. This is graphically illustrated in Figure 6.1. When the acceptance among the users increases, the users will be more willing to use the system as they participate in the development. And when they are more willing to use a system, it will influence the intrinsic motivation positively, which may make it easier to manage the systems as well (Ryan and Deci, 2000).

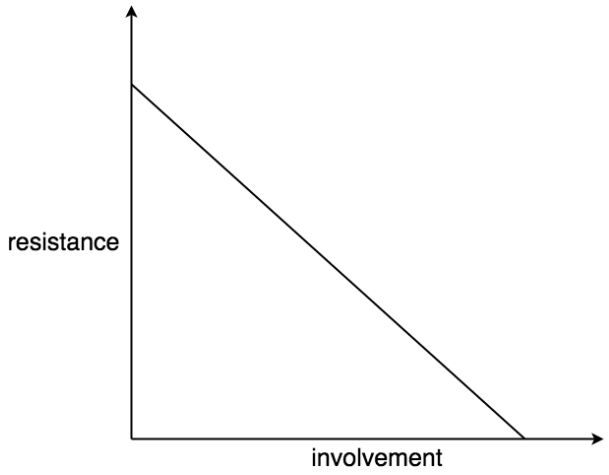


Figure 6.1.: An illustration of lower resistance from the users when the involvement increase

6.4.2. The Users are not Involved in the Development of the Conceptual Model for the System

When the users are not included in the development of the conceptual models nor in the design of the web services today, it makes it harder for the designers to create conceptual models matching the mental model of the users.

When a system is already made, the users need to develop their own mental model through interaction with the system, as shown in the Figure 2.3. They get no ability to communicate with the designers, get instructions or help by those who developed the systems (Norman, 2013).

They will therefore depend on help from others. If the users are involved in the development of the conceptual model of the systems, the user's mental models will not need to be adjusted as much through the use and through training subsequently (Norman, 2013).

This study illustrate, by an empirical example, the effect of a direct link between the users model and the conceptual model for the system. In this way the conceptual model become more similar to the mental model of the users. As described in Section 5.3.2 in findings, the participants discussed the system to find a mutual understanding. This made it easier for them to understand their own- and each others mental model. Since several attendees had never used digipost.no before, they had not developed a mental model in advance. By creating a mutual understanding, they developed a kind of a common mental model of the system. This contributed to a more efficient way to develop the conceptual model for the system which presented their common mental model.

Through the usability tests of the prototype developed with the older adults and a prototype of the existing solution, it turned out that the conceptual model made by the older adults though co-design got a significantly better matched with the mental models of the test persons, than the one developed by the design team at Digipost. This showed that by doing co-design with relevant target groups, it can provide better results, even though the design of digipost.no today is developed over time. This shows that the money used on direct involvement of the users before and under the design process is well used money which will easily be saved when the system is developed (Nielsen, 2003).

Even though this research found a better match between the conceptual model made trough co-creation and the mental model of the users from the usability tests, it may not necessarily be possible to generalize to other users. If other users were included in the co-design workshop, other solution would occur, due to the presumable differences in the mental models. It is possible that another solution co-designed with other users would have been even better for the general user. Most importantly, a co-created solution reduces the distance between the developers and the users, that will help create systems which are easier to use for the end users.

As Norman (2013) stated, it is important with good communication with the users to make good conceptual models. Since the older adults are more likely to need help when using a system, it makes it even more important to have a good communication with these group through the model. It is important that they understand the metaphors, concepts and relationships and mapping between the concepts, which contributes to the understanding to ensure that the context of the design reflects their knowledge (Johnson and Henderson, 2002). This became prominent in co-design workshop in this research. The attendees were trying to find mapping and metaphors that fits all the present participants understanding. This helped them express their ideas in a way

that the rest of the group understood.

As this research found, the designers and developers in public sector often conduct usability tests. In these tests, the designers evaluate whether the conceptual model of the system is usable for the end users, and if the users are able to adapt their mental model to the conceptual model. In recent times, it has become more commonly in the public sector to gain insight to the users wishes, needs and mental model of the existing service before the designers creates the conceptual model. This approach is related to the UCD. The UCD approach was also used by the designers of public web services interviewed in this research. In Figure 6.2, this way of involving the users is illustrated. The figure is adapted, combined and further developed from Sanders and Stappers (2008) and Norman and Draper (1986) models.

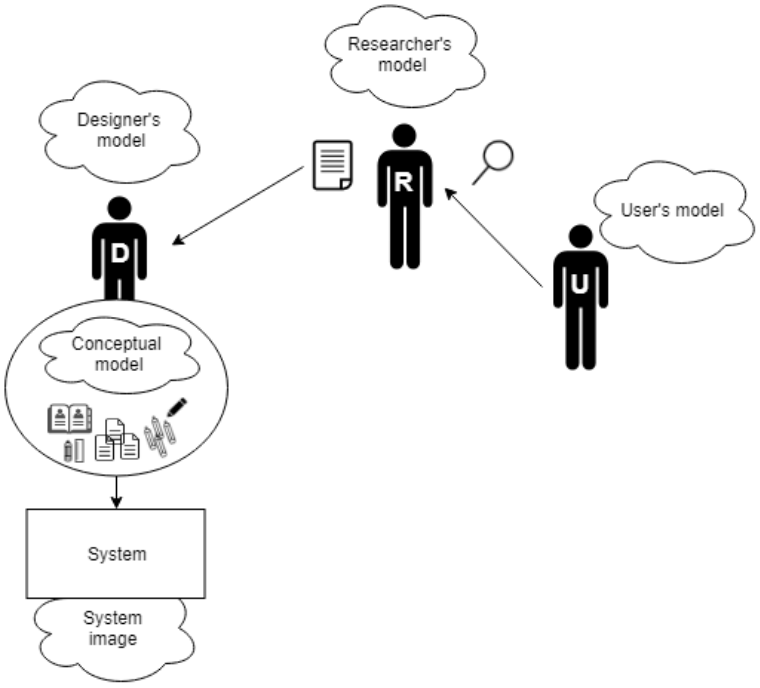


Figure 6.2.: Model: Third party investigating users needs

In the figure, the researcher (R) is in dialogue with the user (U) and investigate the user's needs and wishes before it is interpreted and written in a report. The report are delivered further to the designer (D) and works as a basis for the conceptual model and further becomes the design of the system. The person who are referred to as the researcher, can be whichever third-part who do investigations and gain insight to the user group. It can also be the designer. The approach of having an intermediary doing the investigations of the users, is a common approach in UCD where the users needs are seen through reports when developing the conceptual model. As stated earlier, when there are several intermediaries involved, this may lead to misinterpretations (Courage and Baxter, 2005).

If the users are involved directly in the design of the systems, there are no need for intermediaries, and less misinterpretations are made. Additionally, the designers are able to access explicit, observable and tacit knowledge that the users possess (Sanders, 2003). The important role of direct involvement became prominent in this research. The researcher tried to understand the users needs using several methods like interviews and observation in different settings. However, several new insights into tacit knowledge became evident trough the co-design workshop. There would then be more desirable with a direct link between the users' and the developer's model instead of this intermediary. The value of a direct link was experienced in this research. By letting the users be part of the design process together with the designers through co-design, they got an opportunity to influence the conceptual model of the system. This is illustrated in Figure 6.3. The figure is adapted, combined and further developed from Sanders and Stappers (2008) and Norman and Draper (1986) models.

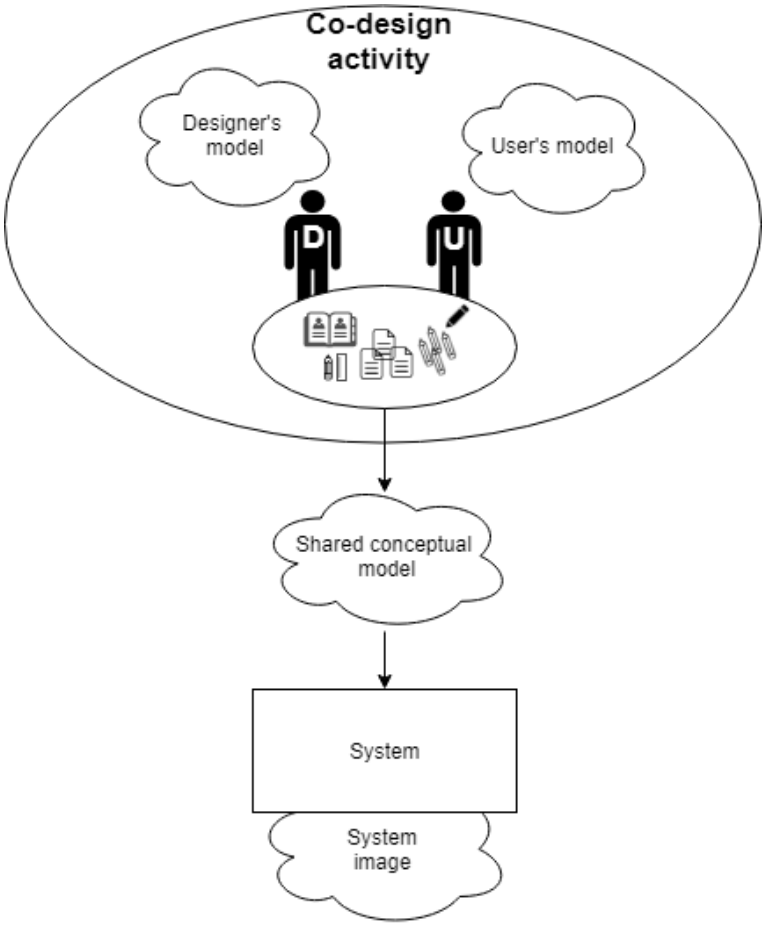


Figure 6.3.: Model: Direct involvement

In this figure, the users (U) and the designers (D) develop the conceptual model together through a co-design session. There are several different activities and methods that can be applied for this purpose. The designers plays a role as facilitators in a co-design session, in order to provide the users with a proper mindset in the workshop (Sanders and Stappers, 2008). The users, illus-

trated in Figure 6.3, can be all the different stakeholder of the system, both service providers, the end users and other external stakeholders. User's model in the figure include requirements, needs, experiences, values, previous knowledge and possible an already existing mental model. The mental model is probably based on the previous system (either digital or non-digital), and their ideas of how the new system should work. The designer's model contains previous knowledge and assumptions which the designer must try to put aside. The designers role is in this context is to facilitate the users in the designing of the shared conceptual model and the design of the system. This shared conceptual model becomes the base when implementing the system. Then it is likely that the conceptual model is matching other users mental model better as well. The discussed value of making a shared conceptual model through co-creation is supported by the findings in this study.

This research gives an empirical indication for developing the Figure 2.3 from Norman and Draper (1986) (and frequently reused, e.g.: Papantoniou et al. (2002); Stone et al. (2005)) and the co-design part of Figure 2.1 from Sanders and Stappers (2008) and combine the two theories as illustrated in Figure 6.3. By combining the theories it is easy to see that the users works as co-designers to create a conceptual model for the system, where the designers works as facilitators (Sanders and Stappers, 2008; Sanders, 2003). This makes the conceptual model matching better with the mental model of the users. The research team encouraging other researchers to do more empirical studies to strength the indication for the connection between the theories. This could probably make it easier for the designers and developers. In addition the authorities can understand and discover the benefit of the direct involvement of user in the development of conceptual models.

6.4.3. Implications for Practise

Based on the findings, a list of recommendations for the design process was made. This summarize useful steps to keep in mind while doing the design process:

- Involve the users directly in the pre-design and design process.
- Find a proper target group: it can be useful to choose the group with the most digital challenges, since good design for them, generally is good design for everyone.
- Designers and researchers should facilitate the participants in the co-design, but still let users find the solutions themselves.
- Let the participants brainstorm individually first. Afterwards let them brainstorm in groups where aspects could be discussed so that more ideas could evolve.
- Facilitate activities where their mental model can be observed.
- Facilitate activities to investigate the useful features and prioritize features of the system.
- Facilitate activities where the participants can prototype their ideas.

6.5. The Cost of not Involving Older Adults is Unknown

The main factors of the establishment of "digital by default" in the public sector, were to save money and find a more efficient use of resources, in addition to providing the users with high quality services. This research showed that the older generation are not satisfied with the public web services.

Today, people are automatically opting in for digital correspondence. There may be an underlying consciousness from the authorities' perspective, because they want people to become digital. Consequently,the proportion of those who manage to opt out of digital correspondence, and by definition have the least digital competency, is low. The number is artificially low, according to indications from this research. As a result, the authorities are provided with a misleading number of citizens struggling with the digital world.

Even though digitalization may cause huge savings, the people who are left behind may be a bigger cost. However, it may be more expensive than including the marginalized group. In the short term, savings may arise. In a longer perspective, the expenses may be bigger, both for the society and for the individual.

Cost for society:

- Improved design: It is more expensive to change the design when the system is already developed than before the implementation (Stappers, 2006).
- If the systems are not good enough, they have to be continuously upgraded. This especially applies to web services, where the upgrades happen automatically without informing the users.
- Education: The need for courses and training increases if the users have to learn a new interface of the system.
- Resources for support: If the systems are difficult to use, more people need help while using them.
- System not in use: If the systems are difficult to use there is a risk that people may give up trying and call for help as they used to.

Cost for the individual:

- Being marginalized from the society.
- The feeling of being unsuccessful.
- Decreased sense of achievement. They may not be able to do things they mastered before the digitalization of the public systems.
- Affecting their mental health.

Since the public web services are delivered to all Norwegian citizens, it may be a challenge to develop intuitive systems that target everyone. The authorities need to consider multiple perspectives and interests. They need to ensure a sustainable future for the country while still considering the individual citizens' satisfaction.

Nevertheless, their focus may be wrong when they order development of new systems. As found in interviews with the different representatives of the web-based public service, they prioritize the needs of the different sectors, along with regulations and decisions made by the authorities. The actual users are not prioritized, neither private users nor users on the service side. Svanæs and Gulliksen (2008) also recognized this structure and prioritization in hospitals, where the users of the systems were not considered in the development of new systems. Those who develop the public web services need to develop features based on orders from the different departments, and receive financial support to realize these orders. The orders do not consider the overall structure of the system.

This prioritization may be related to how the authorities measure their gain and success. Today, it seems like success is measured in the savings they do in the development of new systems, which was also seen as an important business-strategy in the study by Brenes et al. (2008). The Norwegian authorities should rather measure their success and gain by user satisfaction (Tvedt et al., 2009), and the number of people who actually utilizes the digital web services.

The authorities focus on developing digital solutions rapidly. In the short term, this makes the authorities reduce cost, but this may lead to systems with lower quality (Hartson and Pyla, 2012). This results in systems that need to be further developed subsequently. It also induces difficulties for the users and a low user satisfaction. To handle this problem, more insight into the end users is required, through involving them directly in the development process. When the users are directly involved, the developers and designers will gain more insight in how and what to develop. Today, the authorities allocate an insufficient amount of money for user involvement. Nielsen (2003) supports the need for money allocated to increase the usability of the systems. By involving the users in the digitalization of the public sector, the authorities will reduce the cost in the longer term. The systems developed through user involvement gives a higher quality for the users. This also gives a higher satisfaction among users (Steen et al., 2011).

The authorities also wish to create more self-service systems, where the users actively take part in serving themselves. This will save public resources, which can be allocated to do other important tasks. The online banking systems include the users as workers by letting them provide feedback on what the users need, in order to make the systems more usable. This may lead to several people utilizing the services. However, the inclusion of users are in contrast with the

authorities' mentality, as they wish to include the users by making them a "working customer". In this study it was evident that not everyone had the needed skills to be a working customer. This confirms the findings from the research made by Dunkel and Voß (2004). If self-service strategy is desired, the solution should be influenced by the users feedback and level of skills.

The skills of the customers are a valuable economic asset for the authorities (Rieder and Voß, 2010). This may be a reason why they have a large focus on increasing the digital competency among the citizens by providing courses. Nevertheless, the courses help to handle the already existing problem. Instead of trying to cope with the problems, it may be more important to uncover why the problem occurred in the first place. When developing user friendly systems that matches the citizens needs, the reason behind the problem may become clear. This will affect the authorities and municipalities positively, as less resources are needed to increase the competencies of the weakest groups.

If the self-service systems were easier to use, they would also require less skills. The users would be provided with more efficient service and additional control over the information concerning them. When users manage to use the services and understand the value of the digital service, this will also increase the value for the service providers. The research team would never have come up with the design solution presented in Section 5.3.1 without having the attendees at the co-design workshop expressing their thoughts through illustrations. It is neither time consuming, nor does it require a lot of resources to this kind of user involvement. It could even save the designers time they would have spent discussing different options.

The research team wants to encourage both the authorities and the different providers of web-based public service to make a clear strategy for the cost of not involving the users in the process of designing the systems. A well thought out strategy yields more deliberate choices. If this examination supports the findings from this study, co-creation will hopefully be included in future orders from the authorities.

6.6. Co-creation Could be a Solution

As earlier discussed, co-creation turns out to be a useful tool, which matches the conceptual model designed for the system closer to the mental model of the users. The example from the co-design workshop in this research did not require much resources to conduct. However, the outcome turns out to be significant. At the same time, it could have been more time consuming for the designers to discuss what they thought would be the best solution. The internal solution among the designers may not fit the users idea about how the end product should be. The users are likely to have another mindset than the designers. Due to this, including the users directly in

the process is important, instead of letting the designers guess what would be the best solution for the users.

Co-creation is more than just co-design workshops. Including all the aspects related to the problem area is important. All the stakeholders involved should be included to make sure their needs are considered. It could be interesting to involve different types of stakeholders in a common workshop to see how this influences their understanding of each others needs.

It is a risk that results from co-creation are not used after the workshops and field work are finished. To prevent this, it is important with proper tools which communicates what the actual contribution from the co-creation is. This research indicates that involving the theory of conceptual and mental model may be a tool helping to concretize the contribution. When having in focus that the conceptual model for the system needs to be developed together with the user to match their mental models, it is easier to see the benefits of designing together with the users. Co-creation also require everyone to be at the same level. The problem of utilizing the results from co-creation also relates to the challenges to make use of co-creation in a broader perspective where many different actors are involved in a complex system. It is often several actors involved in the developments of public systems and several services are often linked together. It is important that all the different actors take part in the co-creation processes in order to obtain a good communication and a mutual understanding of the needs, which lead to an end product that match the mental models of the users.
It is important to remember that co-creation is only one possible solution. It could also be other methods improving the situation. The most important is that the users need to be directly involved, to ensure that the their actual thoughts, needs and tacit knowledge are included.

6.7. Limitations

Time and resources for this project were restricted. If given more time, the research team would have done a more thoroughly exploration of the problem area and performed co-design workshop for other web-based public service to identify patterns. It would also be interesting to talk with the older adults' relatives, the different instances of Difi, and other voluntary organizations like Senior ICT, in order to understand their point of view. These perspectives were not included in the research due to lack of time and resources.

The research team consisted of two persons, with the assistance of one supervisor. Limited resources made it difficult to identify and observe all the aspects of the older adults' experiences with the digital everyday. By recruiting a larger selection of older adults the information base would be more extensive. The research team chose to focus on older adults who were motivated

to learn and wanted to share their experiences with the digital everyday life. If a more diverse range of older adults were recruited, the research could have explored into a broader user group with more diverse challenges. The selection did also contains more women than men, as they signed up to participate in the study.

All of the web-based public service involved in this research contain sensitive information and require secure login. This circumstance made it difficult to fully investigate the usage, as not all participants accepted to share their sensitive information. One attendee even chose to cancel the interview to avoid giving access to the sensitive information, which the research team respected. The research team chose not to conduct any video recordings of the interviews and observations regarding ethical considerations of the attendees. However, video recordings could have provided the research team with a more efficient and thorough analysis of the older adult' experiences concerning the use of digital web services.

In human research, human errors will always be a risk. This include the researchers ability to understand the situation properly, and also unpredicted occurrences. For instance, some participants became ill or forgot the appointment. This is more likely to happen to older adults, considering their age and health. This resulted in canceled and rescheduled interviews, and also less attendees than planned in some of the activities. For instance, one participant forgot the agreement to attend the co-design workshop. It was impossible to find a replacement as the research team did not get any notice.

The eye tracking tools that were used in the usability tests required the participants to conduct the test within a lab and with a unfamiliar computer. This could potentially have affected the results as they were not using their own computer, nor being located in a familiar environment. Further, some older adults in this research preferred to use tablets instead of a computer. The use of computers in the usability test, may therefore have affected the findings.

6.8. Research Critique

Even though the researchers were critical to the sources of information used in the study, some news articles were included. However, the news articles were only used as examples, and do not provide the main source of information in any case. News articles often presents only one perspective and may adjust some facts to fit their stories, which is important to keep in mind.

The involvement of older adults in the digital life is a complex problem, and there are many factors affecting how the older adults cope with the increase digitalization (Friemel, 2016). Several factors, like how to motivate people that are not involved in the digital everyday, tools

that can help them cope with their physical challenges and social contexts like the degree of Internet usage in their social networks, were not investigated in this case study. If more factors were included in this study, the case study would have been even more complete.

The participants in the study were all from the same geographical area which may have affected the results. The older adults from this area may not represent the same group located other places in Norway. The situation in Trondheim may also differ due to the focus areas and available service in the municipality and county compared to other municipalities and counties.

As mentioned in the limitations, there was a higher selection of women participating in this research than men. The recruiting were done by sending an email asking for participants. The first respondents were included in the selection. This resulted in more women answering, than men. If the research team had influenced the selection by recruiting men in specific, the selection could have been more balanced. However, the research had male participants in all the conducted activities. Concerning the usability test, the research team focused on recruiting participants who had no prior knowledge regarding the developed designs in the co-design workshop. This was done to obtain reliable results regarding the usability of the system.

In the usability test there were five participants. This number is stated by Nielsen (2012) to be an ideal number to discover all usability problems as if you have had many more attendants. Nevertheless, in an eye-tracking session the recommended number of participants is said to be 39, as this would provide better heatmaps for comparing the participants and analyzing the overall experience (Nielsen, 2012). To obtain a better comparison between the heatmaps, it would have been beneficial for the research team to increase the number of participants in the usability test. However, the main focus for the usability test was to compare the two prototypes developed. Considering this focus, five participants is a proper number. Additionally the older adults attending the usability test were located in the same room after they had tested one prototype. Even though the research team made it clear that their experiences with the prototypes was not a convenient topic for their conversation, it is possible that it was discussed anyway. This may have affected the SUS results and their answers as they were able to discuss their opinions about the design.

The social desirability (Podsakoff et al., 2003) may also affect results in this research. The participants were informed about the purpose of the research, which may have influenced their behaviour. The participants may have answered what they thought the research team wanted to hear. This may include their potential problems using the web services and also what causes the problems. Social desirability is not easy to completely avoid. However, the research team tried to deal with this issue to the best possible extend. When observing the participants in the use of the services the actual experiences is hard to hide and the research team managed to get a

more correct understanding of the situation. The risk of social desirability is also applicable to the interviews with developers and designers of public web services. The research team's focus on older adults in the digitalization may have affected them to present their work on inclusion as best as possible. Additionally, the research may have influenced them to become more aware of who to include and how to include the users in the development process in the future.

All participants in this study knew they were observed by the research team when interacting with a public web services. This was done to maintain the ethical rights for the participants. However, it is important to notice that this may have affected how the participants behaved or used the public web services. A common reaction when knowing people are watching how one perform a task, is to be stressed. This was also observed in this study, but it became less affecting when the attendees got used to the researchers' presence.

Some findings from this study may be affected by the researchers prior knowledge about problem area and theory. As this research was conducted with an inductive and exploratory approach, it required the researchers to stay open minded and learn throughout the investigation. Even though the researchers tried to put aside assumptions and previous knowledge, it is always a risk of affecting the mindset. This bias was also a risk in inductive analysis, where the analysis may be affected by prior knowledge and pre-assumptions.

The research team initiated the research by trying to use affordance and awareness theory as possible tools to target the area of concern. Throughout the exploratory case study, this theoretical base was shown to not be the best approach. There may be bias related to some findings due to some questions focusing on affordance and awareness. These findings were not included in the further research. However, the researchers asked several open questions, which were valuable for the further study.

There are several methods and approaches to conduct a co-design workshop. This research presents a co-design workshop containing three methods. It is important to notice that by using other methods, or the same methods with different participants the results may differ.

6.9. Future Work

Even though there are different research containing recommendations when designing for older adults, they do not address the older adults desires, needs and logic related to public web services. This study indicates the appropriately of doing more research related to involving the older adults directly in the design process of the web-based public service.

The public web services need to fit a huge range of users. To handle the variety, a good approach may be to focus on the user groups that do not manage the use of these services. This research found that there are not only older adults who struggles with the web-based public services. This also applies to immigrants, people with psychological challenges, people with physical disabilities and younger people with low motivation for usage.

The situation regarding the older adults in the digitalization is complex. There are many aspects that were not included in this research and require additional investigation. This involves variation in motivation, competency and demographic aspects, different levels of digital divide, social context and support network surrounding the older adults. It would also be useful to develop new tools to compensate for physical limitations.

This research indicates that the older adults have another mindset than younger people. They tend to think in activities, boxes and images, not in a taxonomy structure like many web services are structured today. Considering the limited participants in this study, it requires more thoroughly research in order to determine patterns among older adults. Additionally it would have been interesting to conduct co-design workshops with other public web services than digipost, to compare different web services.

In this study it is suggested to use theory on conceptual and mental models as a tool to get use of findings from co-creation. There is need for more research on the connection between conceptual- and mental models and co-creation.

It may also be interesting to create a course for developers and designers of the public web services regarding how to involve users directly in the development process. Through a course they can learn from others and acquire new methods to obtain knowledge of the potential end users and also how to make use of the results.

The research team encourage designer and developers to cooperate closer with SeniorNet and other non-governmental associations as it will expand their knowledge regarding the least digital groups in society.

Last but not least, the research team recommends the public authorities to investigate the cost of not involving the users direct in the development process of the web-based public systems.

7. Conclusion

This chapter will summarize the study and provide a conclusion based on the research questions, findings and contribution.

The Norwegian authority wants to digitalize the Norwegian society and rapidly develop web-based public service to increase the efficiency and lower the financial expenses. Due to rapid development and systems being ordered by the authorities, the end users' needs are not considered. This induces that the web services subsequently need to be redesigned, which in longer terms will be expensive. Also, by developing web-based public service that are not usable for the weakest groups in society, the weakest group will be marginalized. This marginalization will provide the individual citizen with less empowerment and control over their own lives, which may contribute to negative effects on their self-esteem. The older generations are among the most vulnerable, but this also applies to younger generations.

The older adults participating in this study experienced challenges with the use of web-based public service. They also struggled coping with the rapid development and they expressed despair of being marginalized and left behind in the digital society. The older adults feel forced to use the digital services delivered by the public sector, as there are no competitors. Consequently, they are dependent on help by family or voluntary organizations like SeniorNet to master their everyday life. The public sector do not provide enough resources to cope with this problem, which leads private organizations and families to handle the large amount of people being marginalized.

The development process in public sector today is dominated by digital solutions being developed based on commissions from various authorities. These orders provide less opportunity for user involvement. Even though the developers of public web services has grown a higher focus on their users, they often include users only through the validation of the developed design. This is done through usability testing. The developers has also seen the importance of gaining insight into the user's needs before developing the systems. Nevertheless, none of the developers involved in this study include the users directly in the design process. In this study, it was shown that by involving the end users directly through co-design, new and more customized solutions can be developed. By involving the users in the development process, the conceptual model of the system will reflect their needs, and the adaption to the users mental

model will be more efficient. This will further decrease the chance of having to redesign the systems subsequently. The involvement of users do not necessarily require much resources, or needs to be time consuming. Today, the developers and designer do not have a clear strategy of how to specify a target group for the web-based public service. It may therefore be efficient to target the weakest groups, as earlier research indicates, the design will also provide usability for more experienced users.

This study indicates that co-creation by involving the intended end users in the development process of a system could be a good solution to create systems that matches the users needs and demands. The theory concerning conceptual- and mental models could be an useful tool to take advantage of the outputs from the co-creation work.

Based on these indications, the research team recommend the public sector to consider, to a much greater degree, the possibilities for early and direct involvement of the users in their work with web-based public service. If this will be too ambitious, a clear strategy examining the cost of not involving the users will be recommended. The strategy should include both cost for the individual citizen and for the authorities, in order to make a conscious decision.

Early and direct involvement can provide large economical savings for society, and simultaneously improve the situation for the individual citizen.

Bibliography

Agency for Public Management and eGovernment (2018). Universell utforming av ikt. Accessed: 2018-05-06.

altinn.no (2018). altinn.no. `https://www.altinn.no/`. Accessed: 2018-01-18.

Arch and Andrew (2010). Web accessibility for older users: A literature review. *W3C*.

Bovey, W. H. and Hede, A. (2001). Resistance to organizational change: the role of cognitive and affective processes. *Leadership & Organization Development Journal*, 22(8):372–382.

Brenes, E. R., Mena, M., and Molina, G. E. (2008). Key success factors for strategy implementation in latin america. *Journal of Business research*, 61(6):590–598.

Bugge, S. (2016). Nav snur for pensjonister: Fortsatt mulig å få utbetalinger i posten. [Online; posted 06-December-2016].

Cain, J. (1998). Experience-based design: Toward a science of artful business innovation. *Design Management Review*, 9(4):10–16.

Carey, S. (1986). Cognitive science and science education. *American Psychologist*, 41(10):1123.

Chadwick-Dias, A., McNulty, M., and Tullis, T. (2003). Web usability and age: how design changes can improve performance. In *ACM SIGCAPH Computers and the Physically Handicapped*, pages 30–37. ACM.

Clement, A. (1996). Computing at work: empowering action by low-level users. *Computerization and Controversy-Value Conflicts and Social Choices*.

Courage, C. and Baxter, K. (2005). *Understanding your users: A practical guide to user requirements methods, tools, and techniques*. Gulf Professional Publishing.

Cresci, M. K., Yarandi, H. N., and Morrell, R. W. (2010). The digital divide and urban older adults. *CIN: Computers, Informatics, Nursing*, 28(2):88–94.

Dahl, Y., Linander, H., and Hanssen, G. K. (2014). Co-designing interactive tabletop solutions for active patient involvement in audiological consultations. In *Proceedings of the 8th Nordic Conference on Human-Computer Interaction: Fun, Fast, Foundational*, pages 207–216. ACM.

Damodaran, L., Olphert, C., and Sandhu, J. (2014). Falling off the bandwagon? exploring the challenges to sustained digital engagement by older people. *Gerontology*, 60(2):163–173.

DAMVAD (2015). Tiltak som kan bidra til å øke befolkningens digitale deltagelse og kompetanse. *DAMVAD*.

David, S. and Edwin, M. (2013). Bringing users into your process through participatory design. *UX week*.

de Almeida, R. X. E., Ferreira, S. B. L., and Soares, H. P. (2015). Recommendations for the development of web interfaces on tablets/ipads with emphasis on elderly users. *Procedia Computer Science*, 67:140–149.

Deci, E. and Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.

Demiris, G., Rantz, M. J., Aud, M. A., Marek, K. D., Tyrer, H. W., Skubic, M., and Hussam, A. A. (2004). Older adults' attitudes towards and perceptions of 'smart home'technologies: a pilot study. *Medical informatics and the Internet in medicine*, 29(2):87–94.

digipost.no (2018). digipost.no. `https://www.digipost.no/`. Accessed: 2018-01-18.

Digital agenda Norway (2012). Digitizing public sector services: Norwegian egovernment program. *Ministry of Government Administration*.

dnb.no (2018). dnb.no. `https://www.dnb.no/`. Accessed: 2018-01-18.

Dunkel, W. and Voß, G. G. (2004). *Dienstleistung als Interaktion: Beiträge aus einem Forschungsprojekt; Altenpflege-Deutsche Bahn-Call Center*, volume 5. Hampp.

Dutton, W. and Blank, G. (2014). Cultures of the internet: Five clusters of attitudes and beliefs among users in britain. *SSRN*.

e boks.com/norge (2018). e-boks.com/norge. `https://www.e-boks.com/norge`. Accessed: 2018-01-18.

Ehn, P. (1988). *Work-oriented design of computer artifacts*. PhD thesis, Arbetslivscentrum.

Ellis, R. D. and Kurniawan, S. H. (2000). Increasing the usability of online information for older users: A case study in participatory design. *International Journal of Human-Computer Interaction*, 12(2):263–276.

Fidgeon, T. (2006). Usability for older web users. *WebCredible, February*.

Fisk, A., D, A., Rogers, W., A, W., Charness, N., , N., Czaja, S., Sara, J., , S., and , J. (2004). *Designing for Older Adults: Principles and Creative Human Factors Approaches*. CRC Press.

Friemel, T. N. (2016). The digital divide has grown old: Determinants of a digital divide among seniors. *New Media & Society*, 18(2):313–331.

Hanington, B. and Martin, B. (2012). *Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions*. Rockport Publishers.

Hartson, R. and Pyla, P. S. (2012). *The UX Book: Process and guidelines for ensuring a quality user experience*. Elsevier.

Helsedirektoratet (2018). Eldre ønsker mer veiledning etter opplæring i digitale verktøy. [Online; posted 16-May-2018].

helsenorge.no (2018). helsenorge.no. `https://helsenorge.no/`. Accessed: 2018-01-18.

Hernández-Encuentra, E., Pousada, M., and Gómez-Zúñiga, B. (2009). Ict and older people: Beyond usability. *Educational Gerontology*, 35(3):226–245.

Hornnes, E., Njøs, C., Hails, S. J., Botn, A. S., and Hansen, L. U. (2014). Staten må tenke annerledes for å gjøre oss til flinkere brukere. motivasjon og barrierer for digital kommunikasjon med det offentlige. *Difi*.

Johnson, J. and Henderson, A. (2002). Conceptual models: begin by designing what to design. *interactions*, 9(1):25–32.

Johnson, R. and Kent, S. (2007). Designing universal access: web-applications for the elderly and disabled. *Cognition, Technology & Work*, 9(4):209–218.

Kania-Lundholm, M. and Torres, S. (2017). Older active users of icts make sense of their engagement. In *Seminar. net*, number 1 in 13.

Kanstrup, A. M., Rotger-Griful, S., Laplante-Lévesque, A., and Cleveland Nielsen, A. (2017). Designing connections for hearing rehabilitation: Exploring future client journeys with elderly hearing aid users, relatives and healthcare providers. In *Proceedings of the 2017 Conference on Designing Interactive Systems*, pages 1153–1163. ACM.

Keates, S., Clarkson, J., Langdon, P., and Robinson, P. (2012). *Designing a more inclusive world*. Springer Science & Business Media.

Klein, H. K. and Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS quarterly*, pages 67–93.

Knudsen, T. (2018). Norge er i digitaliseringstoppen. 400.000 mennesker står utenfor. [Online; posted 13-March-2018].

Kommunal-og moderniseringsdepartementet (2018). Kommunal-og moderniseringsdepartementet. https://www.regjeringen.no/no/dep/kmd/id504/#. Accessed: 2018-01-18.

Kose, S. (1998). From barrier-free to universal design: an international perspective. *Assistive technology*, 10(1):44–50.

Kvale, S., Brinkmann, S., Rygge, J., and Anderssen, T. (2009). *Det kvalitative forskningsintervju (2. utg.) Oslo: Gyldendal Akademisk*. Gyldendal.

Langdridge, D. (2006). *Psykologisk forskningsmetode: en innføring i kvalitative og kvantitative tilnærminger*. Tapir.

Macedo, I. M. (2017). Predicting the acceptance and use of information and communication technology by older adults: An empirical examination of the revised utaut2. *Computers in Human Behavior*, 75:935–948.

Mahr, D., Lievens, A., and Blazevic, V. (2014). The value of customer cocreated knowledge during the innovation process. *Journal of Product Innovation Management*, 31(3):599–615.

Mathiassen, L. (2017). Designing engaged scholarship: From real-world problems to research publications. *Engaged Management ReView*, 1(1):2.

Matz, K. (2013). *Designing Usable Apps: An agile approach to User Experience Design*. Winchelsea Press (Winchelsea Systems Ltd.).

nav.no (2018). nav.no. https://www.nav.no/. Accessed: 2018-01-18.

Nielsen, J. (2003). Return on investment for usability. *Jakob Nielsen's Alertbox, January*, 7.

Nielsen, J. (2012). How many test users in a usability study. *Nielsen Norman Group*, 4(06).

Nielsen, J. (2013). Seniors as web users. *Neilsen Norman Group. Retrieved September*, 27:2015.

Nilsson, L.-G. (2003). Memory function in normal aging. *Acta Neurologica Scandinavica*, 107(s179):7–13.

Nordskag, A. (2017). Er det verdig at eldre skal gråte på telefonen? at de skal føle seg maktesløse? sinte? [Online; posted 01-Februrary-2017].

Norman, D. (2013). *The design of everyday things: Revised and expanded edition*. Basic Books (AZ).

Norman, D. A. and Draper, S. W. (1986). *User centered system design: New perspectives on human-computer interaction*. CRC Press.

Oates, B. J. (2005). *Researching information systems and computing*. Sage.

Papantoniou, B., Soegaard, M., Lupton, J. R., Goktürk, M., and Trepess, D. (2002). *The Glossary of Human Computer Interaction*. Intraction design foundation).

paper, W. (2015). Digital agenda for norge. ikt for en enklere hverdag og økt produktivitet. *White papers*.

Patsoule, E. and Koutsabasis, P. (2014). Redesigning websites for older adults: a case study. *Behaviour & Information Technology*, 33(6):561–573.

Peacock, S. E. and Künemund, H. (2007). Senior citizens and internet technology. *European journal of ageing*, 4(4):191–200.

Peugeot, C. (1995). Conceptual model and mental model. In *ECIS*, pages 993–998. Citeseer.

Philip, L., Cottrill, C., Farrington, J., Williams, F., and Ashmore, F. (2017). The digital divide: Patterns, policy and scenarios for connecting the 'final few'in rural communities across great britain. *Journal of Rural Studies*, 54:386–398.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of applied psychology*, 88(5):879.

Polanyi, M. (2009). *The tacit dimension*. University of Chicago press.

Posten Norge AS (2018). Selskapsform og styring. `https://www.postennorge.no/om-oss/kort-om-posten-og-bring/selskapsform-og-styring`. Accessed: 2018-01-18.

Procter, R., Greenhalgh, T., Wherton, J., Sugarhood, P., Rouncefield, M., and Hinder, S. (2014). The day-to-day co-production of ageing in place. *Computer Supported Cooperative Work (CSCW)*, 23(3):245–267.

Rieder, K. and Voß, G. G. (2010). The working customer–an emerging new type of consumer. *Psychology of Everyday Activity*, 3(2):2–10.

Rønning, W. M. and Sølvberg, A. M. (2017). Older adults' coping with the digital everyday life. In *Seminar. net*, number 2 in 13.

Ryan, R. M. and Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary educational psychology*, 25(1):54–67.

Ryan, R. M. and Stiller, J. (1991). The social contexts of internalization: Parent and teacher influences on autonomy, motivation and learning. *Advances in motivation and achievement*, 7:115–149.

Sanders, E. B.-N. (1992). Converging perspectives: product development research for the 1990s. *Design Management Journal (Former Series)*, 3(4):49–54.

Sanders, E. B.-N. (2003). From user-centered to participatory design approaches. In *Design and the social sciences*, pages 18–25. CRC Press.

Sanders, E. B.-N. and Stappers, P. J. (2008). Co-creation and the new landscapes of design. *Co-design*, 4(1):5–18.

Selwyn, N., Gorard, S., Furlong, J., and Madden, L. (2003). Older adults' use of information and communications technology in everyday life. *Ageing & Society*, 23(5):561–582.

seniornett.no (2018). seniornett.no. `https://www.seniornett.no/`. Accessed: 2018-01-18.

Slettemeås, D. (2014). Ikt-bruk i befolkningen og barrierer for digital inkludering. *En kunnskapsoppsummering. SIFO oppdragsrapport*, 2.

Somech, A. and Drach-Zahavy, A. (2013). Translating team creativity to innovation implementation: The role of team composition and climate for innovation. *Journal of management*, 39(3):684–708.

Spinuzzi, C. (2005). The methodology of participatory design. *Technical communication*, 52(2):163–174.

Stappers, P. J. (2006). Creative connections: user, designer, context, and tools. *Personal and ubiquitous computing*, 10(2-3):95–100.

Statistics Norway (2017). Ict usage in households. Accessed: 2018-01-06.

Statistics Norway (2018). Fakta om befolkningen. Accessed: 2018-05-06.

Steen, M., Manschot, M., and De Koning, N. (2011). Benefits of co-design in service design projects. *International Journal of Design*, 5(2).

Stone, D., Jarrett, C., Woodroffe, M., and Minocha, S. (2005). *User interface design and evaluation*. Morgan Kaufmann.

Svanæs, D. and Gulliksen, J. (2008). Understanding the context of design: towards tactical user centered design. In *Proceedings of the 5th Nordic conference on Human-computer interaction: building bridges*, pages 353–362. ACM.

Trischler, J., Pervan, S. J., Kelly, S. J., and Scott, D. R. (2017). The value of codesign: The effect of customer involvement in service design teams. *Journal of Service Research*, page 1094670517714060.

Trondheim biblioteket (2018). Læringssenteret. `https://biblioteket.trondheim.kommune.no/innhold/om-biblioteket/tilbud/laringssenteret`. Accessed: 2018-01-18.

Tvedt, S. D., Saksvik, P. Ø., and NytrØ, K. (2009). Does change process healthiness reduce the negative effects of organizational change on the psychosocial work environment? *Work & Stress*, 23(1):80–98.

United Nations (2015). World population ageing. department of economic and social affairs, population division. *United Nations*.

Vassli, L. T. and Farshchian, B. A. (2017). Acceptance of health-related ict among elderly people living in the community: A systematic review of qualitative evidence. *International Journal of Human–Computer Interaction*, 34(2):99–116.

Yin, R. (2003). K.(2003). case study research: Design and methods. *Sage Publications, Inc*, 5:11.

Terminology

co-creation Co-creation refers to the collective creativity between users and designers through the entire development process. All relevant stakeholders are directly involved (Sanders and Stappers, 2008).. 2, 4, 7, 9, 10, 20, 21, 37, 51, 71, 74, 77, 78, 84

co-design Co-design is an instance of co-creation which refers to the direct involvement of users collaborating together with designers in the design process (Sanders and Stappers, 2008).. 3, 9, 10, 24, 29, 32, 35, 51, 55, 57, 65, 67–69, 71, 73, 77, 83

conceptual model Conceptual model refers to the high-level, simplified explanation of description of how a system work based on the designers understanding of the area of concern, technology and environment (Norman, 2013).. 2, 3, 10–12, 29, 32, 58, 70–74, 77, 78, 83

digital by default Digital by Default is a new Norwegian strategy which involves that all communication with the public sector should become digital (Digital agenda Norway, 2012).. 1, 12, 75

digital divide Digital divide is a divide between the once managing the use of digital services and those who are not (Friemel, 2016). According to Friemel (2016) there are three levels of digital divide: "first-level" digital divide, "second-level" of digital divide and a "grey divide".. 1, 13, 50, 61, 65, 82

digitalization Digitalization is a term that refers to process of converting information into a digital format. In this case going from analogue services to services on the Web.. 1–3, 7, 13, 15, 18, 19, 23, 28, 37, 41, 58, 59, 61–63, 75, 76, 81, 82

direct involvement Direct involvement refers to the users being involved directly in the development process aligned with the designers.. 2–4, 19, 55, 69, 71, 73, 74, 84

extrinsic motivation Extrinsic motivation refers to the willingness to do a task in order to attain an instrumental value (Ryan and Deci, 2000).. 3, 7, 15, 16, 62

fuzzy front end Fuzzy front end refers to the early phase of the co-design process (Sanders and Stappers, 2008).. 9

intrinsic motivation Intrinsic motivation relates to an individual's genuine interest and willingness of doing a task for the inherent satisfaction by doing it (Ryan and Deci, 2000).. 3, 16, 62, 64, 70

marginalized Marginalized refers to the older adults' experience of being excluded in society (Rønning and Sølvberg, 2017).. 75, 83

mental model Mental models are models in people's minds of how they think things work, formed through experiences, instructions and training. The mental models are developed while interacting with the system (Carey, 1986).. 2, 5, 7, 10, 11, 18, 29, 32, 58, 70, 71, 77, 78, 82–84

older adults Older adults, or elderly, refers to the target group of retired adults in the age range of 67 and above.. 3, 4, 7, 12–14, 21, 22, 26, 28, 29, 37, 40, 46, 47, 61–67, 71, 83

participatory design Participatory design refers to the approach that focuses on designing with users in the development process (Ehn, 1988).. 7, 8

pre-design Pre-design refers to the early phase of the co-design process (Sanders and Stappers, 2008).. 9, 69, 74

system image The system image is the actual product or system and supporting documents, training, etc. The system image present the functionality to the user (Stone et al., 2005).. 10–12

thematic analysis A widely uses method to analysis data qualitatively through finding patterns across the data collected (Oates, 2005).. 34

User-centered design User-centered design is an approach that focuses on the users and the usability of the system in the development process (Norman and Draper, 1986).. 7

web-based public service Web-based public service involve all public services located on the Web.. 3, 4, 13, 18, 21, 26, 37, 45, 48, 51, 54, 55, 59, 61, 64, 68, 76–79, 81, 83, 84

working customer Refers to the customer doing self-service and creating value to themselves, other customers and to the service (Rieder and Voß, 2010).. 1, 12, 77

Acronyms

DNB The Norwegian Bank. 44, 46, 53, 61, 67

HCI Human-Computer Interaction. 7

ICT Information and Communication Technology. 3, 12–15, 28, 33, 40, 51, 65

NAV Norwegian Labour and Welfare Administration. 1, 43, 55, 59, 62

NSD Norwegian centre for research data. 35

NTNU Norwegian University of Science and Technology. 26, 30

PD Participatory design. 8, 9, 37

SUS System Usability Scale. 24, 29, 33, 55, 58, 80

UCD User-centered design. 7–9, 72

UD Universal Design. 67

Appendix

A. NSD Approval

This appendix present the NSD approval who confirm the data collection and how personal information is treated in this study. Additionally the research team decided to make a written consent forms based on the feedback from NSD. Throughout the research process, the research team realized it would be necessary to video record the co-design workshop to be able to analyze the session afterwards. In addition, the research team wanted to video record the usability tests using eye tracking to be able to analyze the usability tests in detail. Video recording were therefore added to the list in the consent form for the co-design workshop and the usability tests.

First the original approval is presented. Then the consent form is presented, called "Samtykke til deltakelse", and afterwards the approval of the change request is presented.

Babak Farshchian
Sem Sælandsvei 7-9
7491 TRONDHEIM

Vår dato: 29.11.2017 Vår ref: 57049 / 3 / PEG Deres dato: Deres ref:

Vurdering fra NSD Personvernombudet for forskning § 31

Personvernombudet for forskning viser til meldeskjema mottatt 10.11.2017 for prosjektet:

57049	*Involvering av eldre i digitaliseringen.*
Behandlingsansvarlig	*NTNU, ved institusjonens øverste leder*
Daglig ansvarlig	*Babak Farshchian*
Student	*Andrea Leikvold*

Vurdering

Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er meldepliktig og at personopplysningene som blir samlet inn i dette prosjektet er regulert av personopplysningsloven § 31. På den neste siden er vår vurdering av prosjektopplegget slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

Vilkår for vår anbefaling

Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:

- opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
- vår prosjektvurdering, se side 2
- eventuell korrespondanse med oss

Vi forutsetter at du ikke innhenter sensitive personopplysninger.

Meld fra hvis du gjør vesentlige endringer i prosjektet

Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringsskjema.

Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet

Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

Vi tar kontakt om status for behandling av personopplysninger ved prosjektslutt

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Ved prosjektslutt 30.06.2018 vil vi ta kontakt for å avklare status for behandlingen av personopplysninger.

Se våre nettsider eller ta kontakt dersom du har spørsmål. Vi ønsker lykke til med prosjektet!

Marianne Høgetveit Myhren

Pernille Ekornrud Grøndal

Kontaktperson: Pernille Ekornrud Grøndal tlf: 55 58 36 41 / pernille.grondal@nsd.no

Vedlegg: Prosjektvurdering
Kopi: Andrea Leikvold, andrlei@stud.ntnu.no

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 57049

Utvalget består av eldre brukere av Seniornett Trondheim og Læringssenteret på Trondheim bibliotek.

Ifølge prosjektmeldingen skal utvalget informeres muntlig om prosjektet og samtykke til deltakelse. For å tilfredsstille kravet om et informert samtykke etter loven, må utvalget informeres om følgende:

- hvilken institusjon som er ansvarlig
- prosjektets formål / problemstilling
- hvilke metoder som skal benyttes for datainnsamling (Spørreskjema, personlig intervju gruppeintervju, observasjon og deltakende observasjon)
- hvilke typer opplysninger som samles inn (navn, e-post, adresse, telefonnummer, stemme mv.)
- at opplysningene behandles konfidensielt, hvordan de oppbevares, og hvem som vil ha tilgang
- at det er frivillig å delta og at man kan trekke seg når som helst uten begrunnelse
- dato for forventet prosjektslutt
- at data anonymiseres ved prosjektslutt
- hvorvidt enkeltpersoner vil kunne gjenkjennes i den ferdige oppgaven (krever eksplisitt samtykke)
- kontaktopplysninger til student/veileder.

Personvernombudet legger til grunn at forsker etterfølger NTNU sine interne rutiner for datasikkerhet. Dersom personopplysninger skal lagres på privat pc /mobile enheter, bør opplysningene krypteres tilstrekkelig.

Forventet prosjektslutt er 30.06.2018. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)
- slette digitale lydopptak

Samtykke til deltakelse

Vi er to studenter fra 5.klasse i Informatikk ved NTNU. I anledning vår masteroppgave som tar for seg involvering av eldre i den digitale utviklingen, ønsker vi å få en bedre forståelse av hvordan eldre bruker teknologi i dag og hvordan man kan tilrettelegge teknologien for gjøre det enklere å ta del i den digitale utviklingen.

Det vil bli gjennomført observasjon, et lite spørreskjema og stilt noen spørsmål angående brukervennligheten til systemet. Hvis deltakerne synes det er greit kan det bli benyttet lydopptak. Opptaket vil i så fall bli analysert i etterkant. Det antas at aktivitetene ikke vil medføre spesielle ulemper, ubehag, risikoer eller aktiviteter som vil kunne oppleves som belastende for deltakeren.

Hva kan bli aktuelt å samle inn av informasjon?

- Navn
- Alder
- Telefonnummer og e-post
- Meninger og opplever rundt bruken av digitale tjenester
- Stemme fra lydopptak

Hva skjer med informasjonen vi samler?
Alle opplysninger vil bli anonymisert og behandlet konfidensielt. Det vil si at personidentifiserbar informasjon lagres i en liste med en koblingsnøkkel adskilt fra resten av den innhentede informasjonen. Det er bare forskerteamet som har tilgang til informasjonen som blir samlet. Etter at masteroppgaven er levert vil personidentifiserbar data bli slettet (senest 30. juni) og enkeltpersoner som har deltatt vil ikke kunne gjenkjennes i den ferdige rapporten.

Frivillig deltakelse
Det er frivillig å delta i studien, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert.

Studien er meldt og godkjent av Personvernombudet for forskning, NSD - Norsk senter for forskningsdata AS.

Jeg samtykker til deltakelse: _____ _____
Signatur *Dato*

Mvh forskerteamet,
Studenter:
Andrea Leikvold (Tlf: 921 55 275, E-post: andrlei@stud.ntnu.no)
Hege Louise Borge (Tlf: 472 59 892, E-post: hegebor@stud.ntnu.no)
Veileder:
Babak Farshchian (Tlf: 992 86 869, E-post: babak.farshchian@sintef.no)

From: Pernille Ekornrud Grøndal <Pernille.Grondal@nsd.no>
Sent: Friday, February 23, 2018 3:37:50 PM
To: Babak.Farshchian@ntnu.no; andrlei@stud.ntnu.no
Subject: Prosjektnr: 57049. Involvering av eldre i digitaliseringen.

BEKREFTELSE PÅ ENDRING

Hei, viser til endringsmelding registrert hos personvernombudet 04.02.18.

Vi har nå registrert at dere skal føye til en metode, nærmere bestemt registrering av personopplysninger via bilde- og videoopptak. Personvernombudet understreker at tilføyelsen ikke var en del av det opprinnelig informasjonsskriv. Dette innebærer at utvalget må informasjon om, og samtykke til, tilføyelsen av metoden før prosjektet kan fortsette. Vi legger til grunn at datamaterialet slettes/anonymiseres senest samtidig med det øvrige datamaterialet.

Personvernombudet forutsetter at prosjektopplegget for øvrig gjennomføres i tråd med det som tidligere er innmeldt, og personvernombudets tilbakemeldinger. Vi vil ta ny kontakt ved prosjektslutt.

Vennlig hilsen,

Pernille Ekornrud Grøndal
rådgiver | Adviser
Seksjon for personverntjenester | Data Protection Services
T: (+47) 55 58 36 41

NSD – Norsk senter for forskningsdata AS | NSD – Norwegian Centre for Research Data
Harald Hårfagres gate 29, NO-5007 Bergen
T: (+47) 55 58 21 17
postmottak@nsd.no www.nsd.no

B. Analysis of Web Services

This appendix contains an analysis of some of the public web services studied in this project. This example contains an analysis from an awareness perspective. This analysis is from the researchers perspective with theory from the field of awareness in mind. The researchers analysis were done separately from the field work to understand the web pages in details. The appendix contains a table defining the dimension of awareness from the theory and analysis of nav.no, helsenorge.no and digipost.no based on this dimensions.

The researcher were also doing a similar analysis with theory from the field of affordance in mind, but this is not included in the appendix.

B.1. Dimensions of Awareness

Dimension	Definition	Reference to literature
Collaboration awareness	"Collaboration awareness is defined as the up-to-the-moment understanding of another person's activities in a group environment, including information about who else is using the system, where they are working, and what they are doing"	(Lauwers and Lantz 1990, Dewan and Choudhary 1991)
Workspace awareness	"Workspace awareness is the up-to-the-moment understanding of another person's interaction with a shared workspace"	(Gutwin, 1997)
Shared awareness	"Distribution of general information about the environment, both physical and social. Such information includes who is here, what they are doing (if they want this to be known), whether they are available for interactions, and what is happening in the common areas."	(Borning, 1991)
Mutual awareness	"Mutual awareness refers to a fundamental quality of collaborative work, the ability of co-workers to perceive each others activities and expressions and relate them to a joint context."	(Rittenbruch, 2009)
Peripheral awareness	"The kind of awareness we are after is our ability to maintain and constantly update a sense of our social and physical context. We do so in an apparently effortless manner and without being aware that we do so, - at least until something happens that is out of order and makes us raise our level of consciousness." "Peripheral awareness is the awareness if information that is not the main focus, and for easy access to resources." "The notion of peripheral awareness denotes the way in which some systems present information to their users, i.e. without requiring the focus of their attention."	(Pedersen, Rønby & Sokoler, 1997) (Grudin, 2001) (Liechti, 2000)
Contextual awareness	"Contextual awareness should allow for individual work styles and provide information that is relevant for the respective task at hand." "Contextual awareness is important, because the information presented to users (e.g. the identity of only a small subset of all other users) and the presentation of this information (e.g. notification modalities) should dependon the user situation."	(Gross, 2013) (Liechti, 2000)
Passive awareness	"We discuss a study of shared editor use which suggests that awareness information provided and exploited passively through the shared workspace, allows users to move smoothly between close and loose collaboration, and to assign and coordinate work dynamically. Passive awareness mechanisms promise effective support for collaboration requiring this sort of behaviour, whilst avoiding problems with active approaches."	(Dourish & Bellotti, 1992)
General awareness	"The pervasive experience of knowing who is around, what sorts of things they are doing, whether they are relatively busy or can be engaged, and so on."	(Gaver, 1992)
Situational awareness	"The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future."	(Endsley, 1988)
Background awareness	"The background awareness creates a sense of what happens at other sites; the group meetings were occasions to work together. Both contributed to a sense of shared experience and culture."	(Bly, 1993)
Reciprocal awareness	"The distinguishing aspect is the reciprocity of the interdependence, with each unit posing contingency for the other."	(Thompson, 1967)

Table B.1.: Dimensions of awareness

B.2. Helsenorge.no

This section contains one example of the analysis done from the web page helsenorge.no. The shown analysis is from the steps from logging in to the web page and look at the prescriptions. Some screenshots from the part of the web site analyzed in this example are visualized in Figure B.1, and the analysis is presented in Table B.2. Both positive and negative aspects related to awareness are included.

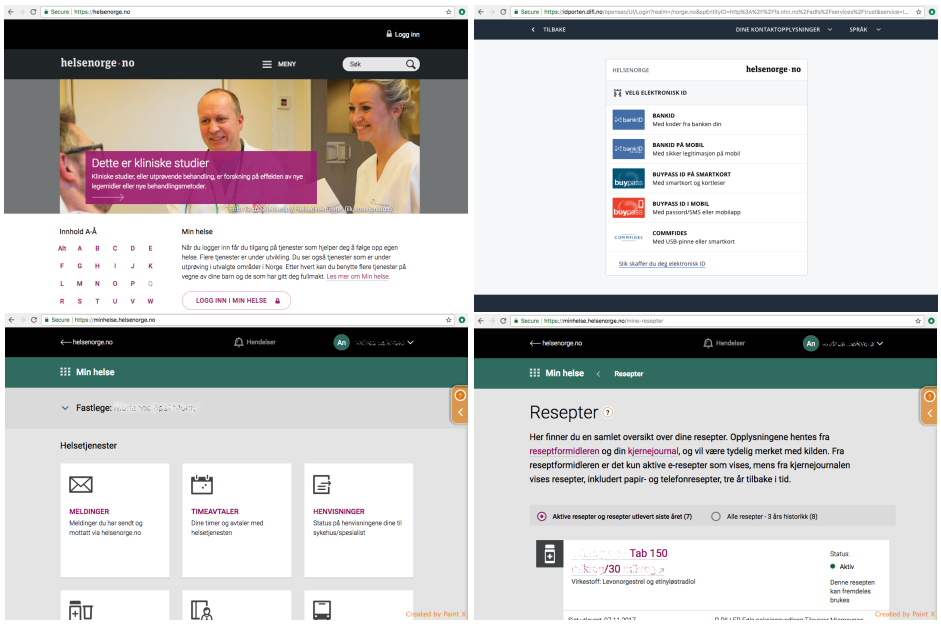


Figure B.1.: Web page helsenorge.no

Dimension	Analysis of helsenorge.no
Collaboration awareness	- Does not support for collaboration with other users. + Supports for collaboration with employees on helsenorge.no through phone.
Workspace awareness	- Does not support information about other users interacting with the website. Workspace awareness is strongly connected to proximity of colleagues working in real-time, which is not supported easily through a web service.
Shared awareness	+ With the usage of images of doctors on the front-page creates an environment of confidentiality and safety. - No information about what is happening in the common area. - No images is visualised to get a shared awareness when logged in.
Mutual awareness	- No support on mutual awareness as danskebank and users cannot immediately get same awareness through the web service without the users taking contact. + Supports mutual awareness when users press "Avtal m¯te" and they meet up with a mutual awareness of situation.
Peripheral awareness	+ When logged in all information are displayed in hvite boxes, "Meldinger", "Timeavtaler", "Henvisninger", "Resepter", etc. + No irrelevant information are shown when logged in.
Contextual awareness	+ Information relevant to log on to helsenorge are clearly visualised with a blue button on the middle of the page with "Logg inn". + Does provide for individual work styles. Different ways to log in; BankID, mobile bankID, buypass, commfides. - When logging in, the standard language which is Norwegian becomes English. - When logged in, there are no 'frequently used' health services listed at the top, rather are all services listed in boxes.
Situational awareness	+ The web page contain enough information to perceive. All services are listed and an ability to see events with new updates. + Space gives information through informative symbols, like calender for appointments, medisin for prescription and a doctor for changing RGP. - Comprehension of the information and projection of future actions is not visualised in any ways.
General awareness	There are no support as users are not able to sense other people. They cannot relate to shared culture.
Reciprocal awareness	+ Supports reciprocal awareness when user contacts helsenorge by pressing "800 HELSE" or "Kontakt oss" or the orange drop-down question-mark on the right side on the front-page or when logged in.

Table B.2.: Analysis of the webpage: helsenorge.no

B.3. Digipost.no

This analysis basis on how to log into digipost and being aware of new letters. The process is visualized with images in Figure B.2, and the analysis is presented in Table B.3.

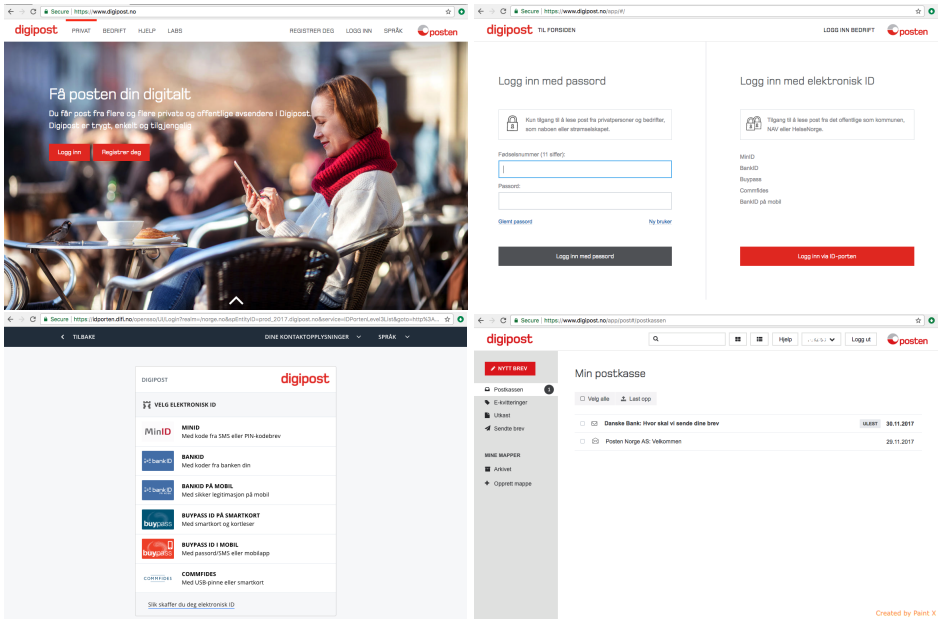


Figure B.2.: Web page digipost.no

Dimension	Analysis of digipost.no
Collaboration awareness	- Does not support for collaboration with other users. + Supports for collaboration with the digipost employees through "Hjelp"-tab on the top of page: phone, email, frequently asked questions and "Gi innspill" at the bottom of the page.
Workspace awareness	- Does not support information about other users interacting with the website. Workspace awareness is strongly connected to proximity of colleagues working in real-time, which is not supported easily through a web service.
Shared awareness	+ With the usage of images of people using digipost and postmen during different generations shows that this web service is the new future and everyone can use it. - No information about what is happening in the common area.
Mutual awareness	- No support on mutual awareness as digipost and users cannot immediately get same awareness through the web service without the users taking contact.
Peripheral awareness	+ When logged in, information is shown in a list-view on left side; "Postkassen", "E-kvittering", "Utkast". The peripheral information is well structured
Contextual awareness	+ Information relevant to log on to helsenorge are clearly visualised with a red button on the middle of the page with "Logg inn" og "Logg inn" on top of the page in white. + Does provide for individual work styles. Different ways to log in; minID, BankID, mobile bankID, buypass, commfides or with username/password - No symbols for logging in.
Situational awareness	+ The web page contain enough information to perceive. All services are listed and an ability to see notifications with new updates in the postbox. + Space gives information through informative symbols, like a postbox for new post, paper plane for sent mails. - When pressing "Hjelp" when logged in, the user are redirected to another page, which can mislead the users as the user interface changes. - Comprehension of the information and projection of future actions is not visualised in any ways.
General awareness	There are no support as users are not able to sense other people. They cannot relate to shared culture.
Reciprocal awareness	+ Supports reciprocal awareness when user contacts digipost by pressing "Hjelp" in the tab on the top, or "Kontakt oss" on the bottom on front-page.

Table B.3.: Analysis of the webpage: digipost.no

B.4. Nav.no

Through observations of members in Seniornett Trondheim, NAV is mainly used to get information about the pension payments. For that reason, an analyze considering this mainly used activity is used to examine the support of different dimensions of awareness in the web service. Screenshots of the service is visualized in Figure B.3, and the analyze is presented in Table B.4.

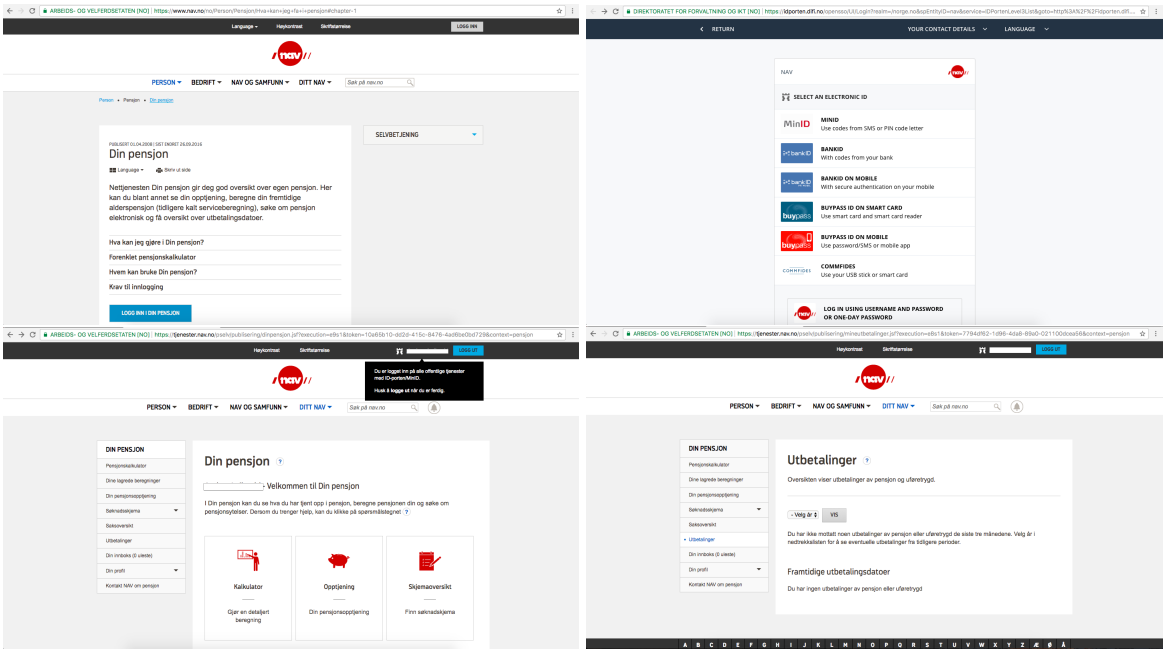


Figure B.3.: Web page nav.no

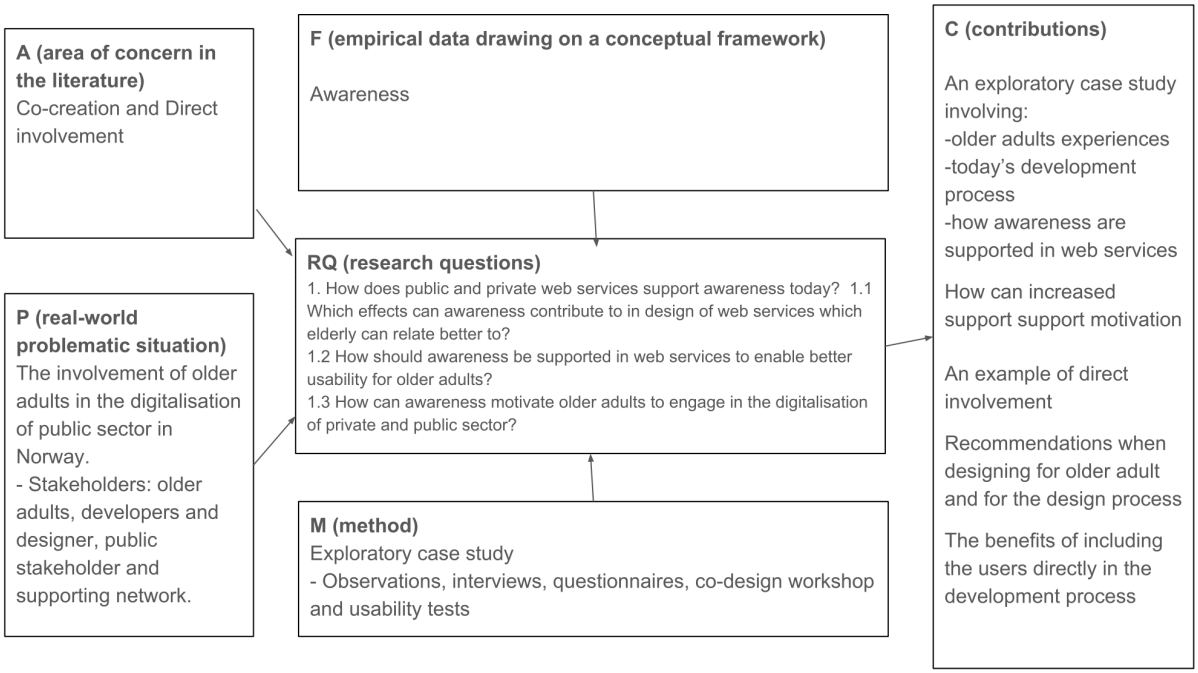
Dimension	Analysis of Nav.no/person/pensjon
Collaboration awareness	- Does not support collaboration on the website. + Supports for collaboration with the nav employees through chat or phone.
Workspace awareness	- Does not support information about other users interacting with the website. Workspace awareness is strongly connected to proximity of colleagues working in real-time, which is not supported easily through a web service.
Shared awareness	+ Supports interaction with NAV by "Spør oss om pensjon" - No informative images which older adults can relate to. - No information about what is happening in the common area.
Mutual awareness	Nav and the user does not have mutual awareness as the user have it's own personal information and Nav's got their own internal information.
Peripheral awareness	Additional information than the goal, like other topics in NAV, can be found under dropdown-menus such as "Person", "Bedrift", "Nav og samfunn" or "Ditt nav". + When logged in the user are able to choose different topics of "Din pensjon" presented as a list in the left hand side.
Contextual awareness	+ Information relevant to find the correct pension is given with boxes where users choose their year of birth. - (or +) Does not support different work styles as the users need to follow a pattern.
Situational awareness	+ Provides choices for the user to perceive, needs to click on the correct one to get correct inputs to continue with. - Space gives no information through informative images to perceive information - Comprehension of the information and projection of future actions is not supported through the design
General awareness	+ Users can relate to shared culture with "Finn svar pÂ nav.no" where questions frequently asked are listed.
Reciprocal awareness	+ It is possible to obtain reciprocal awareness when user contacts NAV by pressing "Kontakt oss" on the main page or by pressing the question-mark for help + Ability to chat with Nav when interacting with the page - Difficult to find the chat for interaction.

Table B.4.: Analysis of the webpage: nav.no/person/pensjon

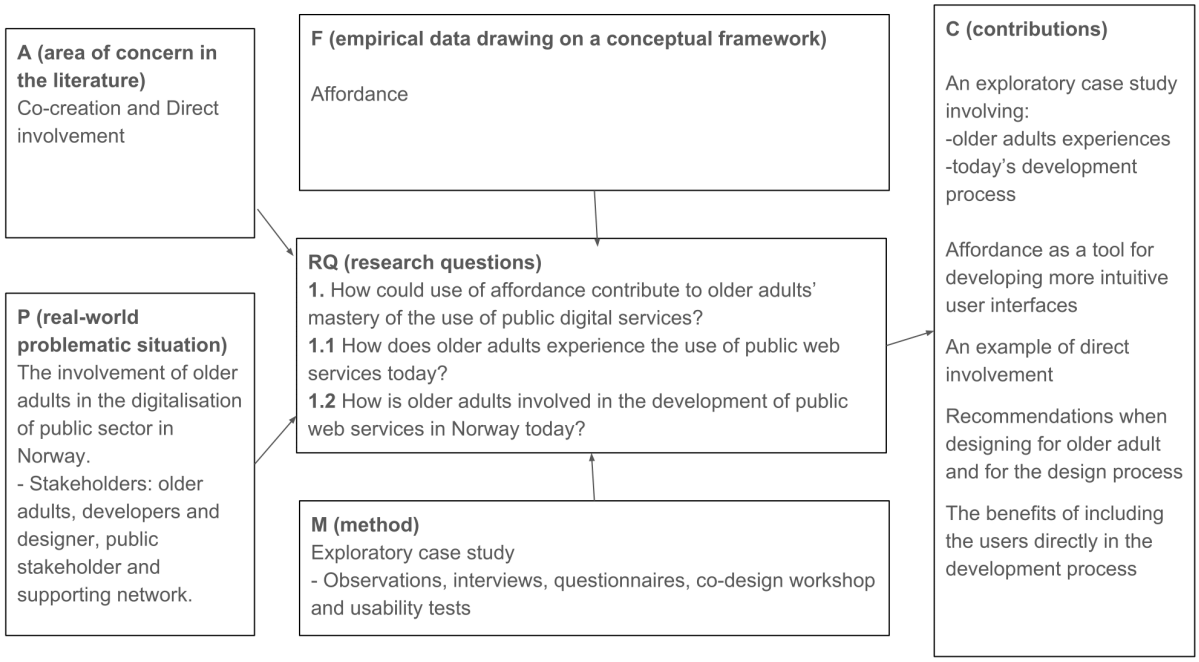
C. Framing

This appendix presents two conceptual frameworks that were considered as framings early in this study. First, the awareness framing is presented, secondly the affordance framing is presented.

C.1. Awareness



C.2. Affordance



D. Observation Guides

This appendix presents the observation guides made by the research team to the observation of the digipost course, helsenorge course and the usability test.

D.1. Course: Helsenorge.no

This observation guide was used in the course about helsenorge.no. It shows the questions that were presented to the attendees in the course about helsenorge, and a description of what to observe for the different questions.

Helsenorge.no

Observasjonsguide

Overordnet mål:
Observerer og lytte til hva de sier (subjektivt) om utfordringer
Generelt:
Se etter ting som er utfordrende, hvorfor er det utfordrende?
Spør de hva de tenker og tror kommer til å skje eller hvorfor de har problemer.

Ser de statusen på reseptene og skjønner hva dette betyr?

Skjønner de hvordan de kan få mer informasjon, at de kan trykke på selve ruten eller pilen, hva velger de i så fall?

Skjønner de at de kan får mer informasjon ved å bruke spørsmålstegn-ikonet? Er dette noe de er kjent med og bruker?

Finner de kjernejournalen under “Innhold i journaler og helseregistre“ lenger ned på siden selv etter at det ser ut som det “tar slutt”?
Åpner de alle kategoriene i kjernejournalen samtidig, eller en og en av de.

Leser de seg frem til hvordan de kan finne ting?
Skjønner de at + tegnet kan brukes til å legge til ny informasjon?

Oppgaver uten forklaring

(Be om et oppgaveark med forklaring hvis du ønsker dette.)

Steg 1: **Logg inn** på Helsenorge.no med **BankID**

Resepter

Oppgave 1: Hvor mange resepter har du fortsatt mulighet til å hente ut?

Oppgave 2: Har du hentet ut den nyeste resepten din tidligere?

Helsekontakter

Oppgave 1: Hva vil det si å være primærkontakt i helsetjenesten?

Kjernejournal

Oppgave 1: Finn din kjernejournal og se hva slags informasjon som allerede er registrert om deg der.

Oppgave 2: Legg til informasjon i din kjernejournal

a) Legge til pårørende
b) Legge til helsekontakter

c) Legge til sykdom og kritisk informasjon (hvis du har)

Oppgave 3: Se på informasjonen du har lagt inn i kjernejournalen

---

Trykker de der det står “Vis registrerte egenandeler”, eller bare generelt i ruten?

Frikort og egenandeler

Oppgave 1: Finn dine betalte egenandeler i egenandeltak 1 i 2018

Oppgave 2: Hvor mange egenandeler betalte du i 2017?

Se om de har lagt merke til denne muligheten. Og at de kan kommunisere med folk gjennom nettsiden

---

Hjelp

Oppgave 1: Finn mulighet for å få hjelp fra helsenorge inne på nettsiden.

Husker de av for bare fastleger de kan bytte til, eller bruker de filtreringsmuligheten i tabellen?
Ser de på antallet ledige plasser eller på forskjellen på knappene i handlingskolonnen (sett på venteliste vs bytt)

Trykker de på tilbakeknappen eller på “Endre område/søk” over tabellen?

Trykker de på den lille pilen til venstre i raden i tabellen, eller bare hvor som helst i tabellen for å finne ut dette?

Tror de at de setter seg på venteliste med én gang de trykker på “sett på venteliste”, eller regner de med at de må bekrefte valget før det er gjennomført?

Bytte fastlege

Oppgave 1: Finn ut hvilke fastleger som er ledige i Trondheim i Trøndelag

Oppgave 2: Finn ut om Marthe Kjeldstad på Ringve Legesenter har ledig plass til flere pasienter ved søk på navnet hennes.

Oppgave 3: Hvilket år ble Marthe Kjeldstad godkjent som fastlege?

Oppgave 4: Sette deg opp på venteliste til Anders Askelund eller en annen fastlege (hvis du ønsker, du kan fjerne deg fra ventelisten etterpå igjen).

D.2. Course: Digipost.no

This observation guide was used in the course about digipost.no. It shows the different questions that were presented to the attendees in the digipost course, a guide for relevant follow-up questions, together with a area for observations.

digipost.no Observasjonsguide

Overordnet mål:
Observerer og lytte til hva de sier (subjektivt) om utfordringer
Generelt:
Se etter ting som er utfordrende, hvorfor er det utfordrende?
Spør de hva de tenker og tror kommer til å skje eller hvorfor de har problemer.

Oppgave	Guide	Observasjon
Min postkasse		
Oppgave 1: Har du noen uleste brev?	Hvor begynner de å se? Skjønner de at de automatisk er inne i postkassen?	
Oppgave 2: Hvordan ser du at et brevet ikke er lest?	Ser de der det står "ulest", at det er uthevet skrift eller på om det lille symbolet til venstre viser et åpent eller lukket brev?	
Oppgave 3: Send et brev til den som sitter til høyre for deg.	Hvor trykker de for å skrive nytt brev? Hvordan finner de fram til mottakeren (spør de etter navn eller epost eller adresse)?	
	Skjønner de at de må flytte markøren ned i emnefeltet for å fortsette å skrive og at de må ha innhold i selve eposten(feilmeldingen kommer øverst og er ikke synlig i bildet når man forsøker å sende)? Finner de sendknappen selv? Ser de likheten med det å sende e-post?	
Oppgave 4: Svar på brevet du fikk.	Hvordan svarer de? - opprette ny eller trykker de "svar"?	
Oppgave 5: Finn igjen brevet du sendte først.	Skjønner de at de må gå til "Sendte brev"?	
Arkivering av post og dokumenter		
Oppgave 1: Lag en ny mappe med navnet: "Offentlige brev".	Skjønner de at de må trykke på "Opprett mappe"?	

Oppgave 2: Legg et brev inn i denne nye mappa.	Hvor starter de? (Postkassen eller mappen: Offentlig) Skjønner de at man må markere brevet? Skjønner de at de må bruke "Flytt"? "Drar" de brevene til mappen?	
Personalia		
Oppgave 1: Se om postadressen din er riktig.	Skjønner de at de må gå på navnet sitt og "Personlig informasjon" for å finne adressen sin?	
Oppgave 2: Hvordan er varslingsinnstillingene dine inne på digipost? Får du e-post eller SMS når du mottar et brev?	Skjønner de at de må gå på navnet sitt og "Varsling og kontaktinfo" for å finne innstillingene sine?	
Oppgave 3: Hvordan kan du dele din postkasse med andre?	Skjønner de at de må gå på navnet sitt og "Deling av postkasse" for å finne delingsmuligheten. Hva tenker de om denne muligheten?	

Chat med digipost		
Oppgave 1: Hvor kan du finne mulighet for å chatte med kundeservice?	Spør hvilket ord de prøver å se etter. Finner de "Hjelp" øverst eller nederst på siden.	
Oppgave 2: Har du brukt chat-funksjonen tidligere?	Hvorfor har de (evt. har de ikke) brukt chat før?	
E-kvitteringer		
Oppgave 1: Registrer bankkortet ditt, slik at du kan få kvitteringer elektronisk i digipost.	Skjønner de at de skal skrive kontonummer direkte inn i bildet, og at det er kontonr, ikke kortnr? Ser de nytten av å ha kvitteringer samlet på digipost?	

Oppgave 2: Synes du det var vanskelig å registrere bankkort? Har du noen ideer til hva som kunne gjort det lettere?		
Ekstra		
Oppgave 1: Vis brevene i din postkasse med **"Konvoluttvisning"** og **ikke "Listevisning"**. Hvem av disse visningene liker du best?	Finner de knappene for ulike visninger? Forstår de hva symbolene på knappene betyr?	
Oppgave 2: Sjekk sikkerhetsnivået på din konto i digipost. Krev sterk autentisering.	Skjønner de at de må gå på navnet sitt og "Min konto i digipost" for å endre på sikkerhetsnivået?	
Oppgave 3: Finn ut hva som har blitt gjort på din konto tidligere (historikk).	Skjønner de at de må gå på navnet sitt og "kontoaktivitet" for å se historikken?	

Oppgave 4: Send et brev til den ved siden av deg med krav om at han må logge inn med bankID for å lese brevet.	Skjønner de at de må huke av "Krev at mottaker logger seg på med bankID"	
Oppgave 5: Send et brev til noen du kjenner som ikke er på kurset (må ha digipost).	Skjønner de at de kan finne ut om de har digipost ved å søke på navnet deres, eller tar de noen de er sikre på at har det?	
Oppgave 6: Prøv deg selv: Prøv deg frem selv inne på Digipost og bli bedre kjent med mulighetene som finnes der.		

D.3. Usability Test

Observasjonsskjema - **prototype av nåværende digipost**

Oppgaver	Observasjon	Tanker
1. Hvem er du innlogget som? (Kari Normann)		
2. Har du fått noen brev fra NAV i det siste?		
3. Har du fått strømregningen fra november 2017?		
4. Send et brev til Jan Johansen om tidspunkt for møte i velforeningen som er torsdag 22.mars		
5. Finn bilde fra fjellturen		
6. Last opp et dokument		
7. Finn din personlige informasjon		
8. Logg ut fra digipost		

Observasjonsskjema - **prototype fra co-creation**

Oppgaver	Observasjon	Tanker
1. Hvem er du innlogget som? (Kari Normann)		
2. Har du fått noen brev fra NAV i det siste?		
3. Har du fått strømregningen fra november 2017?		
4. Gå tilbake til forsiden		
5. Send et brev til Jan Johansen om tidspunkt for møte i velforeningen som er torsdag 22.mars		
6. Finn bilde fra fjellturen		
7. Last opp et dokument		
8. Finn din personlige informasjon		

E. Interview Guides

The interview guides have been evolved through the process of what the research team need to investigate in more details, or if new questions arise. In this chapter, three examples of interview guides are shown; one for interviews with target group, one for interviews with designers and one for interview with the Ministry of Local Government and Modernisation in Norway. The interview guides were just used as a starting point for the interview as questions arise during the interviews and the researchers wanted to go in details for things that came up.

Intervjuguide: target group

En av de mulige casene velges:

- Nettbank: betale regninger, opprette efaktura og avtalegiro
- Nav: din pensjon, se utbetalingsmelding
- Skatteetaten: skatteoppgjør, endre på skattemelding
- Digital postkasse: opprette digital postkasse, se og sende digital post
- Helsenorge: oversikt over resepter, henvisninger, frikort, kjernejournal, bytting av fastlege, mine vaksiner, pasientreiser og lignende.

- **Ta opp lyd?**

Generelt (kort)

- Innstilling til digitalisering
- Bruker du pc, nettbrett og/eller smarttelefon?
- Hvilke digitale systemer bruker du?
- Kompetanse, hva de mestrer? Er kompetanse et hinder?
- Får du hjelp fra noen?
- Hvilke offentlige tjenester har du behov for?
- Hvilke offentlige digitale tjenester bruker du og hva bruker du de til?
- Hvorfor bruker du ikke noen offentlige digitale tjenester(hvis valgt bort)?
- Hva synes du er mest utfordrende?
- Hvilke systemer er mest utfordrende?
- Hvorfor er det utfordrende?

Velger en tjeneste

- Hvorfor vil de ha hjelp til denne tjenesten? Er det fordi du vil bruke den eller fordi du føler at du må bruke den?
- Hva ønsker du å lære?
- Hva tror du at du har mulighet til å lære/mestre?

Del 1- Gjennomgang av valgt offentlig tjeneste(hva skjer?)

- *10 stegene*
- *Ta notater fra observasjoner av hva de gjør*
- *Hjelpe de med problemene, se hvordan de bruker systemet og hva som er utfordrende*

Føler du at du er bevisst på hva som skjer inne på en nettside? (situational aw)
Er du klar over hva som skjer hvis de klikker på ulike elementer - hva tror du skjer?
Skjer det de tror vil skje? (expectations)

Oppdager de nye ting de forstår ved å prøve ut noe? (Sequential og nested affordance)

Er det unødvendige elementer som er i veien og hindrer fra å finne det de skal?

Får du nødvendige tilbakemeldinger fra den digitale tjenesten? (Collaboration aw, information asymmetry, p4 m affordance)
Får du tilbakemeldingen når du trenger den? Er den motiverende/gjør den det lettere for deg?

Kan de finne hjelp gjennom systemet selv? (peripheral aw)
Får du kontakt med noen hvis du trenger det? (chat, kontakt oss, eller lignende) p5 m affordance)

Kan du finne igjen det du gjorde i stad? (com affordance)

Får du gjort det du ønsket? Føltes det trygt?

Føler de frihet til å få gjort det de ønsker? Men samtidig trygge rammer (constraints)

Hvordan er opplevelsen din av å bruke systemet? Bir opplevelsen bedre når du har brukt det en stund? Får du lyst til å bruke det igjen? (principle 9 og 10 i motivational affordance)

Del 2- Empiri (erfaring)

- *hva som er viktig og hva de synes om ting*
- *SUS-skjema*

Får du gjort det du trenger? Er det noe du savner? (p1 m affordance)

Bruker du lang tid på å finne frem? (situational aw)
Når du får det til, får du det enklere til neste gang?
Hva gjør at du finner fram neste gang?
Hva tenker du kunne hjulpet deg til å forstå bedre neste gang?

<u>Spesifikke systemet:</u>
Hva synes du er bra med dette systemet?
Hva synes du ikke er så bra med dette systemet?
Hva synes du kunne vært annerledes i dette systemet?

Kan de være interessert i å delta på co-creation session eller brukertest av prototype senere? (Antagelig i februar)

Intervjuguide - designere

Hvordan brukere har vært involvert?

Har de vært med å testet tjenesten?

Har de vært med på utviklingen? I så fall hvordan?

Får dere muligheten til å se på helhet for å lage en best mulig helhetlig løsning?

Når dere kjører brukertester på innbyggere, hvilke innbyggere er da dette? Er det folk i alle aldre og i ulike situasjoner? Tester dere på eldre?

Er innbyggerne noe mer med i designprosessen enn gjennom brukertesting på noe vis, f. eks gjennom intervjuer, workshopper, eller lignende? Hva er det som bestemmer hvor mye dere gjør?

Hva ønsker dere at nettsiden skal gi brukerne?

Hvilke funksjoner synes dere er de viktigste og de mest brukte?

Hvordan jobber dere med designprosessen?

Involveres brukerne direkte i designprosessen?

Hvordan jobber dere med universell utforming?

Har dere en målgruppe som dere har mer fokus på?

Involveres eldre i design prosessen? I såfall, hvordan?

Hvilke kriterier legges til grunn når dere verifiserer at et design er godt nok for release?

Intervjuguide - moderniseringsdepartementet

Kan vi ta opp lyd?

Bakgrunn?

Hva er hans rolle?

Har han vært med i felt?

Hva er din rolle i Difi?

Digitaliseringsrådet?

Positive ting med digitalisering? Og spesielt for eldre?

Negative/utfordringer?

Hvilke utfordringer står de overfor når det gjelder de eldre?

Hva gjøres i departementet for å involvere de eldre i digitalisering?

Hva tenker han/de om de casene vi har tenkt til å ha?

Har de hatt noe å si i bestemmelsen om at alt skal være digitalt?

Vet han at det ikke går an reservere seg fra å få ting digitalt fra nav?

Hva tenker han om dette?

Har dere satt noe krav til dem som utvikler offentlige system i dag som de som utvikler må følge?

Hva mener han at er viktig at utviklere tenker på?

Hva skjer fremover i politikken knyttet til digitalisering?

Kommer flere til å gjøre som nav?

Spørsmål fra de eldre: Kan ikke alle nettbankløsninger være like? Kan ikke staten gjøre noe med dette? Hva med like offentlige systemer?

F. Courses Held by the Researchers

This appendix provides some of the relevant material from the courses held by the researchers to observe the target group in use of relevant web systems. This include a schedule for the course, task sheet, SUS results from the participants experiences of the system and finally a retrospective. First the material used in the course about helsenorge.no is presented. Secondly the material used in the course about digipost.no is presented.

F.1. Course: Helsenorge

F.1.1. Schedule

A plan for the course follow in Norwegian.

Plan for temamøte i Helsenorge

kl 13.00-15.00

Ser an antallet deltagere, men optimalt delere i tre grupper der vi kan ha ansvaret for å observere hver vår gruppe.

Program
Introduksjon
- Introduksjonsrunde
- Samtykkeskjema
- Introkurs i Helsenorge

Hoveddel
- Oppgaveløsning

Avslutning
- Oppsummering
- Fortelle om mulighet til å delta på co-creation
- Spørreskjema

Kjøreplan:
Introduksjon: maks 30 min

Introduksjonsrunde: maks 10 min
Vi sier hvem vi er og hva vi holder på med, formålet med opplegget, at vi ikke tester dem, men systemet og at de på denne måten blir hørt og kan bidra til at offentlige systemer blir enklere for dem å bruke i fremtiden, at de kan trekke seg når de vil, og hva som er programmet

Vi tar håndsopprekning på om de har vært inne på helsenorge før og forsøker å dele inn grupper best mulig etter nivå

I mindre grupper: alle presenterer seg for hverandre, hva de heter
Alle tenker på en positiv opplevelse og en utfordrende opplevelse de har hatt med digitale systemer og deler disse med hverandre (skrive ned på post-it?)

Samtykkeskjema: maks 5 min
Alle får utdelt samtykkeskjema, vi sier litt hva det handler om og lar dem signere
Vær tydelig på at de ikke må vise frem informasjon de ikke ønsker og kan si ifra hvis de ikke ønsker lydopptak, eller ønsker å avbryte

Introkurs i Helsenorge: maks 15 min (tar nok lenger tid hvis alle skal logge inn her)
Hva er helsenorge.no? Vi tar opp nettsiden på storskjerm, viser og forklarer

- helsenorge vs minHelse
- 

Hvorfor ta i bruk Helsenorge.no?

- Kvalitetssikret informasjon om helse, sykdommer
- Tilgang til dine helsedata
- Mulighet til å legge inn ting i kjernejournal,

Da kan alle gå inn på helsenorge.no

Innlogging :

Forklare forsiden

- navnet ditt
- fastlege
- ikke alle sidene i bruk enda

Funker:

- Meldinger
- Resepter
- Helsekontakter
- Pasientreiser
- Frikort og egenandeler
- Bytte fastlege
- Sykdom og kritisk informasjon
- Kjernejournal

Hoveddel: ca 1 time

Oppgaveløsning
Alle får først utdelt oppgaveheftet uten forklaring. Sier at vi veldig gjerne vil at de skal prøve denne først, vi kommer til å gå rundt, få dere til å tenke høyt, hvis de står veldig fast kan vi gi hint

Vi observerer hver vår gruppe

Avslutning: maks 30 min

Minikurs

- Hjelp og brukerstøtte
- (Vaksiner - utenfor minhelse)
- (Helfokort - utenfor minhelse)

Oppsummering: ca 10 min
Vi oppsummerer hva vi har inntrykket av at er konklusjonene av positive og negative ting med systemet og opplevelsene (hovedutfordringer). Lar de som ønsker si seg enig eller komme med innspill.

Fortelle om mulighet til å delta på co-creation: ca 5 min
Sende rundt liste - listen kan gå rundt mens de svarer på spørreskjemaet

Spørreskjema: ca 10 min
Alle får spørreskjemaet som de må svare på, i hvertfall alder, kjønn, og SUS

Alle får utdelt oppgavesettet med forklaring som de kan ta med seg hjem

Evt hvis tid til overs:
Gå gjennom noen oppgaver?
vise mulighet for fullmakter, reservering, historikk, osv.

F.1.2. Task Sheet

This section contains the task sheet given to the participants. Both this task sheet an one task sheet with answers (a guide) were shared with the rest of the members of SeniorNet at their web page.

Helsenorge.no

Oppgaver uten forklaring

(Be om et oppgaveark med forklaring hvis du ønsker dette.)

Steg 1: **Logg inn** på Helsenorge.no med **BankID**

Resepter

Oppgave 1: Hvor mange resepter har du fortsatt mulighet til å hente ut?

Oppgave 2: Har du hentet ut den nyeste resepten din tidligere?

Helsekontakter

Oppgave 1: Hva vil det si å være primærkontakt i helsetjenesten?

Kjernejournal

Oppgave 1: Finn din kjernejournal og se hva slags informasjon som allerede er registrert om deg der.

Oppgave 2: Legg til følgende informasjon i kjernejournalen din:

a) Legge til pårørende
b) Legge til helsekontakter
c) Legge til sykdom og kritisk informasjon (hvis du har)

Oppgave 3: Se på informasjonen du har lagt inn i kjernejournalen

---

Frikort og egenandeler

Oppgave 1: Finn dine betalte egenandeler i egenandeltak 1 i 2018.

Oppgave 2: Hvor mange egenandeler betalte du i 2017?

Hjelp

Oppgave 1: Finn mulighet for å få hjelp fra helsenorge inne på nettsiden.

Bytte fastlege

Oppgave 1: Finn ut hvilke fastleger som er ledige i Trondheim i Trøndelag.

Oppgave 2: Finn ut om Marthe Kjeldstad på Ringve Legesenter har ledig plass til flere pasienter ved søk på navnet hennes.

Oppgave 3: Hvilket år ble Marthe Kjeldstad godkjent som fastlege?

Oppgave 4: Sette deg opp på venteliste til Anders Askelund eller en annen fastlege (hvis du ønsker, du kan fjerne deg fra ventelisten etterpå igjen).

Ekstra

Oppgave 1: Finn dine vaksinasjoner
Her må du ut av “Min helse” og ut på helsenorge.no

Oppgave 2: Bestill Europeisk helsetrygdkort
Her må du ut av “Min helse” og ut på helsenorge.no

Oppgave 3: Prøv deg selv
Prøv deg frem selv inne på Min helse og bli bedre kjent med mulighetene som finnes der.

F.1.3. SUS Results

The SUS scores for each participant is shown in this section. Some of the attendees refused to answer the questionnaires so the numbers d not fit the number of attendees. The results from the rest for the questionnaire is shown in Appendix L.3.

Nettside: Helsenorge.no	1 (Sterkt uenig)	2	3	4	5 (Sterkt enig)
1. Jeg kunne tenke meg å bruke dette systemet ofte			BG	CEF	ADH
2. Jeg synes systemet var unødvendig komplisert		ACFG	EH	BD	
3. Jeg synes systemet var lett å bruke			AH	BDEFG	C
4. Jeg tror jeg ville måtte trenge hjelp fra en person med tekninsk kunnskap t	BE	DFGH	A	C	
5. Jeg synes at de forskjellige delene av systemet hang godt sammen			ABCEFGH	D	
6. Jeg syntes det var for mye inkonsistens i systemet (Det virket "ulkogisk")		EG	ABDFH	C	
7. Jeg vil anta at folk flest kan lære seg dette systemet veldig raskt			ABEFG	CDH	
8. Jeg synes systemet var veldig vanskelig å bruke	C	AEFGH	B	D	
9. Jeg følte meg sikker da jeg brukte systemer			AFGH	CE	BD
10. Jeg trenger å lære meg mye før jeg kan komme i gang med å bruke dett	BC	EFGH	AD		
	Totalscore				
A	60				
B	65				
C	70				
D	65				
E	70				
F	65				
G	65				
H	65				
SUM	65.625				

F.1.4. Retrospective

A retrospective from the course containing observations, important quotes and reflections from the course is this section.

Temamøte helsenorge retrospekt

Generelt:
Deltakerne var veldig fornøyde med opplegget og klarte oppgavene stort sett uten forklaring, noen ganger med litt hjelp etter utprøving på egenhånd. Generelt er det mest utfordring rundt symboler, tekst går greiere.
11 deltakere, 5 fra seniornett i tillegg til Andrea, Hege og Babak

Oppsummering funket veldig bra - få med mer dialog på Digipost-møtet- still mer åpne spørsmål
Nivået blant deltakerne var høyt. De fikk til oppgavene uten store problemer
Oppgavene fungerte bra

Utfordringer med helsenorge.no

- Symboler funker dårlig, spesielt pilene for å få mer informasjon, både for mer info om en resept, men også i tabellen med fastleger, osv. Spørsmålstegnet er det få som har vært bori. Det er også forvirring rundt hva man kan forvente hvis man trykke rpå et spørsmålstegn: er det da spørsmål og svar, kan man stille spørsmål selv? Egentlig er det mer informasjon, da burde det kanskje vært en i?
- er ikke vandt til å bruke hjelpefunksjoner, men det er nyttig når de ser det
- Er ikke kjent med “vanlig oppsett” på en webside, og dermed kan det være vanskelig å finne hjelp som ofte står nederst på siden.
- Samme vanlig: fint med hjelp, ikke tørr å prøve

Sitater:

- “den er jo rød da, så vi vet jo det” (om at resepten er ekspedert)
- “Det vet jeg ikke, jeg aner ikke” - må prøve da
- “Blir vel tvinga til å gjøre det”
- “Hva betyr det der da”

Alle er enige om at det at det kommer nye ting hele tiden er en stor utfordring.

- Stadig nye ting. Det positive er at man må skjerpe seg.
- Man kan ikke stå på stedet hvil.
- Omlegging og nye programmer hele tiden.
- Må kunne beherske systemene.
- Omstilling.
- Det skal ikke mye til for at man trykker på feil knapp.
- Ting skifter fort. Windows 10, 11 og store forandringer.

- Nye veier å gå i den nye tablet [kvinnen som satt ved siden av meg hadde fått nytt iPad. Hun sa hun hadde et Android nettbrett før. Den hadde gått i stykker og barna ville at hun skulle kjøpe iPad fordi det var enkelt å bruke. Men hun skjønte ingenting av iPaden sin].
    - Barnebarna lærer meg ting jeg ikke kan.

- Hvem sender man egentlig melding til?
- Hvorfor skal kritisk informasjon og kjernejournal stå som to separate innslag? [når de handler om overlappende informasjon]. Forvirrende!

Første runde med oppgaver:
- Mangel på eget valg for Vestsiden for å bytte fastlege. Mystisk. [de skjønte ikke hvorfor noen leger hadde valget bytt fastlege ved siden av sitt navn].
- Problemer med tekniske ting, f.eks. at websidene ikke fungerer i Firefox [artig at flere av dem hadde lastet ned Firefox!].
- En som prøver seg med mobil og er veldig fornøyd. [skjermbildene er tilpasset mobil].
- Knapper/ikoner for å utvide teksten for å lese detaljer, f.eks. detaljer om fastleger, ikke fungerer helt bra. De er vanskelig å bruke, ikke intuitivt at man skal trykke på dem for å lese mer.
- Mye tekniske detaljer som er "show stoppers" som vi tar for gitt og klarer å løse uten å tenke på.
- Spørsmålstegnet i websidene [for å få frem hjelpeteksten] fungerte ikke i iPad.
- Måtte logg seg inn på nytt. Var det fordi det ble avbrudd i nettet eller finnes det flere nivåer av innlogging? [Man må bytte webside og logge inn på nytt for å se vaksiner, hos folkehelseinstituttet].
- D-nummer for europeisk helsekort, hva er det?

Oppsummering:
- Resepter: Greit å se oversikt, men vanskelig å få se detaljer. Det er mye informasjon men ikke lett å se detalje-pilen.
- Ingen brukte "?" tegnet som gir mer forklaring på ting.
- Åpne og lukke faner var ikke lett å gjøre.
- Generelt går det greit med tekst. De leser tekst nøye og forstår hva som står der i detaljene. Men de har utfordringer med å bruke symbolske ting for eksempel knapper og faner osv.
- Hvem har tilgang til informasjonen? Det er en ting at det ligger der. Men hvem bruker det? De ser ikke vitsen med å legge inn informasjon hvis ingen leser det.
- Undersøk hvem som bruker kjernejournal? Har vi statistikk rundt det?
- Hvilke krav finnes det for helsepersonnel å legge data on sine aktiviteter?

F.2. Course: Digipost

F.2.1. Schedule

A plan for the course follow in Norwegian.

Plan for temamøte i Digipost

kl 13.00-15.00

Ser an antallet deltagere, men optimalt delere i tre grupper der vi kan ha ansvaret for å observere hver vår gruppe.

Program
Introduksjon
- Introduksjonsrunde
- Samtykkeskjema
- Introkurs i Digipost

Hoveddel
- Oppgaveløsning

Avslutning
- Oppsummering
- Fortelle om mulighet til å delta på co-creation
- Spørreskjema

Kjøreplan:
Introduksjon: maks 30 min

Introduksjonsrunde: maks 10 min
Vi sier hvem vi er og hva vi holder på med, formålet med opplegget, at vi ikke tester dem, men systemet og at de på denne måten blir hørt og kan bidra til at offentlige systemer blir enklere for dem å bruke i fremtiden, at de kan trekke seg når de vil, og hva som er programmet

Vi tar håndsopprekning på om de har vært inne på helsenorge før og forsøker å dele inn grupper best mulig etter nivå

I mindre grupper: alle presenterer seg for hverandre, hva de heter
Alle tenker på en positiv opplevelse og en utfordrende opplevelse de har hatt med digitale systemer og deler disse med hverandre (skrive ned på post-it?)

Samtykkeskjema: maks 5 min
Alle får utdelt samtykkeskjema, vi sier litt hva det handler om og lar dem signere
Vær tydelig på at de ikke må vise frem informasjon de ikke ønsker og kan si ifra hvis de ikke ønsker lydopptak, eller ønsker å avbryte

Introkurs i Digipost: maks 15 min (tar nok lenger tid hvis alle skal logge inn her)
Hva er digipost.no? Vi tar opp nettsiden på storskjerm, viser og forklarer

- Digipost vs Eboks

Hvorfor ta i bruk digipost.no?

- https://youtu.be/TolO-RVkg80
- Sikrere enn bruk av vanlig postkasse (sikker innlogging og ting blir ikke borte i posten/stjålet)
- Får beskjed om du har ny post (epost eller sms), må ikke sjekke postkassen
- Alle brev, både de du sender og de du mottar ligger på et sted (kan lage sitt eget mappesystem)
- Historikk, for å se hva som er blitt gjort tidligere

Innlogging :

Forklare forsiden

- Vise konvoluttvisning og listevisning (ikke si noe om dem)
-

Forklar ulike funksjoner (uten å vise det)

- Varsling og kontaktinfo
- Deling av postkasse
- Sende og motta brev
- Benytte fakturatjenesten “Send til nettbank” (ikke alle banker støtter dette enda)
- Elektroniske kvitteringer
- Elektronisk signering
- Arkivere private dokumenter

Hoveddel: ca 1 time

Oppgaveløsning
Alle får først utdelt oppgaveheftet uten forklaring. Sier at vi veldig gjerne vil at de skal prøve denne først, vi kommer til å gå rundt, få dere til å tenke høyt, hvis de står veldig fast kan vi gi hint

Vi ønsker at de skal hele tiden tenke over hva som kunne blitt gjort bedre inne på digipost og skrive ned dette (skriv det på oppgavearket). Hvis det er noe dere ikke skjønner er det systemet det er noe galt med, ikke dere.

Vi observerer hver vår gruppe

Avslutning: maks 30 min

Oppsummering: ca 14 min
Vi oppsummerer hva vi har inntrykket av at er konklusjonene av positive og negative ting med systemet og opplevelsene (hovedutfordringer) ved å vise frem på på storskjerm. Lar de som ønsker si seg enig eller komme med innspill.

Ting å ta opp:

- Enkelt å se hvem som har elektronisk postkasse
- Sikkerhetsnivåer og sikkerhet
- Legge ved filer i brev (tenker de litt på det som en e-post?)
- Deling av postkasse
- Chat
- Digitalt arkiv: bare for dokumenter, ikke hele bildearkivet ditt
- E-kvitteringer
- Varslingsinnstillinger

Fortelle om mulighet til å delta på co-creation: ca 1 min
Sende rundt liste - listen kan gå rundt mens de svarer på spørreskjemaet

Spørreskjema: ca 10 min
Alle får spørreskjemaet som de må svare på, i hvertfall alder, kjønn, og SUS

Alle får utdelt oppgavesettet med forklaring som de kan ta med seg hjem

F.2.2. Task Sheet

This section contains the task sheet given to the participants. Both this task sheet an one task sheet with answers (a guide) were shared with the rest of the members of SeniorNet at their web page.

digipost.no

Oppgaver

Steg 1: **Logg inn** på digipost.no med **BankID**

Min postkasse

Oppgave 1: Har du noen uleste brev?

Oppgave 2: Hvordan ser du at et brevet ikke er lest?

Oppgave 3: Send et brev til den som sitter til høyre for deg.

Oppgave 4: Svar på brevet du fikk.

Oppgave 5: Finn igjen brevet du sendte først.

Arkivering av post og dokumenter

Oppgave 1: Lag en ny mappe med navnet: “Offentlige brev”.

Oppgave 2: Legg et brev inn i denne nye mappa.

Personalia

Oppgave 1: Se om postadressen din er riktig.

Oppgave 2: Hvordan er varslingsinnstillingene dine inne på digipost? Får du e-post eller SMS når du mottar et brev?

Oppgave 3: Hvordan kan du dele din postkasse med andre?

Chat med digipost

Oppgave 1: Hvor kan du finne mulighet for å chatte med kundeservice?

Oppgave 2: Har du brukt chat-funksjonen tidligere?

E-kvitteringer

Oppgave 1: Registrer bankkortet ditt, slik at du kan få kvitteringer elektronisk i digipost.

Oppgave 2: Synes du det var vanskelig å registrere bankkort? Har du noen ideer til hva som kunne gjort det lettere?

Ekstra

Oppgave 1: Vis brevene i din postkasse med **"Konvoluttvisning"** og **ikke "Listevisning"**. Hvem av disse visningene liker du best?

Oppgave 2: Sjekk sikkerhetsnivået på din konto i digipost. Krev sterk autentisering.

Oppgave 3: Finn ut hva som har blitt gjort på din konto tidligere (historikk).

Oppgave 4: Send et brev til den ved siden av deg med krav om at han må logge inn med bankID for å lese brevet.

Oppgave 5: Send et brev til noen du kjenner som ikke er på kurset (må ha digipost).

Oppgave 6: Prøv deg selv

Prøv deg frem selv inne på Digipost og bli bedre kjent med mulighetene som finnes der.

F.2.3. SUS Results

The SUS scores for each participant is shown in this section. Some of the attendees refused to answer the questionnaires so the numbers d not fit the number of attendees. The results from the rest for the questionnaire is shown in Appendix L.3.

Nettside: digipost.no	1 (Sterkt uenig)	2	3	4	5 (Sterkt enig)
1. Jeg kunne tenke meg å bruke dette systemet ofte		IK	BHJ	DEGMNL	CFO
2. Jeg synes systemet var unødvendig komplisert	L	EFNO	BDHMJ	GI	CK
3. Jeg synes systemet var lett å bruke	CI	K	BDEGJL	FMNO	
4. Jeg tror jeg ville måtte trenge hjelp fra en person med tekninsk kunnskap for å k	FJN	LO	BDGHM	K	CEI
5. Jeg synes at de forskjellige delene av systemet hang godt sammen	K		BCDHJNL	EFGMO	I
6. Jeg syntes det var for mye inkonsistens i systemet (Det virket "ulkogisk")	CF	N	BDEGMJLO	H	IK
7. Jeg vil anta at folk flest kan lære seg dette systemet veldig raskt	K	C	BEHIMNO	DFGJL	
8. Jeg synes systemet var veldig vanskelig å bruke		EFJNO	BCDHML	GK	I
9. Jeg følte meg sikker da jeg brukte systemer		H	BDEK	FGMJNLO	CI
10. Jeg trenger å lære meg mye før jeg kan komme i gang med å bruke dette syst	FMJN		BDEGHLO		CIK

	Totalscore
A	77.5
B	50
C	42.5
D	55
E	55
F	85
G	55
H	45
I	13.5
J	67.5
K	15
L	65
M	65
N	75
O	70
SUM	55.73333333

F.2.4. Retrospective

A retrospective from the course containing observations, important quotes and reflections from the course is this section.

Temamøte tanker og lærdom

Generelt:
20 deltagere, 3 seniornett i tillegg til Andrea og Hege

For få observatører til 20 deltagere.

En mann var veldig kritisk og lagde en del dårlig stemning. Han ville bare høre på og komme med spørsmål, ikke prøve selv. Han roet seg til slutt med avlutningen der vi gikk gjennom litt av systemet.

Oppgaveløsningen var preget av at det alltid var noen som hadde problemer med nettet. I tillegg var det veldig mange spørsmål og problemer med systemet, som gjorde at vi bare måtte løpe rundt og hjelpe folk og ikke fikk tid til å observere. Det var alltid veldig mange som lurte på ting til en hver tid.

De fleste hadde digipost fra før, men ingen hadde sendt brev selv før. Mange hadde mye uleste brev. Deltagere ble trygge på båe og sende og motta brev i løpet av temamøtet.

De fleste virket positive til å kunne arkivere dokumenter i digipost.
Litt mer usikkerhet rundt nytten rundt kvitteringer, da det kan bli mye hvis absolutt alle kvitteringer skal inn her: mye å rydde opp i (må komme noe form for system/filtrering.

Utfordringer med digipost:

Scrolling var et stort problem, de fant ikke “send”-knappen
Bytting mellom “til” og “emne”-feltet når sende mail
Velge personen de har søkt på i til-feltet når den kommer opp som eneste forslag (og egentlig generelt at den må velges)

Skjerm-oppløsning/scallering: hvis man zoomer for mye inn får man ikke scrollet nok ned til å f eks laget ny mappe. Samme gjelder hvis man har laget mange mapper, så kan man scrolle i disse, men “opprett mappe” havner utenfor bildet og man kan ikke scrolle ned til det. (dette er et problem allerede på 100% på Hege sin pc). Går ikke å scrolle i menyen til høyre. Går ikke å scrolle bortover horisontalt når det er nødvendig.

Svare på brev: vanskelig å se valgene når man er inne på et brev. Vanskelig å se hvordan man kan svare på et brev.
At ikke alle etater følger opp
Manøvrering: komme seg fra åpning av post og tilbake til postkassen

Åpne brev (pdf) på ipad funket ikke hvis de ikke hadde en app for å åpne pdf'er (får bare en side full av tegn/kode

Kommentarer på at "pusser opp" inne på e-kvitteringer (tjenesten er nede en periode pga oppgradering) er teit, ord som oppgradering, oppdatering, osv er mer ønsket av deltakerne

Vanskelig å vite hvordan man skal flytte noe til en mappe. De fleste så det først når de var inne på selve brevet, at det gikk an å flytte til mappe

Hvis de markerer et brev synes ikke linjen som kommer opp (der du kan velge flytt og slett) hvis man er langt nede på siden.

Ingen skjønner at de kan dra et brev til mappe

Observerte noen om så at det sto "ulest", men disse la ikke merke til det lille brevet først på linjen som viser om det er åpent eller ikke. 3 stykker har skrevet i oppgavehefftet at de så om brevet var åpnet eller ikke med bilde av en åpen vs lukket konvolutt.

Ingen som brukte konvoluttvisning selv om vi hadde vist dem muligheten. Noen ville ha bort det lille brevet først på linjen fordi de tenkte at det tilhørte konvoluttvisningen.

De skjønner ikke at det er mer info inne på der det står navnet deres, selv om det er en liten pil ned ved siden av

De skjønner ikke at de må ha et navn på mappen, ender med mappenavn "ny mappe"

Flere skjønte ikke det at de må bruke bankid (på samme måte som når de betaler en regning) når de huker av for å kreve at mottaker logger inn med bankID. "Jeg er jo allerede logget inn med bankID".

G. Questionnaires

This appendix present the questionnaires used in the study. First the questionnaire from the helsenorge.no course held by the researchers is presented. Secondly the questionnaire from the digipost.no course held by the researchers is presented. Finally the SUS form is presented. The SUS form were also used combined with the other questionnaires and always after one attendee were observed using one of the systems in the focus area of this research.

G.1. Course: Helsenorge.no

The questionnaires asked for the users' age, gender, their ICT background, how knowledgeable they found themselves, positive and negative aspects with helsenorge.no, and also suggestions for improvements.

Temamøte i helsenorge.no

Alder:

Kjønn:

Har du noe bakgrunn innenfor IT? (jobbsammenheng)

I forhold til folk på din alder, hvor kunnskapsrik innenfor IT anser du deg selv? (På en skala fra 1-5, hvor 1 er lav)

Hva var bra med systemet?

Hva var vanskelig med systemet?

Forslag til hva som kunne gjort systemet enklere å bruke?

G.2. Course: Digipost.no

The questionnaires asked for the users' age, gender, their ICT background, how knowledgeable they found themselves, positive and negative aspects with digipost.no, and also suggestions for improvements.

Temamøte i digipost

Alder:

Kjønn:

Har du noe bakgrunn innenfor IT? (jobbsammenheng)

I forhold til folk på din alder, hvor kunnskapsrik innenfor IT anser du deg selv? (På en skala fra 1-5, hvor 1 er lav)

Beskriv hva som var bra med digipost?

Beskriv hva som var vanskelig med digipost?

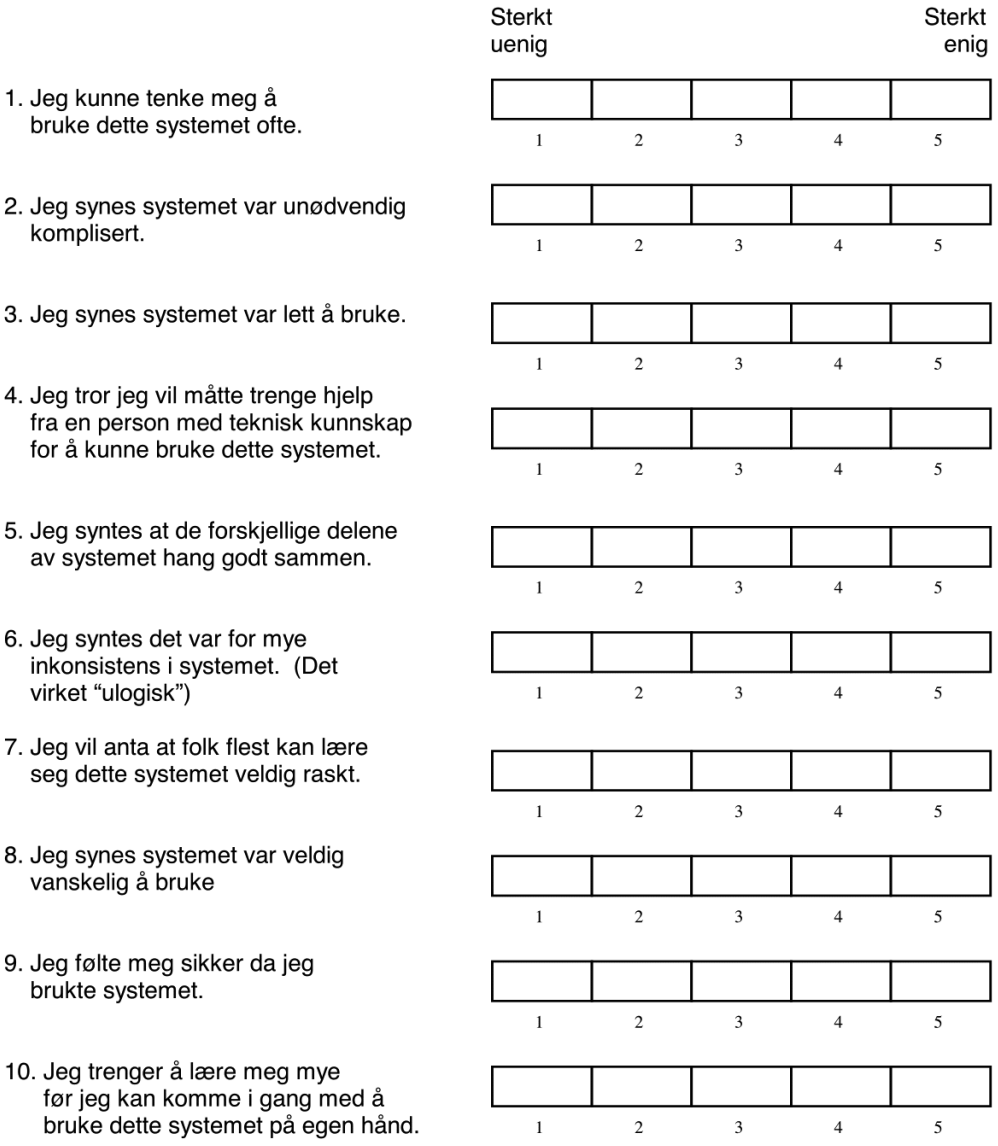
Hvordan kan digipost bli enklere å bruke?
(Gi konkrete eksempler)

G.3. SUS Form

The SUS form gives an indication the overall usability of the system.

Noen spørsmål om systemet du har brukt.

Vennligst sett kryss i kun en rute pr. spørsmål.



I

SUS
Norsk versjon ved Dag Svanæs
NTNU 2006

H. Co-design Workshop

This appendix presents the framing, planning and plan for the co-design workshop, along with the retrospective notes. Additionally, sketches from the co-design session are visualized.

H.1. Planning and Framing

This section presents the framing and planning for the co-design workshop. The framing involves how to find proper participants, and what to investigate in the workshop, and which methods to use. The planning involved to identify how to conduct the different steps in the workshop to get the preferred outputs.

Framing

1. **Select your users:** eldre i Seniornett
- Personlige egenskaper: Lærevillig, interessert i digitaliseringen, ønske om å gjøre tjeneste brukervennlig for eldre
- Demografi: Begge kjønn, 67+ (pensjonister)
- Brukere som er klare i hodet

2. **Create your goals:**

Forstå deres tanker for hvilke behov de har, hvordan de vil prioritere og hvordan de vil design, *for å se om det har noe effekt at andre eldre har vært med å bestemme for andre eldre som tester prototype i ettertid*
Involvere brukergruppen for å skape nye ideer og tanker

Who: Hvem bryr seg om hva? Er det forskjeller på menn og kvinner?
What: Hva er det de bryr seg mest om? hva er det de prioriterer?
Where: Hvor på skjermen er fokuset? Hvor velger de å plassere de ulike funksjonene/elementene?
Which: Hvilke behov har eldre under prioriteringen? Hvilken effekt har en co-creation seanse for brukervennligheten for eldre når de selv har vært med å utforme tjenesten?
How: Hvordan foregår prioriteringen? Hvordan vil designet se ut når de eldre får bestemme? Hvordan samarbeider de om utviklingen?
When: Når velger de å bruke de ulike elementene?
Why: Hvorfor bryr de seg om akkurat disse tingene? Hvorfor velger de som de velger? Hvorfor er denne funksjonen viktig for dem?

Mål 1: Hva er det de prioriterer og hvorfor? (Hva er viktigst for dem, hvorfor er dette viktig)
Mål 2: Hvordan vil designet se ut når de eldre får bestemme?
Mål 3: Dette for å forstå om co-creation med eldre gir en effekt på systemenes brukervennlighet og tilpasning for deres brukergruppe

Hvilken effekt har co-creation med eldre på deres brukergruppes følelse av tilpasning, inkludering og brukervennlighet?

3. **Define what you think you know**:

Hypotese 1: De vil prioritere hovedfunksjonene. Fordi de orker ikke å ha mange ting, blir fort ulogisk.
Hypotese 2: ting må være enkelt, uten unødvendig elementer, det må være stort, enkelt språk, må være lett å få oversikt, følger logisk nedover
Hypotese 3: Vi tror det har en effekt

4. **Identify methods to use:**

Method 1: Idea generation/brainstorming, value ranking/the suitcase
Method 2: Create aktivitet, Fill in the blanks/ interface toolkit
Method 3: Evaluere hverandres prototyper

Planning

Activity objectives

- What is the goal for your activity? Se ovenfor
- What hypotheses of questions will the activity address? Se ovenfor
- How does this activity help fulfill your research objectives? Prioritering og brainstorming gir kunnskap rundt hvilke funksjonaliteter som er viktig for dem i et system → løsning for mål 1. “Fill the blanks” og “Interface toolkit” gir kunnskap rundt hvordan de skulle laget en løsning som er brukervennlig for dems aldersgruppe → løsning for mål 2.

Activity inputs

- Who are the participants for the activity? Eldre 67+
- What information & knowledge they bring to the activity. Tanker og ideer til hvordan systemet kan passe bedre for dem, deres behov og forståelse.
- What materials & unique tools does the activity require? Kamera, lydopptaker, designelementer, skjermer av papp, skrivesaker

Steps for the activity

1. Idemyldring og Value ranking/koffert:

Alle skriver først hver for seg på lapper
Presenterer i plenum, unike lapper legges på et gråpapir på midten, så alle der det og kan delta i utvelgelsen (viktig å ta bilder av gråpapiret med lapper underveis, før lapper fjernes)
Diskuterer hver av funksjonene
Prioriterer hva som er viktig å ha med

2. Fill in the blanks/ interface toolkit

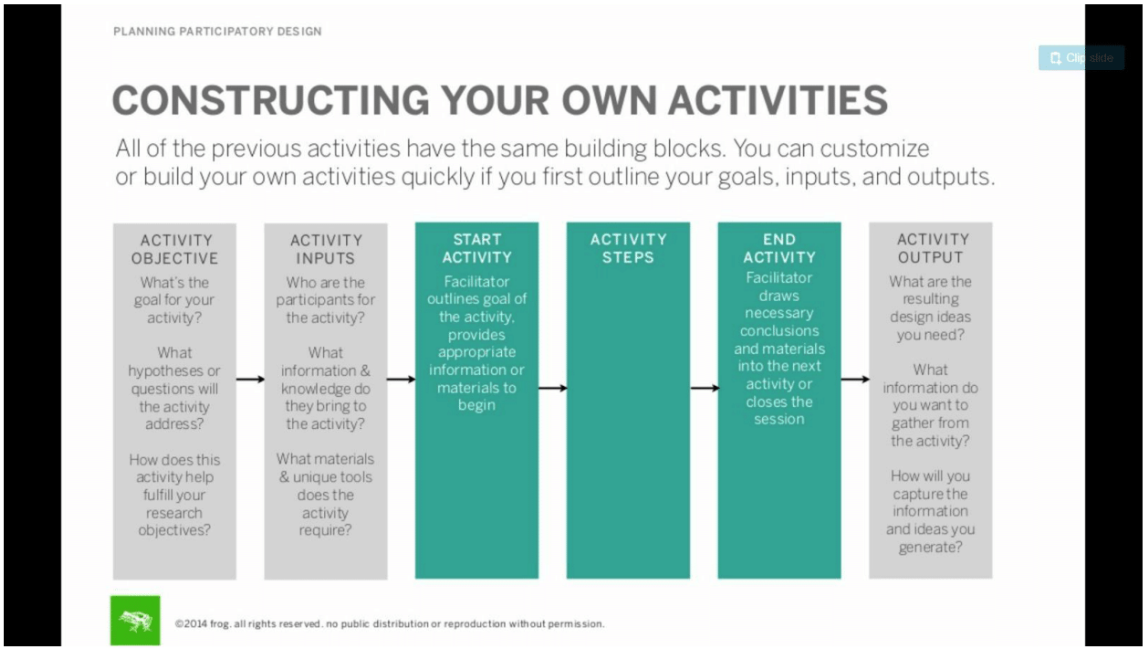
Hver gruppe får utdelt en pappskjerm med bakgrunn de kan tegne på + lapper de kan tegne på og klistre på
Etterhvert kan de også få ferdige elementer de kan velge å bruke. Sortere og prioritere hvor ting skal være og hva som skal være med

3. Evaluation

Deler ut post-it som de kan skrive tilbakemelding på
Gruppe 1 presenterer
Gruppe 2 og fasilitatorer gir tilbakemelding
Gruppe 2 presenterer
Gruppe 1 og fasilitatorer gir tilbakemelding

What should the activity output be?

- What are the resulting design ideas you need? Trenger å se hvordan eldre selv ville designet en nettside.
- What information do you want to gather from the activity? Hvordan de prioriterer nødvendig informasjon på nettsiden og hvorfor. Og hvordan de vil at utseende på nettsiden skal være. Og om disse outputene er med på å skape til et intuitivt design for andre eldre.
- How will you capture the information and ideas you generate? I en observasjonsguide. Analysere videoopptak.



H.2. Workshop Plan

This section presents the entire workshop plan, with the different activities and a time schedule.

Kjøreplan

Totalt: 3 timer (12.00-15.00), inkludert pauser

Tar utgangspunkt i digipost sin nettside

Avgrensninger: de får en “skjerm” av papp de må holde seg innenfor. De tegner først på frihånd, får utdelt elementer på papir etter hvert.
Low-fidelity workshop

To forskjellige metoder, en for å se på behovene, en på designet:
Behov: Idea generation/brainstorming, value ranking/koffert
Design: Create aktivitet, Fill in the blanks/ interface toolkit
Evaluere hverandres prototyper

Hente deltagere kl 12.00 på bussholdeplassen

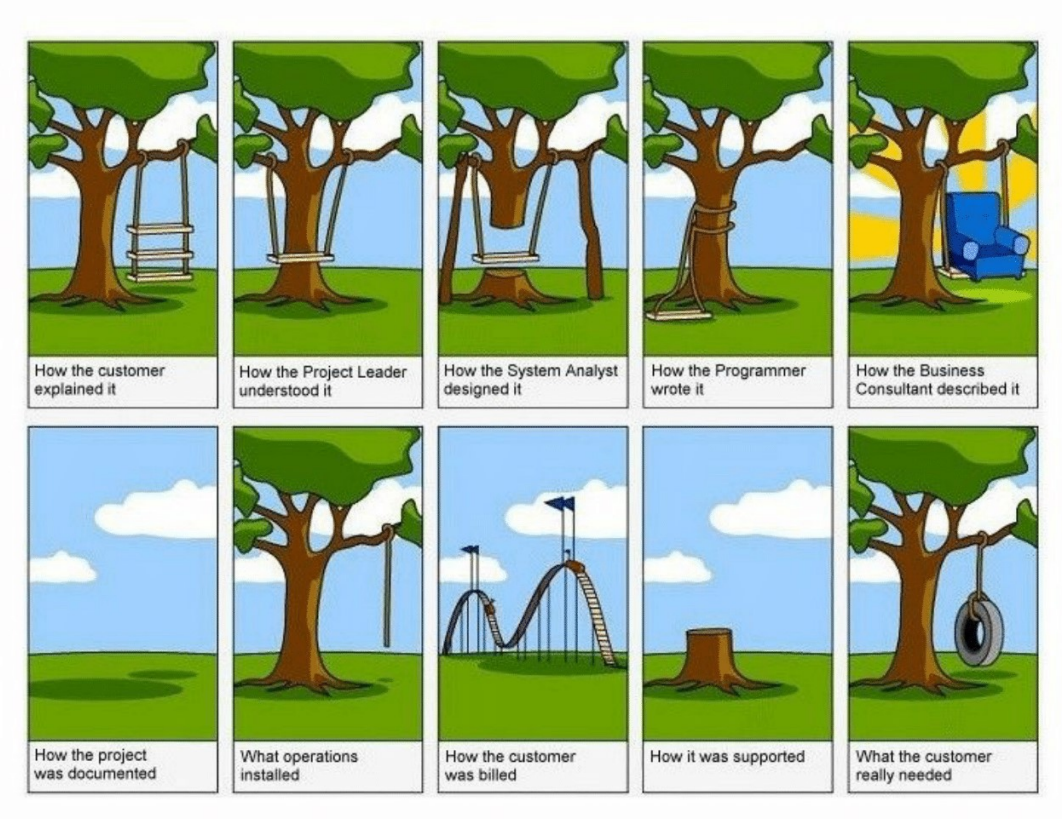
Kaffe og komme på plass, igang 12.15

Introduksjon: 25 minutt

Plan for dagen: 5 minutt
Om opplegget og oppgaven
Mål for dagen, motivasjon for workshop

Introduksjonsrunde: 5 minutt
Alle sier navnet sitt og hvor de er fra i plenum.

Inspirasjon: 10 minutter
Treet med huska som viser forståelsen av problemet



Video: av workshop med prototyping for å inspirere - OBS burde ikke være på engelsk (evt skru av lyd)
Eller: nyhetsartikkel eller historie som kan motivere
Intro i workshopping/prototyping

Omorganisering: 5 minutter
Dele i grupper, bytte rom for noen
To grupper, fire på hver. På hver sitt rom
Samtykkeskjema

Workshop del 1: 20 minutter, kl 12.40

- **Presentere opplegget: 2 minutter**
- **Idemyldring og Value ranking/the suitcase/blink (Bull's-eye):**

Alle skriver først hver for seg på lapper
Presenterer i plenum, unike lapper legges på et gråpapir på midten, så alle der det og kan delta i utvelgelsen (viktig å ta bilder av gråpapiret med lapper underveis, før lapper fjernes)
Diskuterer hver av funksjonene
Prioriterer hva som er viktig å ha med

Pause: 10 min, kl 13.00

Workshop del 2: 60 minutter, kl 13.10

- **Presentere opplegget: 3 minutter**
- **“Fill in the blanks” / “interface toolkit”:**

Hver gruppe får utdelt en pappskjerm med bakgrunn de kan tegne på + lapper de kan tegne på og klistre på
Etterhvert kan de også få ferdige elementer de kan velge å bruke. Sortere og prioritere hvor ting skal være og hva som skal være med
Backup: Ha skjermbilder av nettsiden til å vise som eksempel hvis nødvendig

Pause: 10 min, 14.10

Avslutning med oppsummering: 40 minutt, 14.20

Presentere ideene sine: 20 minutter

- **Evaluation**

Deler ut post-it som de kan skrive tilbakemelding på
Gruppe 1 presenterer
Gruppe 2 og fasilitatorer gir tilbakemelding
Gruppe 2 presenterer
Gruppe 1 og fasilitatorer gir tilbakemelding

Oppsummering: 20 minutt
Diskusjon og evaluering av løsningene

Vise rundt hvis tid, følge tilbake

H.3. Meeting with Yngve Dahl

This section presents the notes from the meeting with Yngve Dahl. The following notes contains Yngve's previous experiences from workshops with older adults, and also recommendations for this specific co-design workshop.

Møte med Yngve 9.2

Spørsmål til Yngve:

Greit å si at vi bruker "Bringing Users into Your Process Through Participatory Design" sin metode til å planlegge workshoppen i co-creation?

- Er det samme

Evaluering: kan man kalle det en metode?
Kan ikke teste det på noen andre (papirprototypen)
Diskusjon i stedet for brukbarhetstest
Ha en moderator (wizard of oz test)
Lager vi en enkel funksjonell prototype kan vi teste den

Hva er forskningsspørsmålet?
Kan vi få svar på forskningsspørsmålet med det vi gjør?

- Blir mye lettere når vi har det
- Relatere det til det som er gjort tidligere
- Posisjonere det ift hva andre har gjort

Spørsmålet er like viktig som svaret

Den artikelen med med kofferten, kanskje de har et relevant forksningsspørsmål?
Evt i annen litteratur?

Universell utforming tar tak i problemer med dårlig syn - er allerede gode guidelines

Hvordan de tenker på oppgavene sine, strukturerer
Supermarked(?)design
Aktivitetsbasert design (ligger i umiddelbar nærhet, det man skal gjøre) - eks han med selvangivelsen som vi intervjuet på Hornemansgården
Er man maler trenger man alt hele tiden, man stabler ikke alt fint hele tiden
DNB er sortert på nivåer, ikke sortert etter aktiviteter

For eldre
Hva på et overordnet nivå er du ute etter?
Lede gjennom det man skal gjennom

Bilder av lapper de har for å huske - disse må vi ha bilde av! TODO

Don norman - artikkel - yngve sender
Organisere for aktivitet vs taxonomi (organisere på en hensiktsmessig måte)

Hypotese: lettere for de å organisere etter aktiviteter enn etter "hyllevare"

Har vi snakket med de som utvikler tjenestene i helsenorge og digiopst? Er det noe grunn til at de tenker som de tenker? Personas, osv?

Bare brukergrensesnittet eller hele tjenesten?
GUI design vs tjenestedesign

Hva slags forhold skal vi ha til det? Det henger sammen, er jo ikke det samme

Dra dette tilbake til forskningsspørsmålet
Opplever du utfordringer knyttet til offentlige tjenester (eks helsenorge og digipost) eller er det grafiske brukergrensesnitt for systemer i den her type tjenester?

Utforskende approach (utforskende greie)
Brukernes opplevde utfordringer tilknyttet disse tjenestene: en case study
Ha med seniorer i tittelen
Dra inn nettsiden
Eldres opplevde utfordringer tilknyttet offentlige digitale tjenester: en case study

Kan stille spørsmålet i en diskusjon
Det er ikke funksjonssvikt, det er at strukturen ikke matcher deres konseptuell modell
Konseptuell modell vs mental modell
Hva de tenker vs hvordan det er strukturert

Er mulig å diskutere dette opp mot at det kan bli lettere for alle med aktivitetsbasert (dette har vi ingen resultater på, men kan diskutere)

Hvorfor stiller vi disse spørsmålene? Er de relevant?

Brukbarhetstest med mer aktivitetsbasert

Kjøreplan:
- Ser ok ut
- Har vi en backup-plan?

Hva hvis de ikke klarer å designe noen ting, selv med elementer?

Dra opp et eksempel på prosjektor som henger sammen med casen
Eller
Vise en skjermdump av systemet slik det er i dag

Tidsbruk: Intro:
- 25 min er ganske lenge
- 10 min pause går for hvis de skal forflytte seg - vær for seg

Tenk på hva vi sier om oss, det legger føring for hva de sier selv videre
Gjenta det mål og mening

Skifte rom kan ta tid
Alt av materiale må ligge klart på rommene på forhånd

Prioritering: blink, viktigste i midten

Trenger ikke transkribere alt: noter ned tidspunkter underveis, så vi vet hvor det interessante er

Holde fokuset til deltagerne: Ha fouks på elementer, eks på postit, blink, prototype

Ta med blinken i fellessesjonen eller hva det blir

Alle er ikke komfortable med å snakke foran alle, vi kan presentere, men de må si hva de tenker
Ha en gruppeleder? Lede presentasjon med støtte av de andre

Oppsummering: kan spørre hva de synes om opplegget også
Oppsummere hva vi har lært
Hva vi sitter igjen med
bekreftelse /avkreftelse av våre inntrykk

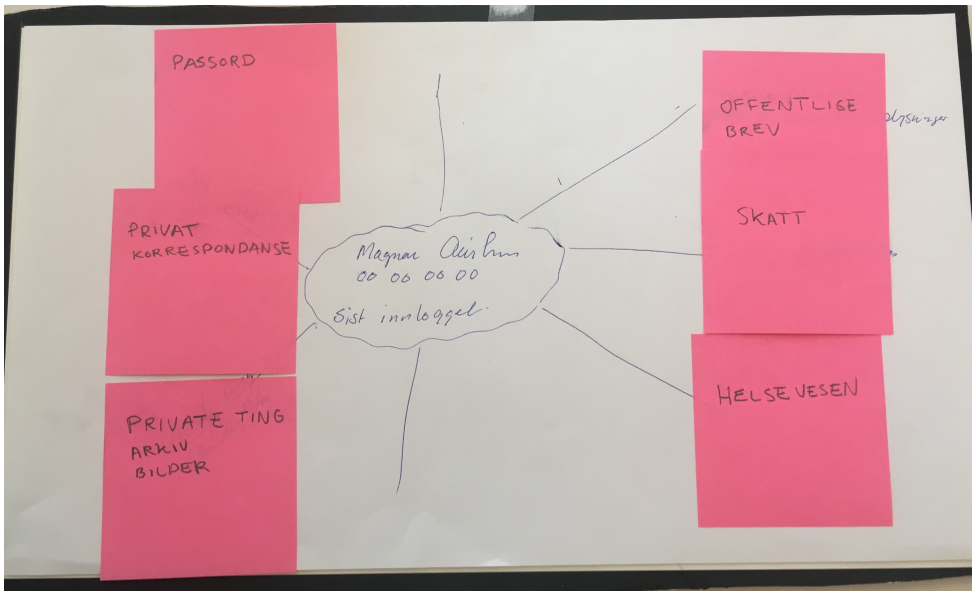
Gjøre det klart at vi tar det opp - hvorfor, for å analysere
Vi anonymiserer og sletter
Vi kan stoppe opptaket undervies hvis noen vil det
Kan avbryte underveis

Ta bilder underveis
Også av at de sitter og jobber

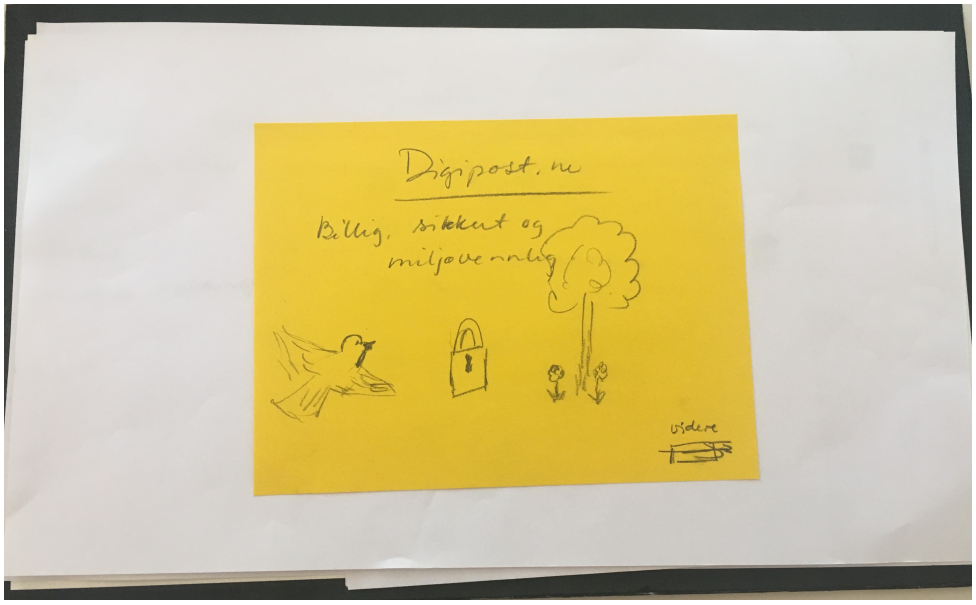
H.4. Sketches From Co-design Workshop

This section presents the participant's sketches and ideas of digipost.no in the co-design workshop. These low-fidelity prototypes were placed on a cardboard to symbolize a computer screen.

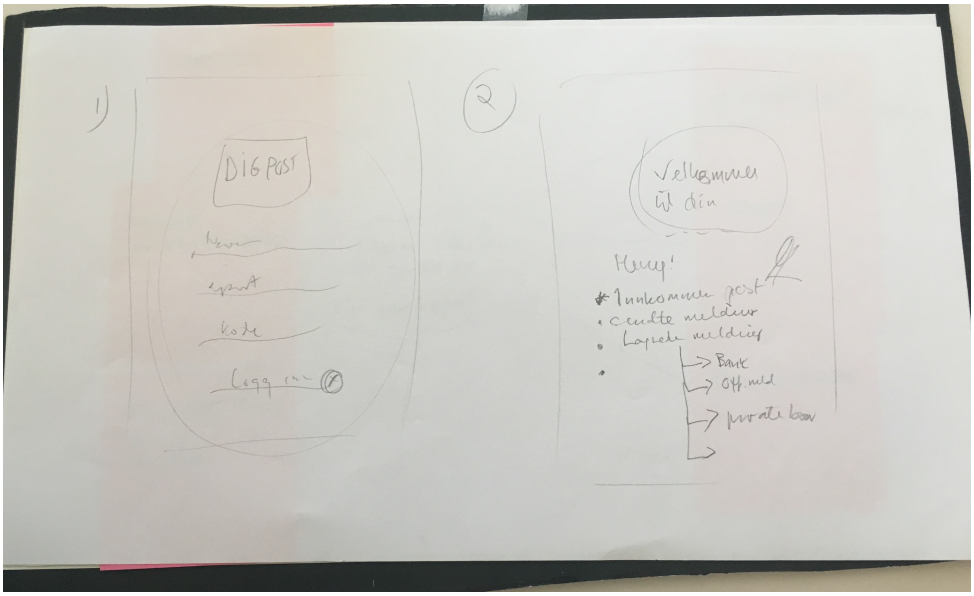
The following figure shows the structure of the front page, sketched with boxes for the different activities that digipost should deliver.



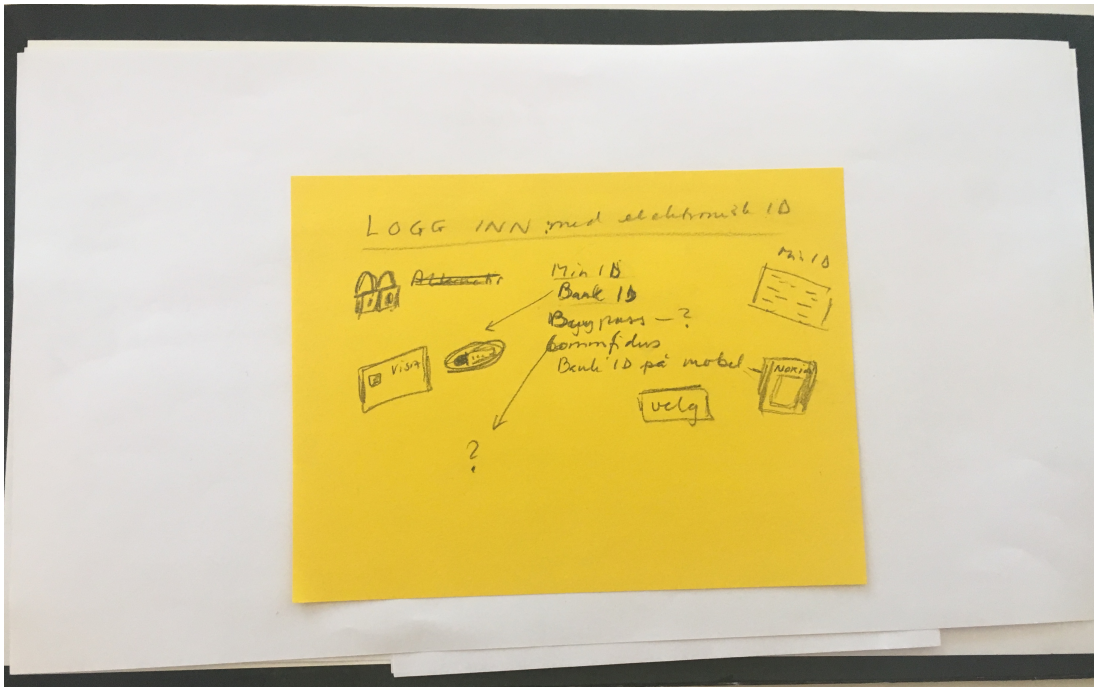
One group created a front page with informative images to visualize positive aspects of digipost, which were considered to be secure storage of mail and good for the environment.



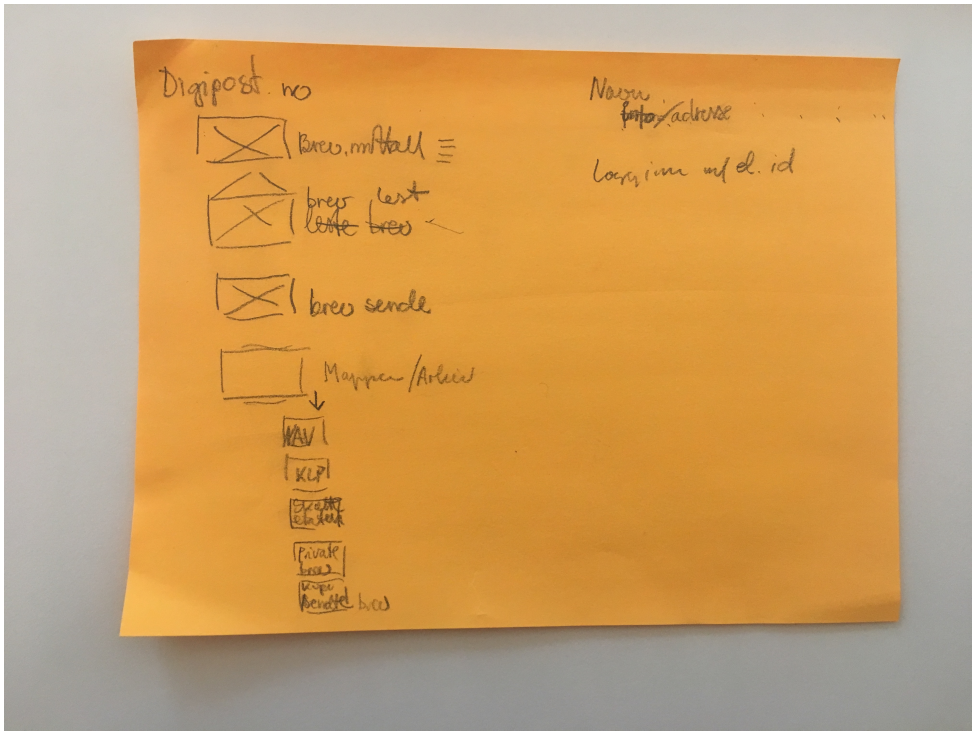
This figure shows another preferred front page of digipost along with a page with the menu of the different activities are visualized.

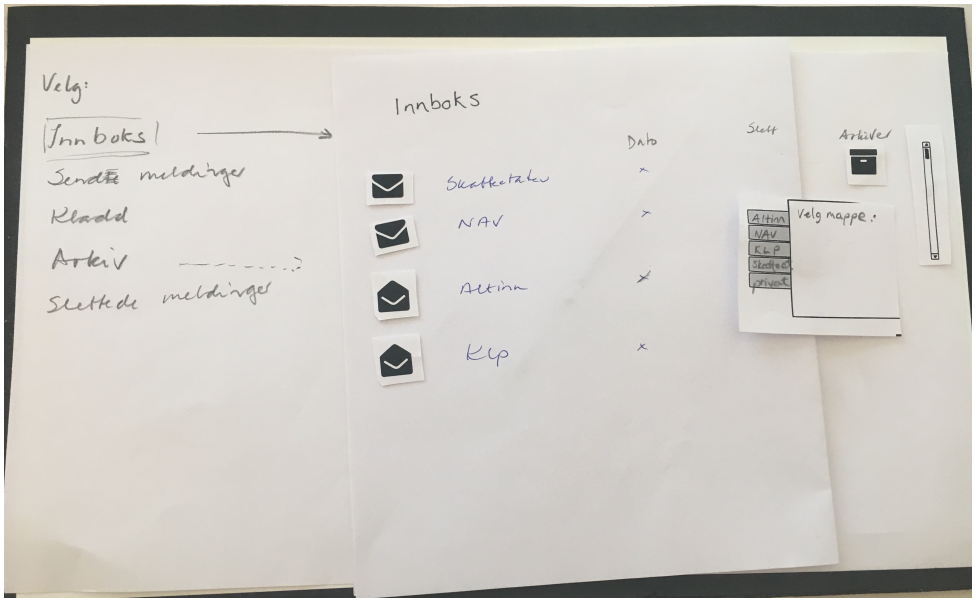


The following figure shows that one group preferred to have text and images together to increase the understanding of which login method to chose.

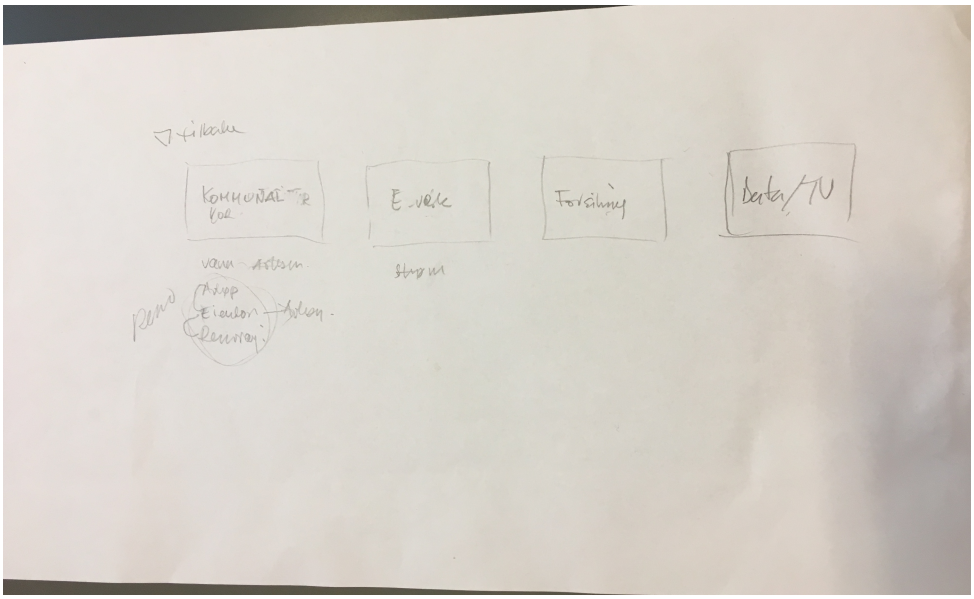


One group mapped the inbox for digipost like their email inbox. The first figure was their prior sketch, and the next figure is the sketch created together in the group.

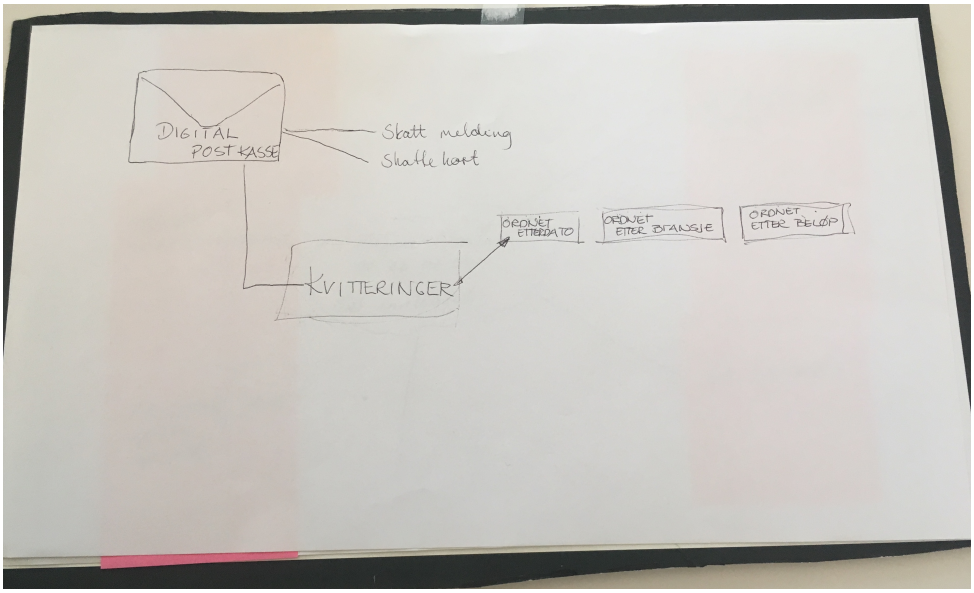




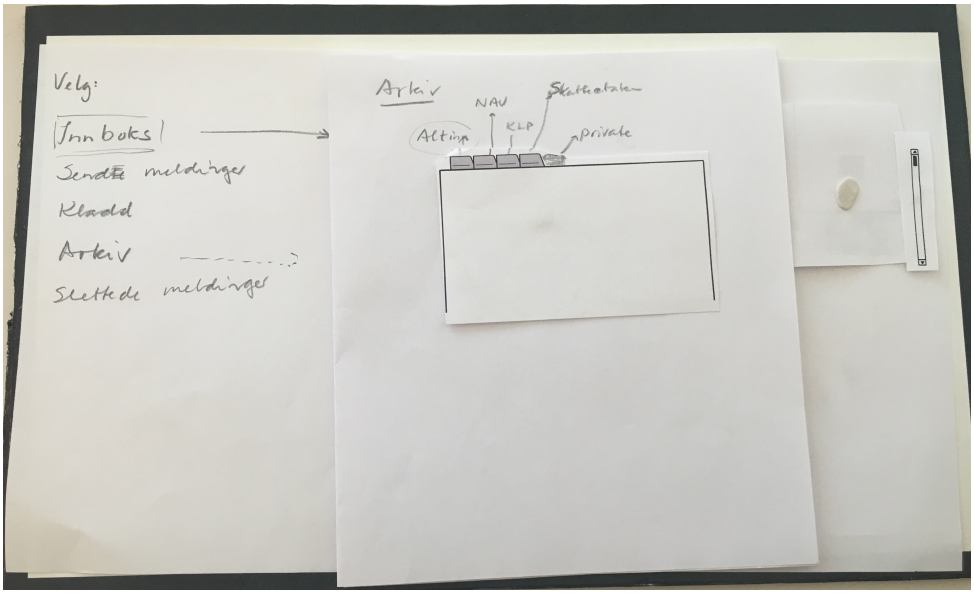
This figure shows how one participant preferred the structure of the different public services.



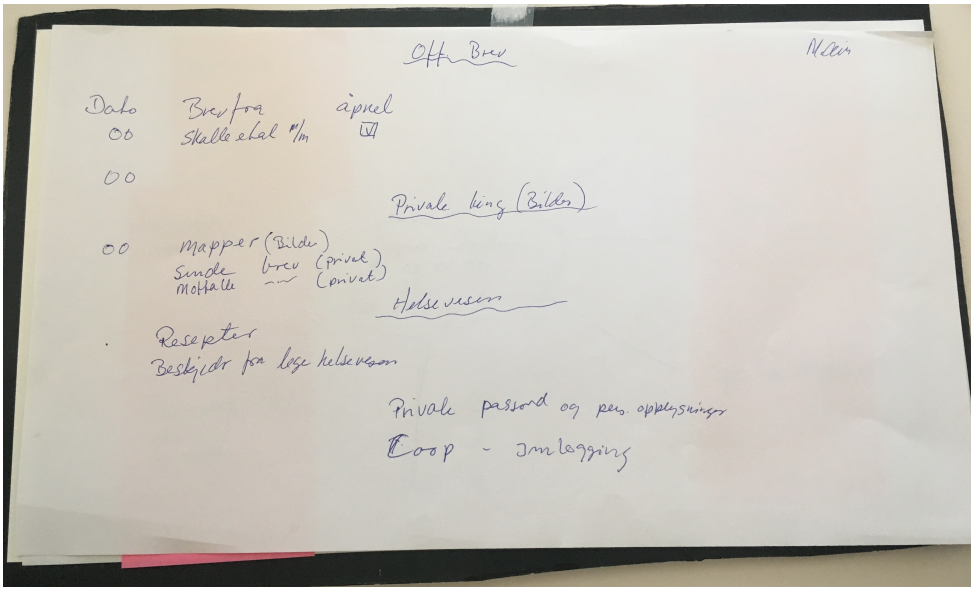
In the following figure, one participant visualized a logical structure of receiving receipts in digipost.

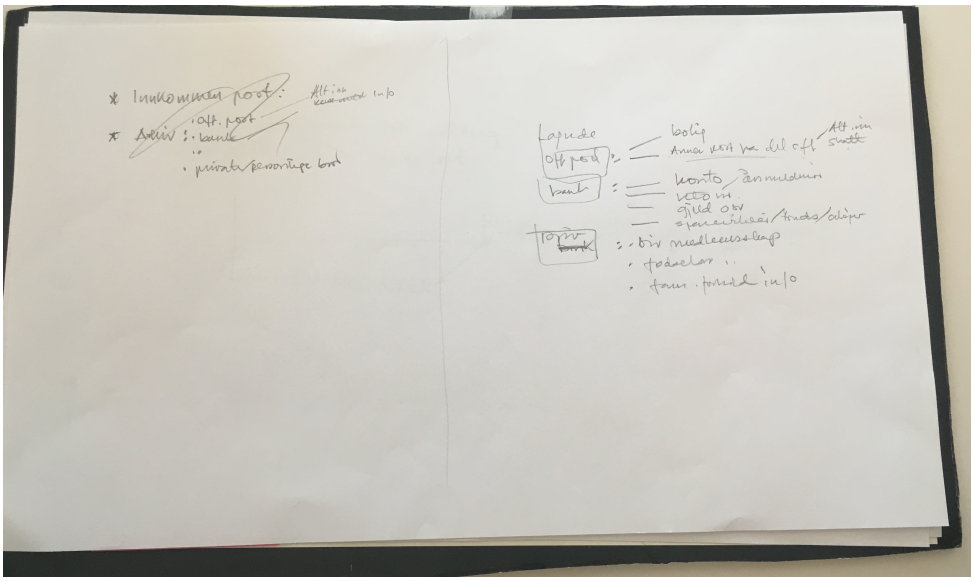


In this figure one of the groups utilized metaphors to understand how to archive different documents or correspondences in digipost.

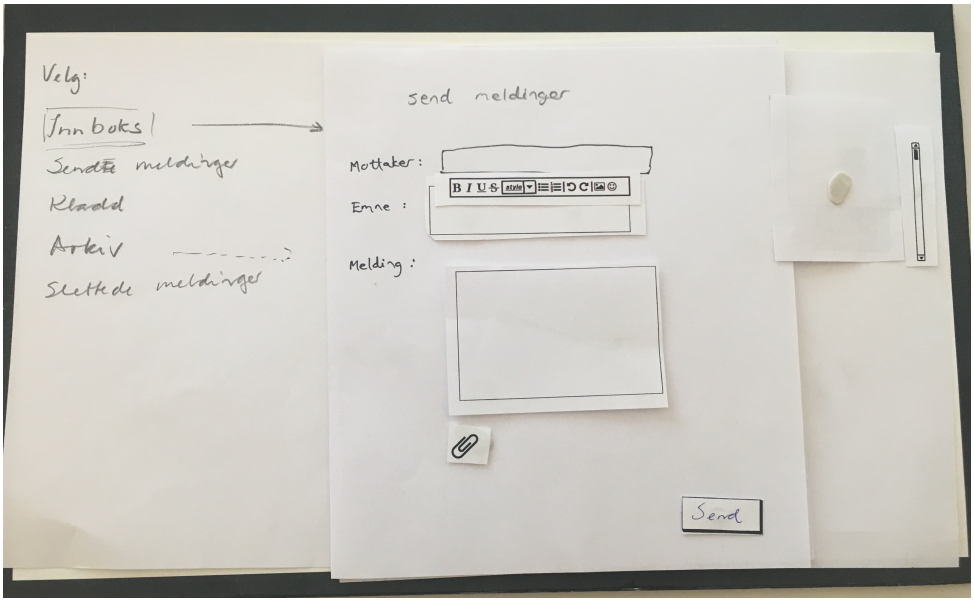


One group wished to filter the different correspondences into public, private, and health, to get them automatically archived correctly, shown in the two figures on this page.

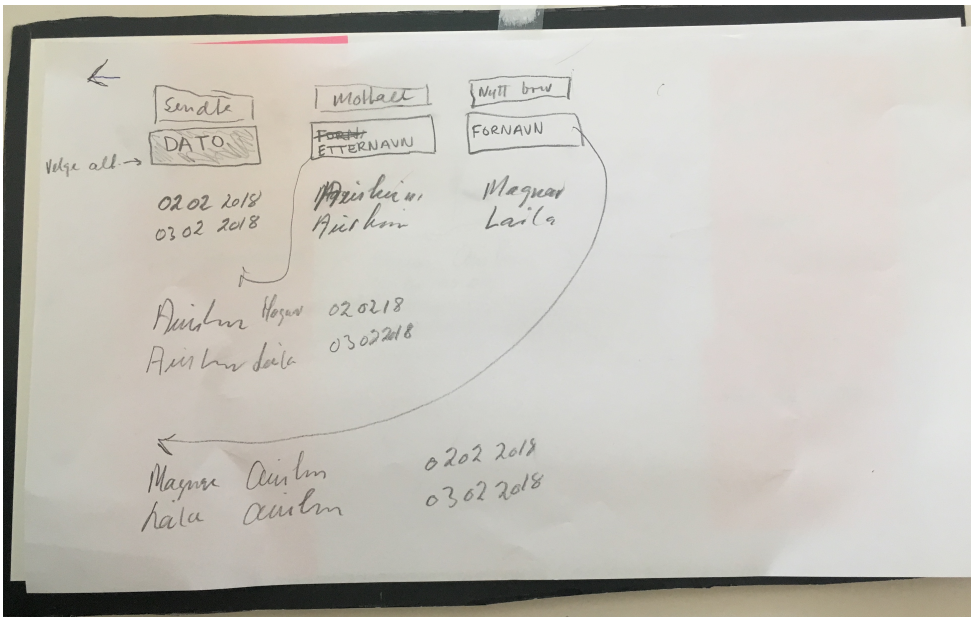




In the figure on this page, one group showed their preferred way of sending a mail. It was important to have all information visual on one page.



The figure shown the possibility to filter on surname, first name and date. The reason behind this functionality was that people could have the ability to choose their preferred way of showing the content.



H.5. Notes From Retrospect Co-design

This section shows an excerpt of the retrospective analysis of the co-design workshop. It contains comments and discoveries for both groups from all activities of the workshop, brainstorming, "Bull's eye" and "Fill in the blanks".

Retrospekt

Generelt:
Positivt innstilling til å være med på slike ting både før vi startet og ikke noe mindre etterpå.
De synes det var veldig gøy å være med!
Avhengig av mye fasilitering

Hvis en sier noe er ofte de andre på gruppa enig.
Gr 1: Team Andrea
Gr 2: Team Hege

Brainstorming

Vanskelig å komme i gang med opplegget, da de ville snakke om hva som var bra/dårlig med digipost og det at det digitaliseres. Redd for at posten blir borte.
Går ikke inn på digipost uten at de får en melding om at noe nytt har skjedd - viktig med varsel

Gr1:
- Hadde problemer med å komme med innspill
- Tenkte enkelt
- Vil ikke at det skal være rotete
- Så ikke helt forskjellen på digipost og mail, hvorfor ha begge deler?

Gr2:
- Alle skrev først på egne lapper, så ble lappene presentert på rundgang
- Tenker veldig stort
- Fokuserer veldig på sikkerhet
- Ønsket først å lage en løsning som inneholdt alt som er sikkert, blant annet nettbank, helsenorge.

Bulls eye

Gr1:
- Da de skulle prioritere ønsket de at løsningen i all hovedsak skulle ta for seg sende/motta brev. Fordi det er sånn e postkasse fungerer.
- Prioritering:
  - Sende/motta brev
  - Arkiv- mulighet for å slette for å unngå at det overfylles og mappestruktur for å unngå rot
  - Dele postkasse fordi det gjør man med den vanlige postkassen
  - Få beskjed hvis det har skjedd noe, så man slipper å gå til postkassen
- Utenfor prioritering:
  - Mail- de snakket mye om forskjellen på mail og digipost, men de er ikke overbevist om at de bør være samme.

Gr2.:

- Da de skulle prioritere, fant de ut at løsningen vil inneholde for mye og vil føles uoversiktlig. Netbank har allerede en god og sikker løsning som de klarer å bruke. Helsennorge fikk være med inn i prototypen, men her var det noen av de som begynte å bli usikre på om den skulle med, eller om det er bedre å la helsenorge være en egen, sikker løsning, slik som det er i dag.
- Prioritering:
    - Motta og sende offentlige post (inkl skatt og skattekort)
    - Sende og motta private ting som skal holdes sikkert eller er konfidensielt (eks kontonr, opplysninger som ingen andre skal vite)
    - Få beskjeder fra lege, sykehus, tannlege
    - Kunne forespørre om f eks resepter og helsevesen
    - Sende og motta personlige private brev
    - Private bilder og arkiv (rett innenfor blinken)

    - Ble tatt utenfor blinken:
        - Nettbank, få og betale regninger, motta regninger, bankkontakt
        - Søke på bilnr for å finne bileier

Fill in the blanks

Gr1.

- Begynte å tegne på store post-its, synes det ble mye rom ledig på skjermene
- Når de skulle tegne hadde de vanskelig med å samarbeide, da en person var bedre til å tegne og visualisere hvordan det burde se ut på skjerm
- Måtte gå over til å bruke symboler da det va vanskelig å vite hvordan ting så ut
- Valgte å lage en “chain” av ting som skjer når man trykker inne på digipost

Billig, sikkert og miljøvennlig
Symboler sammen med tekst
Opptatte av symboler, åpent brev, lukket brev
Plassert ting i leseretning
Arkivmappe, kjenner igjen likhet med en analog arkivmappe

Begynte med å tegne store firkanter, men gikk fort over til listevisning - tenkte mer og mer på mail. Lettere å ha listen på siden, forenkler stegene ut og inn av et brev

Oppsummering gr1:
Enkelt, oversiktlig, listet
Gjenkjennelig med mail

Gr2:
De mente selv at de tenkte likt, men de hadde forskjellige oppsett
Viktige å finne igjen ting (Filtrering: dato, bransje, beløp)
Selv selv i midten
Dele skjermbildet i privat og offentlig

Ser til høyre først, spesielt når man er gammel, derfor ville de ha det viktigste der - det offentlige
Det viktigste øverst og til høyre
Knapper på toppen
Tilbakepil OVERALT i venstre hjørne (de sa: Slik som på Facebook) (en skrev med symbol og tekst)
Sende nytt brev har store bokstaver og på linje (leseretning)
Mapper, med undermapper. (filterering av hvilke etater på offentlige brev og privat korrespondanse)
Synes det er viktig at ting er plassert lett tilgjengelig og på den mest synlige plassen på skjermen. (aktivitetsbasert?)

Oppsummering gr2:
Ikke tilfeldig hvor ting skal stå - det viktige mest synlig (ikke på likt nivå som alt annet)
Personalisert for den aldersgruppen (må ikke se likt ut for alle) (ut fra livssituasjoner)
Sikkerhet- de som må være lagret sikkert, skal på digipost

I. Prototypes

This appendix present the two prototypes made in the project, the first one based on the existing design of digipost.no and the other one based on the prototypes made through the co-design workshop and the other relevant insight.

I.1. Prototype of Existing Solution of digipost.no

This section show screenshots of the existing design of digipost.no. First, the front page showing the inbox is visualized in Figure I.1.

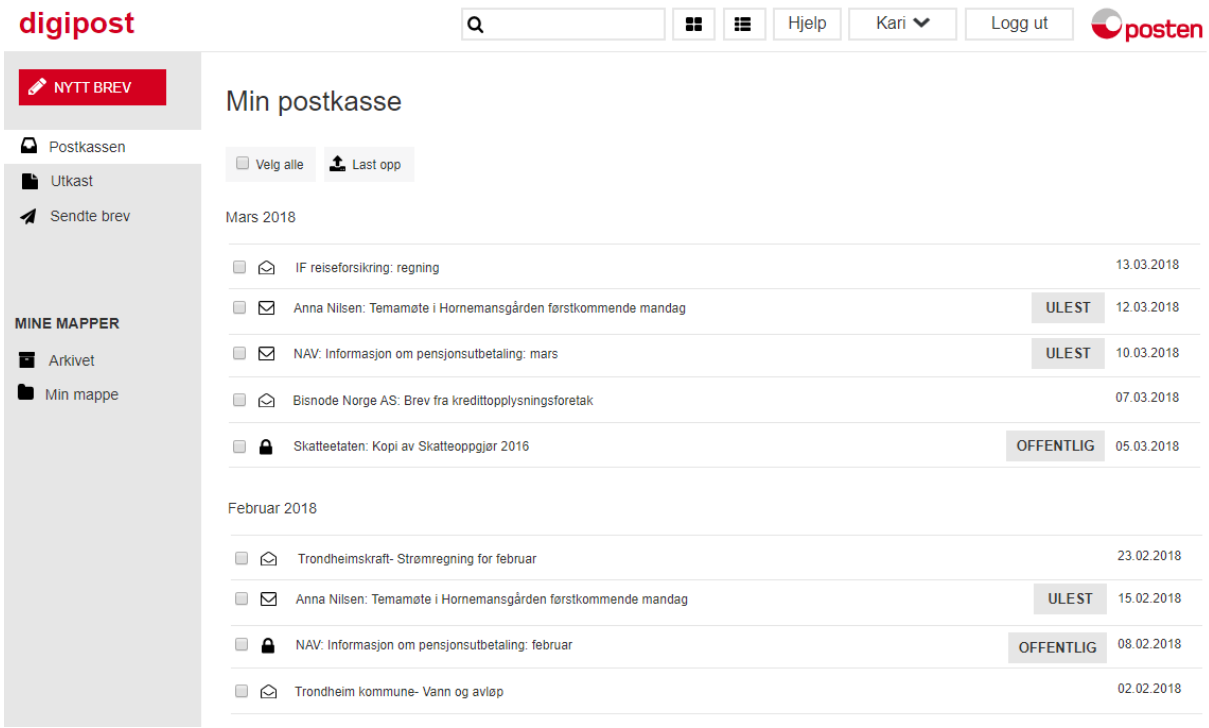


Figure I.1.: Prototype of existing digipost.no: Front page

The figures on this page present the send mail-system. The send button is not visual before scrolling down on the screen. If not all the content necessary to send the letter are filed out, a warning message is telling this on the top of the screen when pressing the send button. However, the message is outside the visual screen when trying to send the letter.

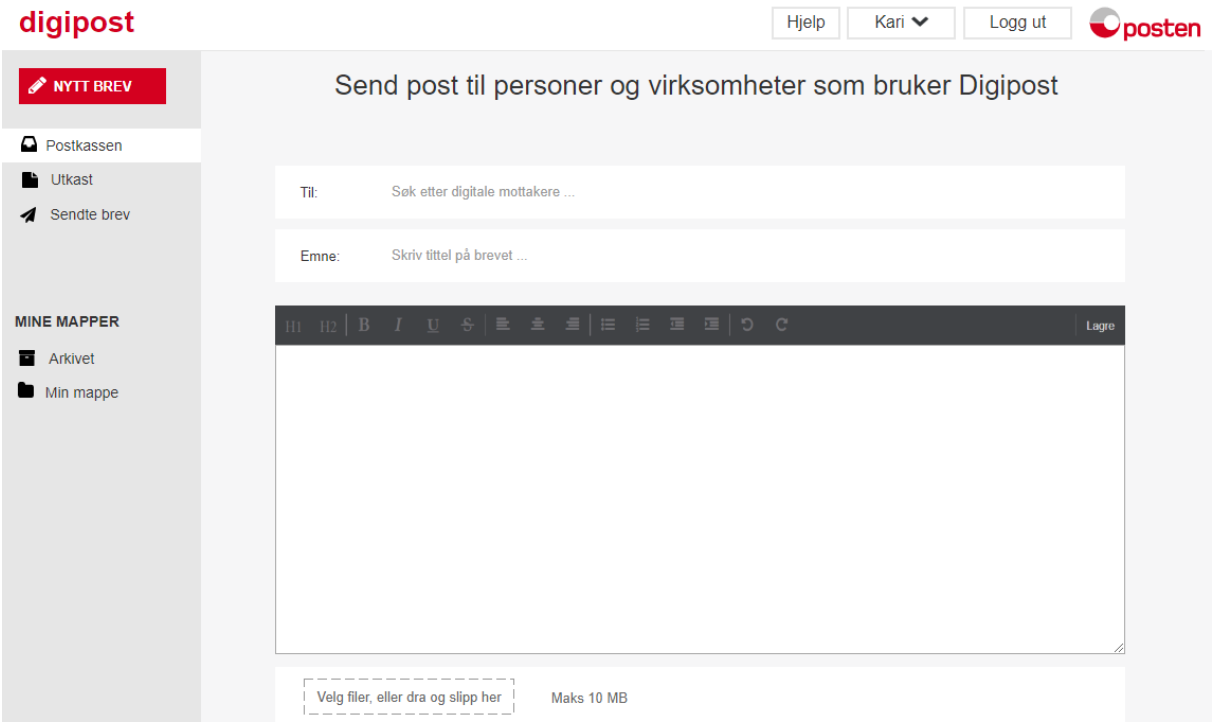
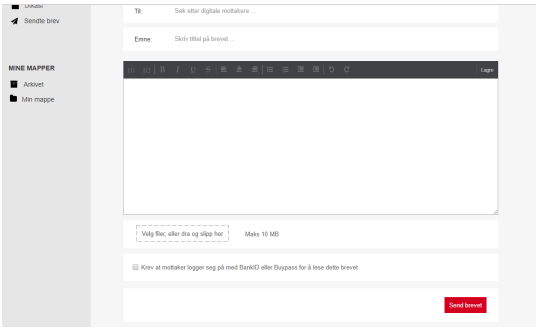
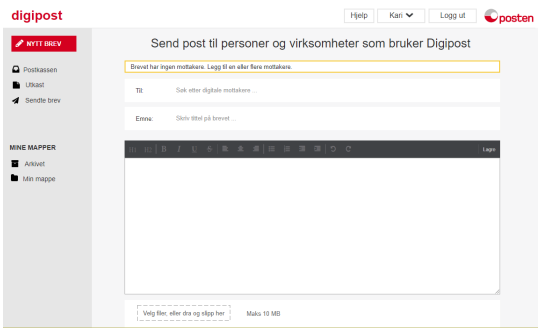


Figure I.2.: Prototype of existing digipost.no: Send letter page



(a) Try to send, no visible message telling the cause of nothing happens



(b) Message on the top of the screen, outside the screen

Figure I.3.: Prototype of existing digipost.no: Send letter without filling out the necessary content

Figure I.4 shows an open letter. The possibility to close the letter again is in the lower right corner. Figure I.5 shows the already sent letters.

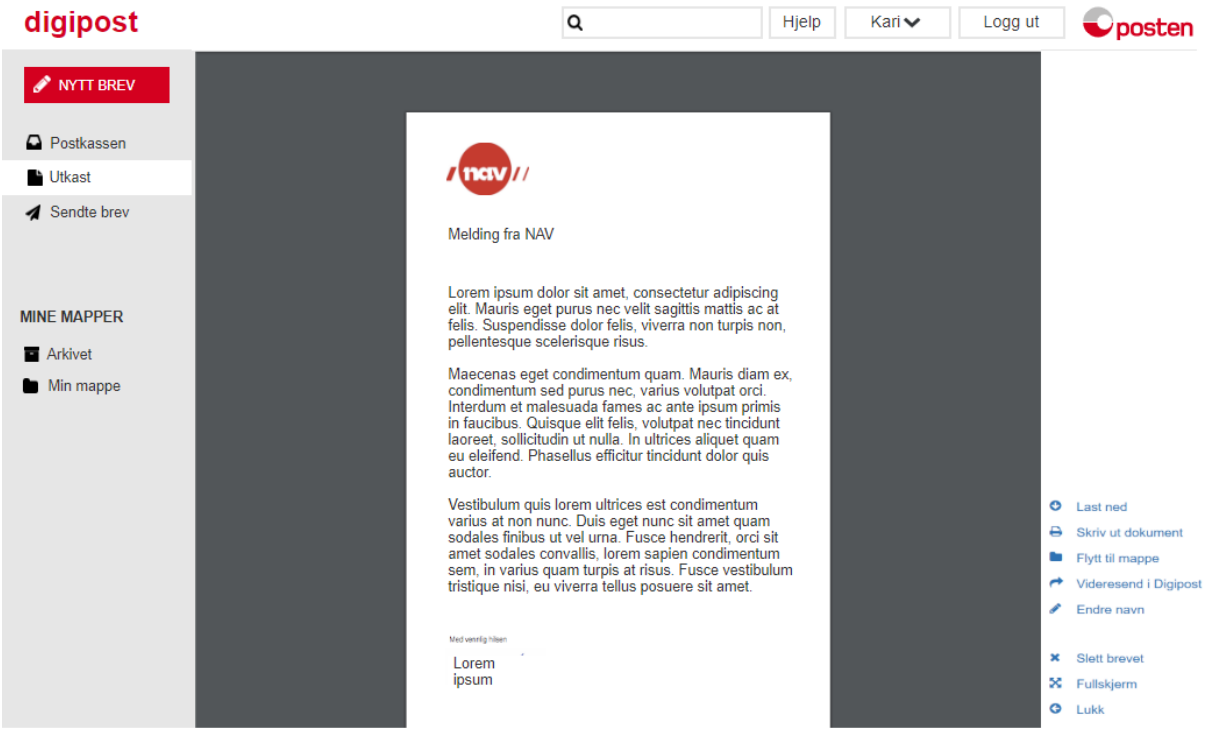


Figure I.4.: Prototype of existing digipost.no: Opened letter

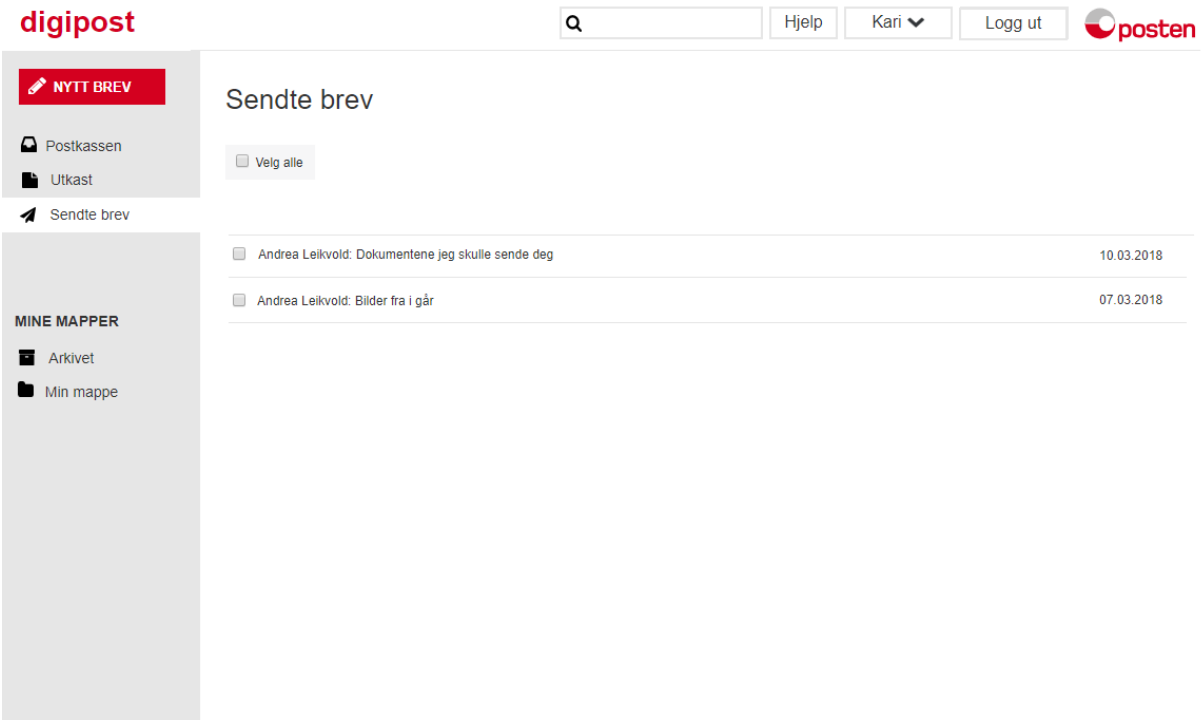


Figure I.5.: Prototype of existing digipost.no: Sent letters page

The two following figures shows the archived letters and documents. Figure I.7 shows an open document.

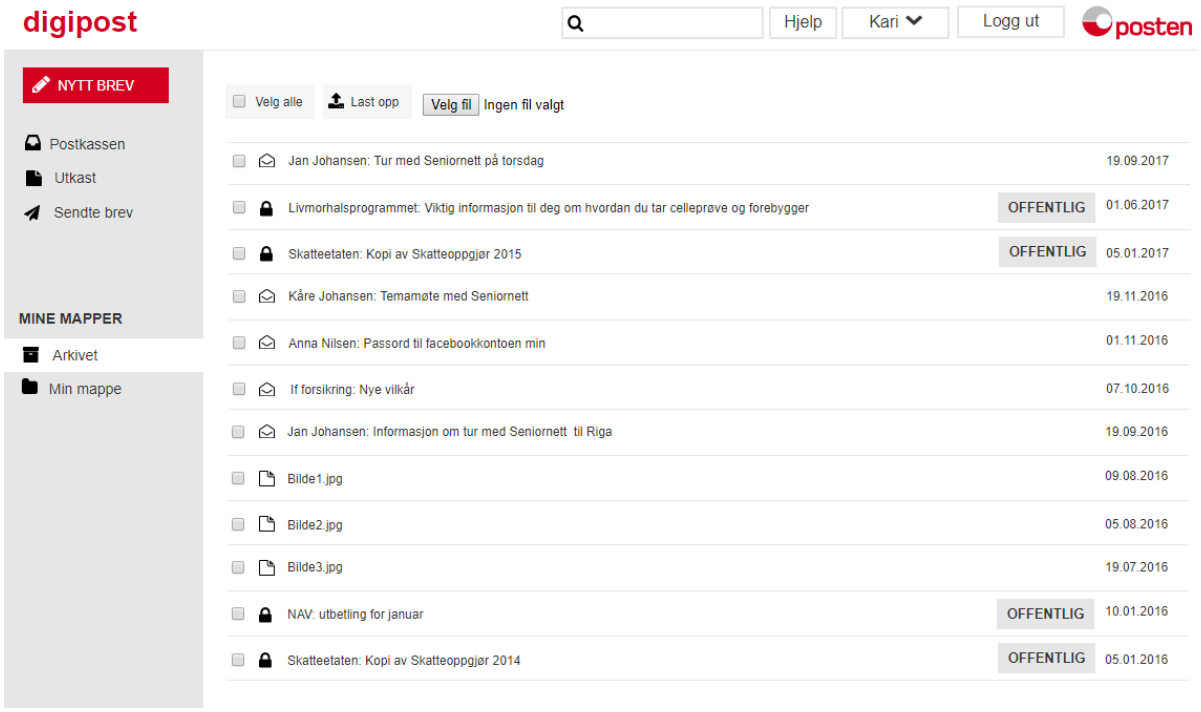


Figure I.6.: Prototype of existing digipost.no: Archive page

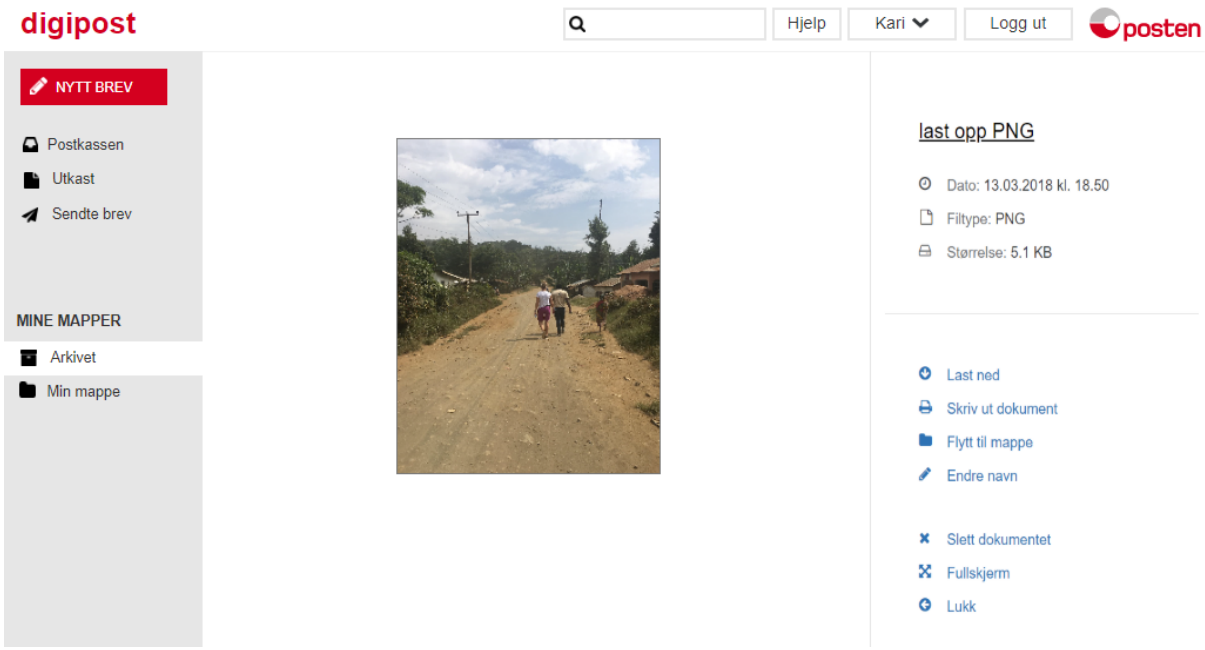


Figure I.7.: Prototype of existing digipost.no: Opened archived file

Figure I.8 shows the second navigation bar, on the right side of the screen. Figure I.9 shows the personal information page found from the navigation bar on the right.

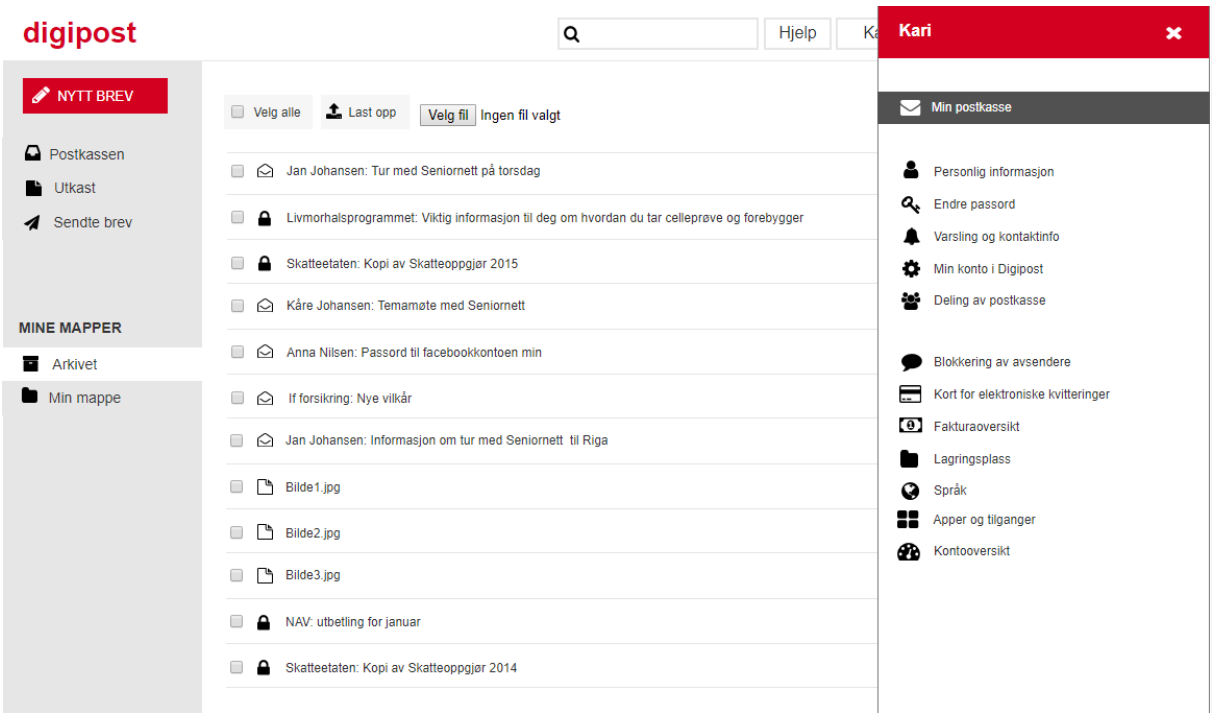


Figure I.8.: Prototype of existing digipost.no: Showing navigation bar on the right

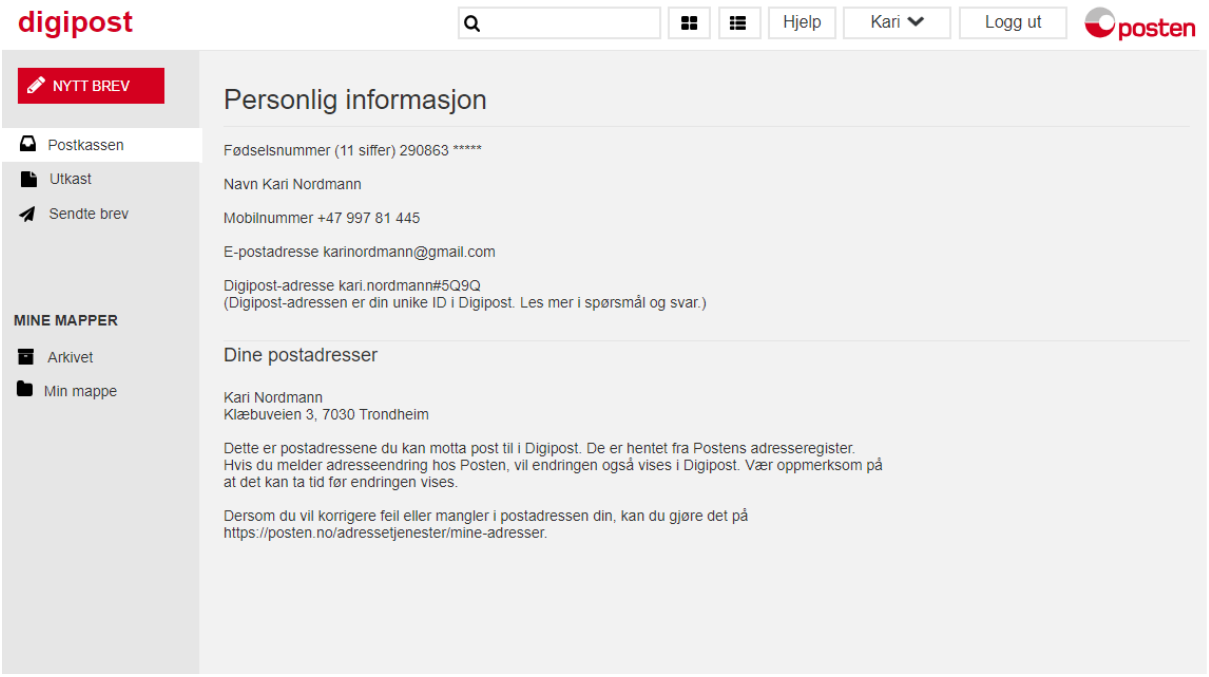


Figure I.9.: Prototype of existing digipost.no: Personal information page

I.2. Prototype Co-created with Target Group

This section show screenshots of the prototype of digipost.no created through co-design workshop and other insight. First, the front page showing the possible activities is visualized in Figure I.1. The activities related to private correspondence, etc. are placed on the left side of the screen, while the activities related to correspondence with public agencies is located on the right side of the screen.

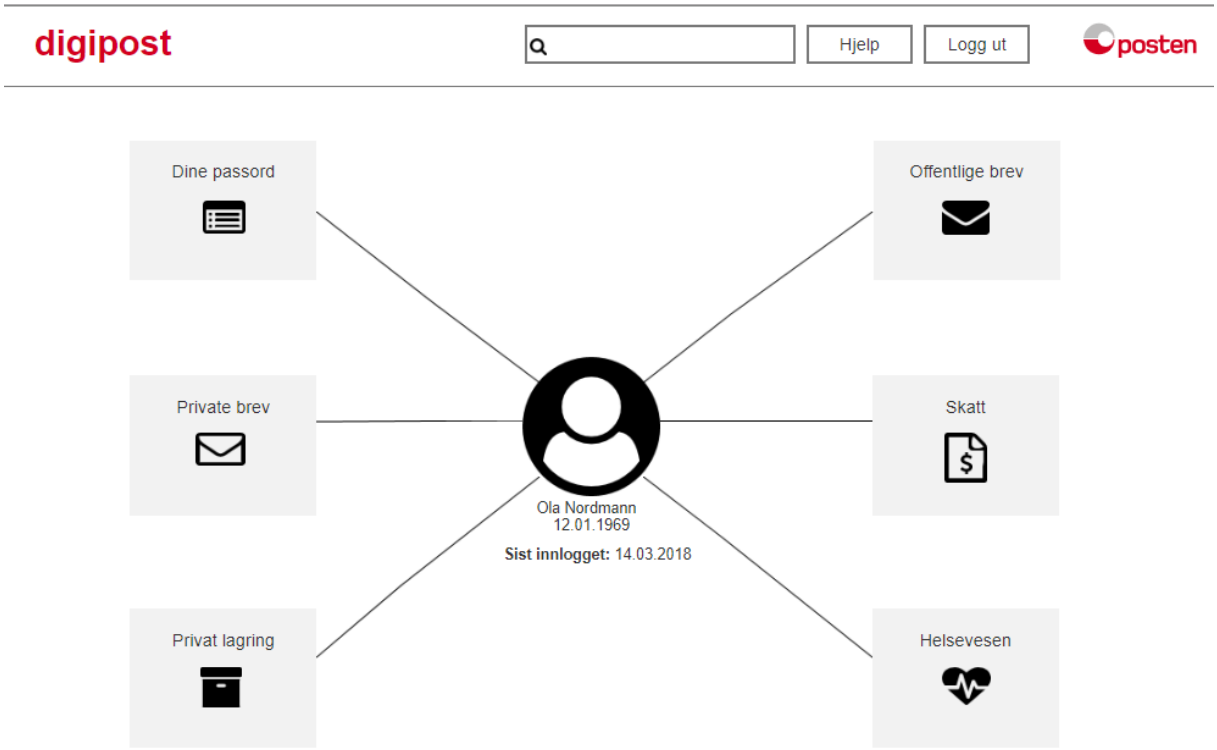


Figure I.10.: Co-created prototype: Front page

Figure I.11 present the inbox for the private letters, while Figure I.12 shows one of the tabs in the inbox for the letters in correspondence with public agencies. The inbox for correspondence with public agencies is divided into tabs related to different agencies, automatically sorted as many people are sorting their regular archive system in the paper world.

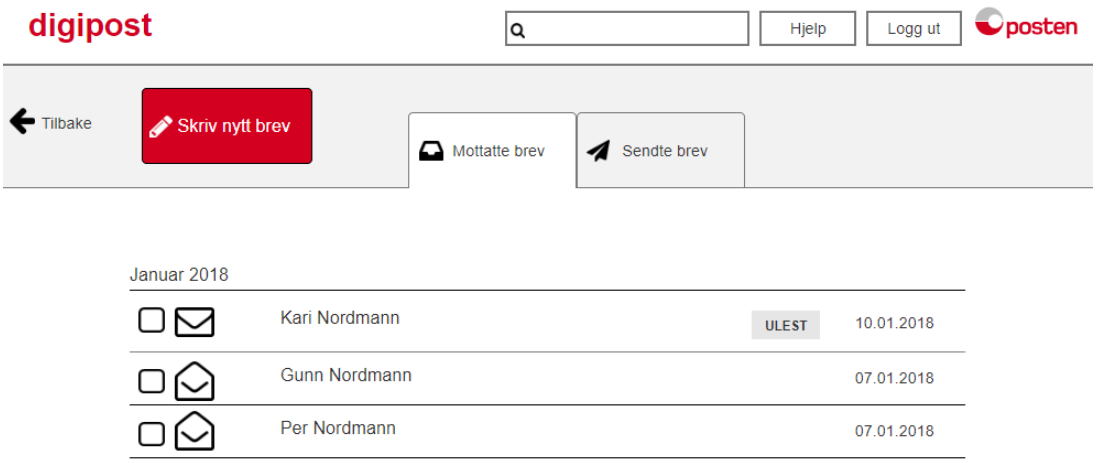


Figure I.11.: Co-created prototype: Inbox for private letters

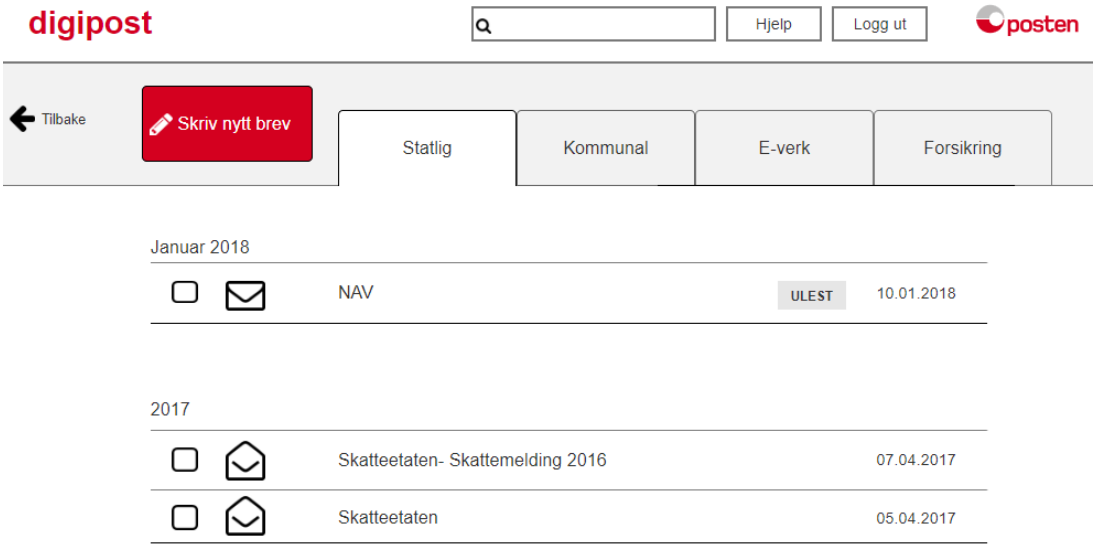


Figure I.12.: Co-created prototype: Inbox for the letters from correspondence with public agencies

The figures on this page present the send letter function. The send button is visual on the right side of the screen. This makes it easy to see both content, send button and potential warning messages simultaneously.

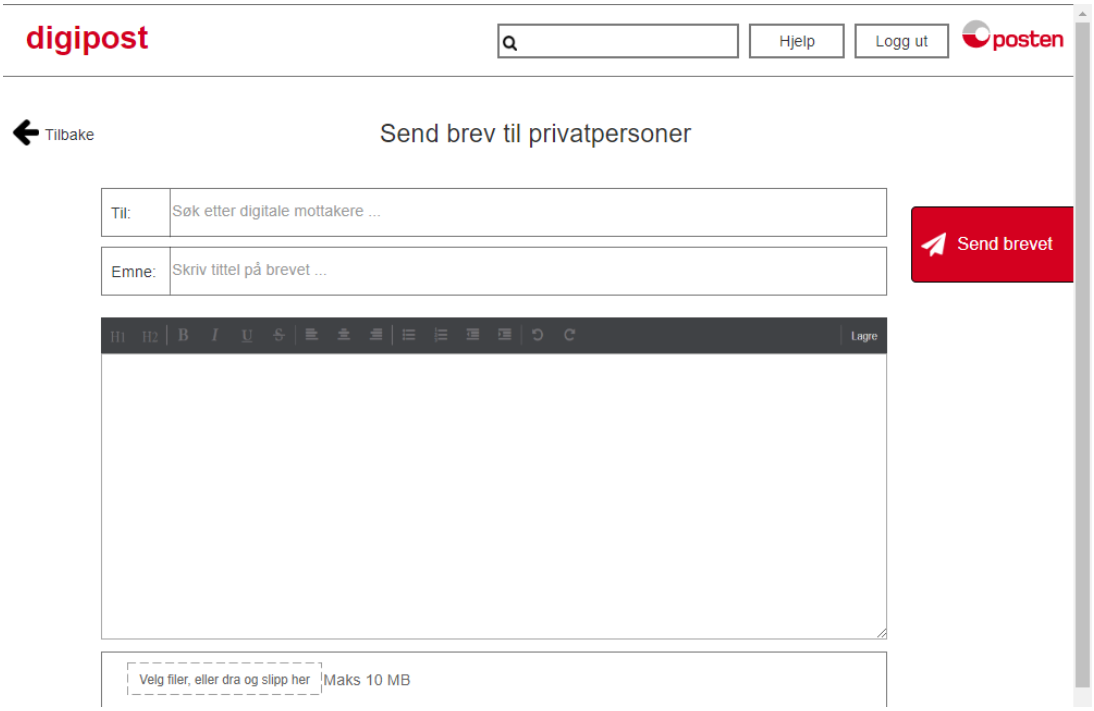


Figure I.13.: Co-created prototype: Send letter

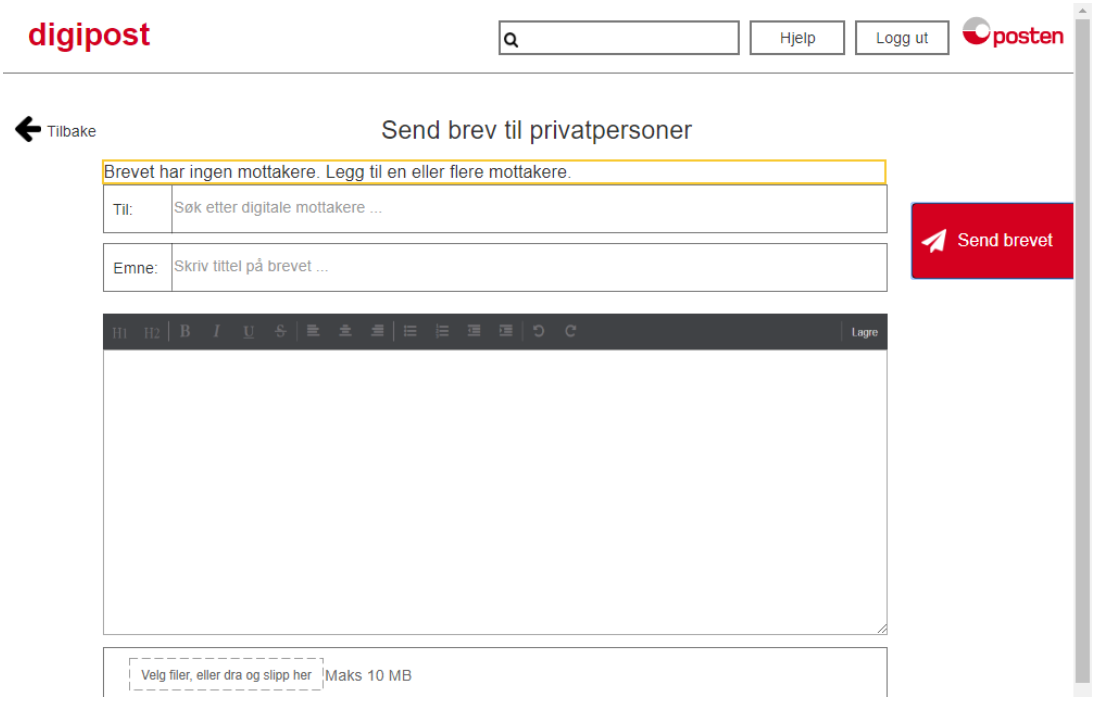


Figure I.14.: Co-created prototype: Send letter, warning message

Figure I.15 shows an open letter. The possibility to close the letter again is in the upper right corner. Figure I.16 shows the function for making the text in the letter bigger and easier to see.

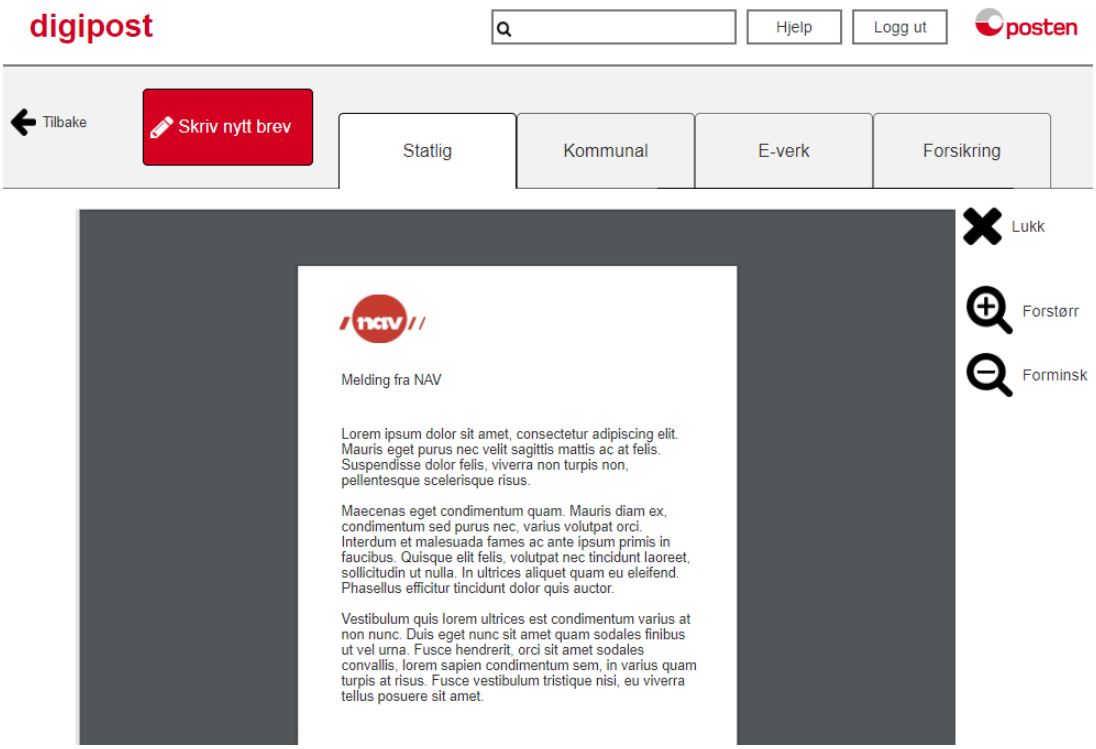


Figure I.15.: Co-created prototype: Opened letter

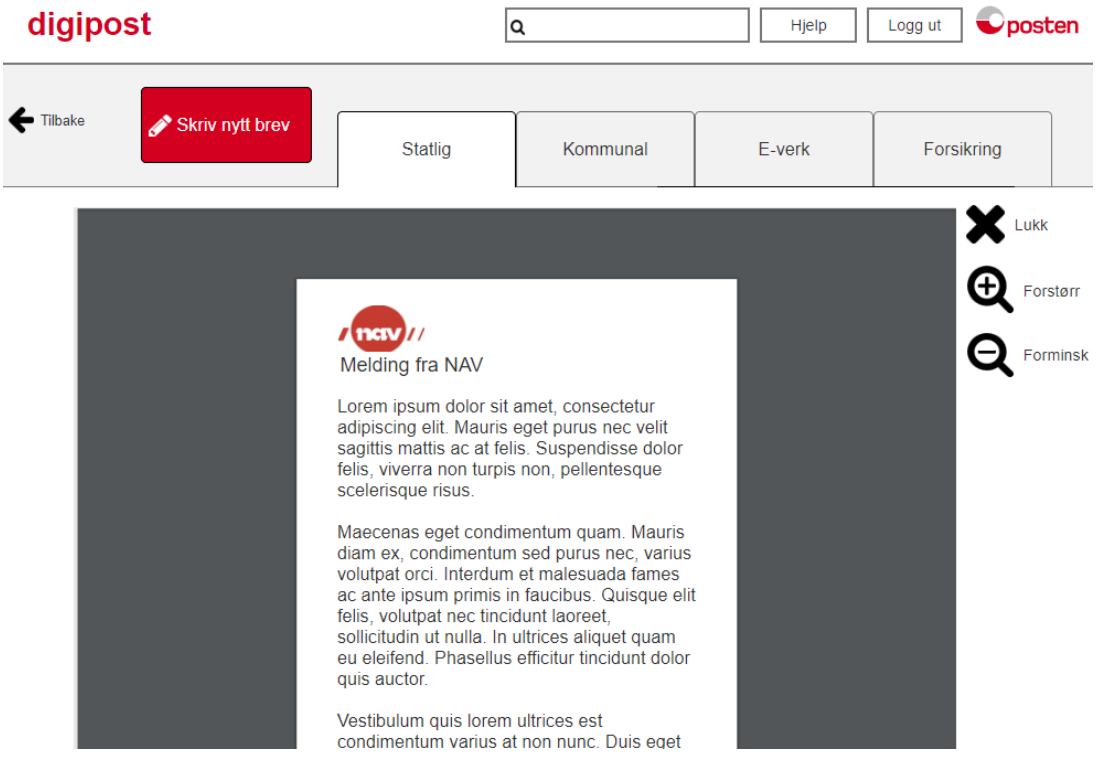


Figure I.16.: Co-created prototype: Zoomed letter

The two following figures shows the archived letters and documents. Documents and pictures have got their own tab as the users desired to have the most important images stored at a secure platform.

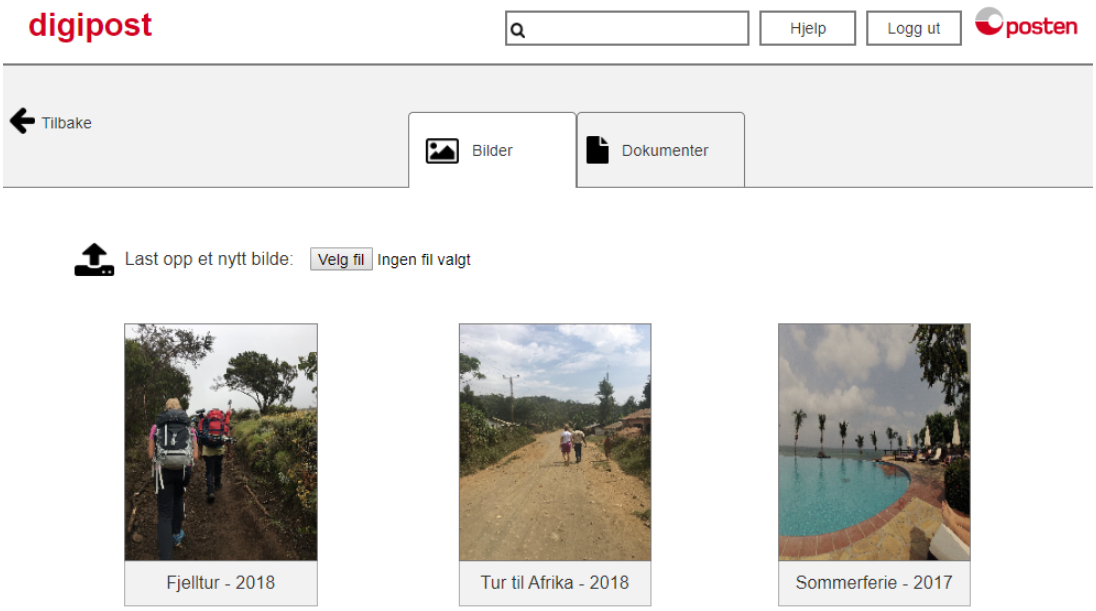


Figure I.17.: Co-created prototype: Archive page - images

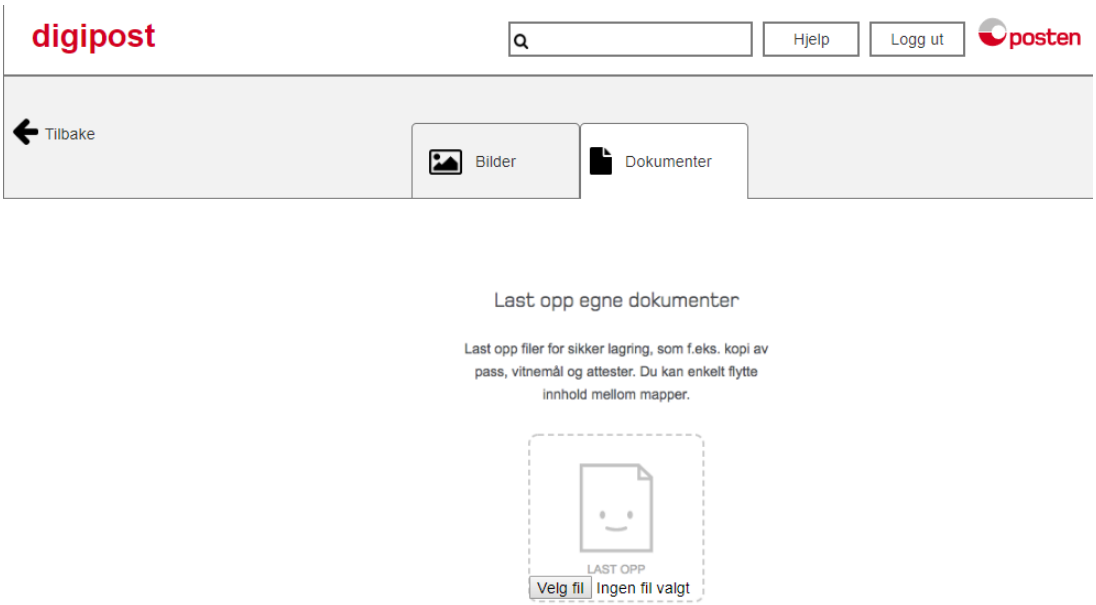


Figure I.18.: Co-created prototype: Archive page - documents

Figure I.19 shows the personal information page found from the center of the front page.

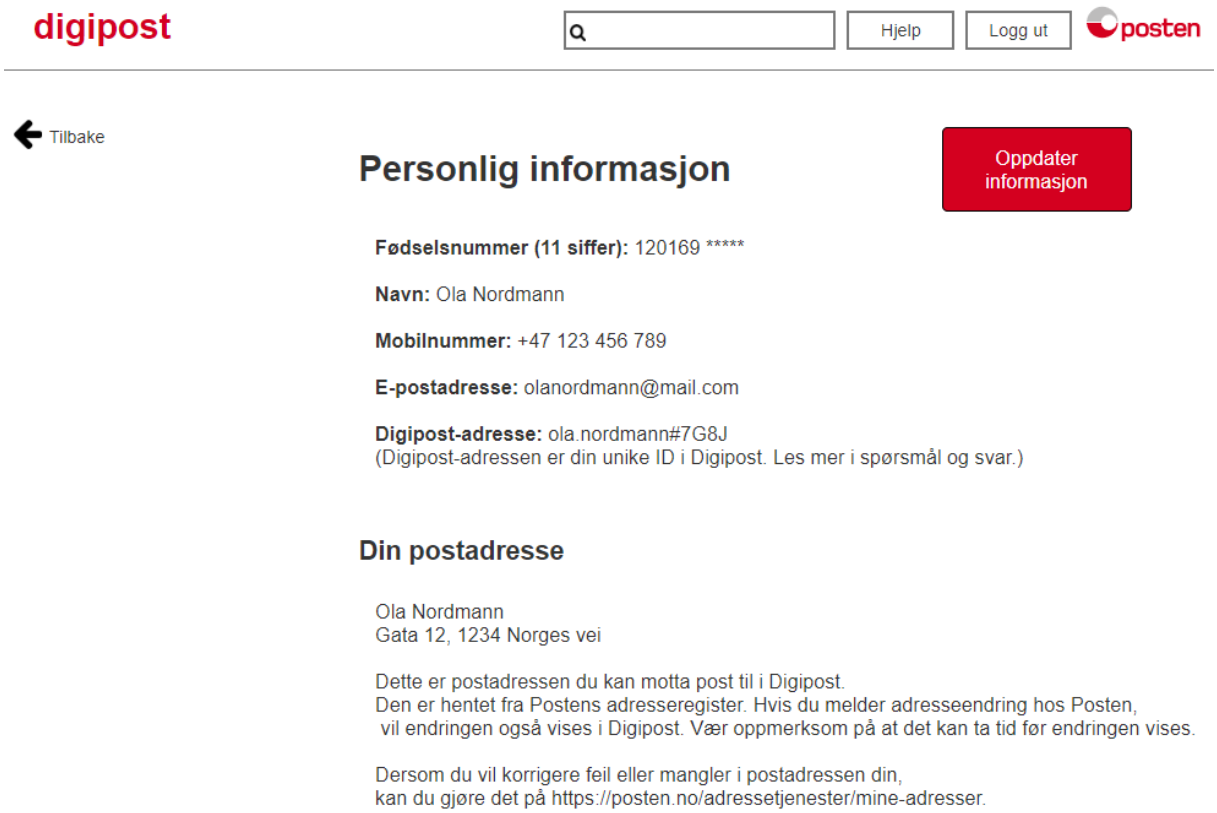


Figure I.19.: Co-created prototype: Showing navigation bar on the right

J. Usability test

This appendix provides some of the material from the usability tests. First, the ten steps used when conducting the tests is shown, secondly the tasks given in the tests are presented. Further, one example from the SUS scores is shown and finally the overall results from the SUS questionnaire is presented.

J.1. Ten Steps for Usability Testing

The ten steps are used as a guide of how to conduct a usability test. It addresses the purpose of the usability test, practical information, teaching the participants to think loudly and their rights to end the test. Additionally, there are some steps involving the work after a usability test.

> Hvordan gjennomføre testen: 10 punkter for brukbarhetstester
> De 10 punktene for brukbarhetstester har etterhvert blitt sett på som en standard for hvordan man bør gjennomføre slike tester (Tognazzini, 1991).
>
> **1. Introduser deg selv** og eventuelt andre som er med på testen
> **2. Beskriv hensikten med testen:** Å finne feil og problemer med et tidlig design av et dataprogram. ”Vi er interessert i å finne ut om det vi har laget er lett eller vanskelig å bruke og hvorfor. Denne testen gjør vi fordi vi ønsker å forbedre produktet”.
> Forstå hvilke system som fungere best og hva som fungerer for dere
> **3. Fortell deltakerne at de kan avbryte når de vil** dersom de føler at det er ubehagelig å fortsette. De trenger ikke å forklare hvorfor de avbryter.
> **4. Beskriv utstyret i rommet begrensningene til prototypen.** Vis fram papirprototypen og fortell hva den skal forestille. Fortell at den fungerer slik at en av testlederne vil bytte om på papirlappene på den etter hvert man ”trykker på knapper” og andre trykkbare steder på skjermbildene. Siden ”datamaskinen” er laget av papir er det selvfølgelig ikke mulig å simulere alt som en vanlig datamaskin kan gjøre, som for eksempel animasjoner, scrolling og lyder. I tillegg tar litt lengre tid å skifte om på papirskjermbildene enn det ville ta med et dataprogram. Dersom det blir brukt video eller lignende utstyr under testen må man forklare hvorfor man bruker det.
> **5. Lær bort hvordan man tenker høyt.** Si at det er svært viktig at de ikke bare forteller hva de gjør, men også hvorfor, slik at man kan forstå hva som er galt med designet. Gi et eksempel som ikke er relatert til prototypen.
> **6. Forklar at du ikke kan tilby hjelp under testen.** Dette er fordi målet med testen er å finne brukerens mening, ikke å forklare hvordan gruppen har tenkt. Det er likevel ønskelig at den som gjennomfører testen forteller høyt hva han/hun lurer på så gruppen kan notere spørsmålene og svare på de etter at testen er gjennomført. Testpersonen kan for øvrig stille spørsmål før testen begynner og etter at den er ferdig.
> **7. Beskriv oppgaven og introduser produktet.** Fortell at den som tar testen skal gjennomføre en rekke oppgaver ved hjelp av produktet mens han/hun forteller høyt hva som blir gjort og hvorfor. Gi testpersonen en liste over de oppgaven han/hun skal gjennomføre. Beskriv produkt og fortell hvilken sammenheng det er tenkt i. Men husk å ikke beskrive hvordan det virker!
> **8. Spør om det er noe de lurer på og kjør testen.** Noter ned hvilke problemer testpersonen har når han/hun skal utføre de forskjellige oppgavene. Noter også eventuelle spørsmål.
> **9. Avslutt testen med å la brukeren uttale seg før du samler tråder.** Spør om konkrete sider ved designet som du så brukeren hadde problemer med når han/hun skulle gjøre de forskjellige oppgavene.
> **10. Bruk resultatene** som input til videre arbeid med designet!

J.2. Tasks in the Usability Test

Oppgaver til brukertest

Spm før test:

- Har du brukt digipost før?

Brukertest på gammel prototype

1. Hvem er du innlogget som? (Kari Nordmann)
2. Har du fått noen brev fra NAV i det siste?
3. Har du fått strømregningen fra november 2017?
4. Send et brev til Jan Johansen om tidspunkt for møte i velforeningen som er torsdag 22.mars
5. Finn bilde fra fjellturen
6. Last opp et dokument
7. Finn din personlige informasjon
8. Logg ut fra digipost

Brukertest på ny prototype

1. Hvem er du innlogget som? (Ola Nordmann)
2. Har du fått noen brev fra NAV i det siste?
3. Har du fått strømregningen fra november 2017?
4. Gå tilbake til forsiden
5. Send et brev til Jan Johansen om tidspunkt for møte i velforeningen som er torsdag 22.mars
6. Finn bilde fra fjellturen
7. Last opp et dokument
8. Finn din personlige informasjon
9. Logg ut fra digipost

Prat

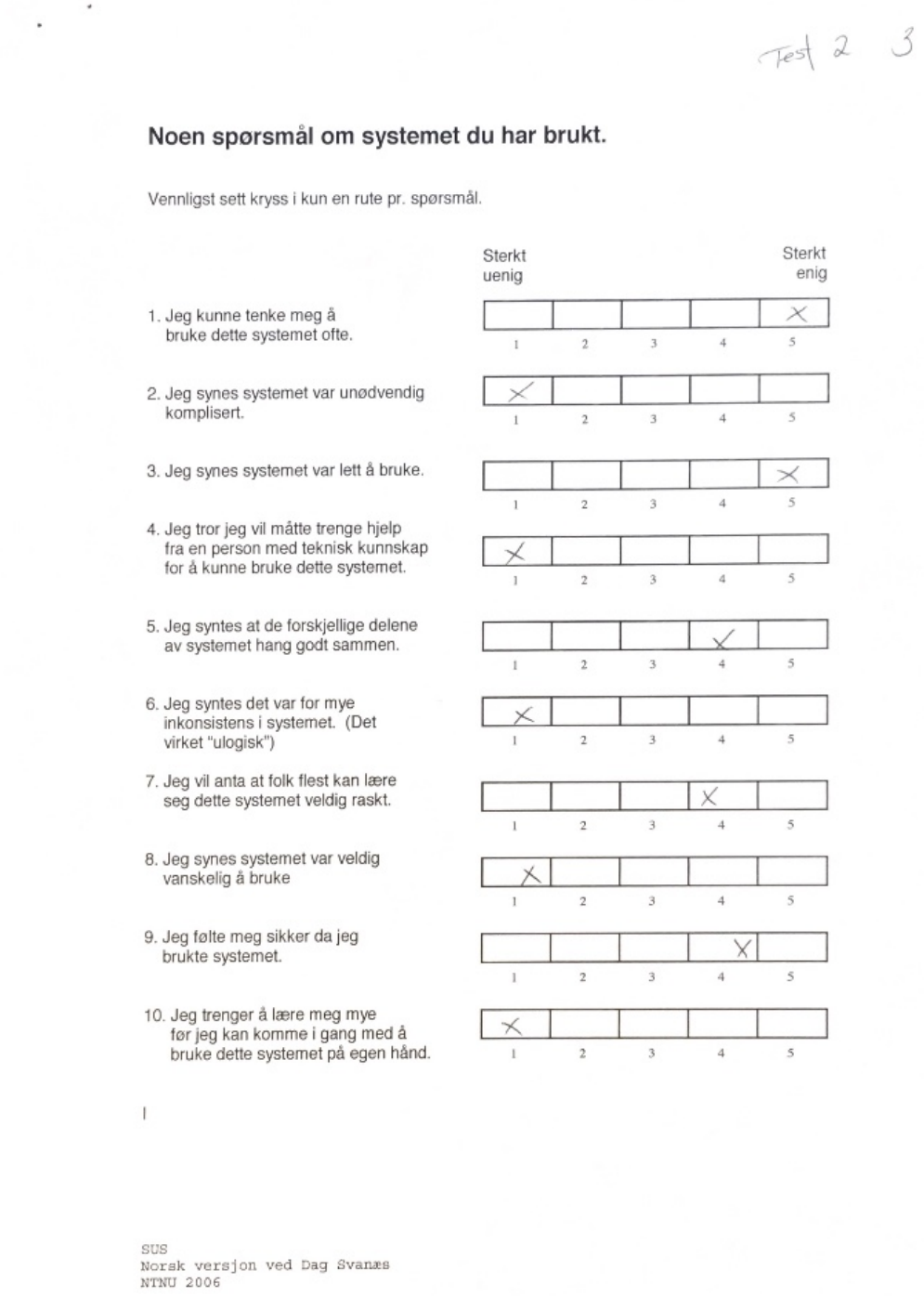
- Har du noen tilbakemeldinger til prototypen?
- Hva syns du om forsiden?
- Hva synes du var utfordrende?
- (Spørre om ting man har notert seg under testen)

Prat etter begge testene:

- Hva synes du om de ulike løsningene?
- Hvilken synes du var enklest å bruke? Hvorfor denne?

J.3. Example of SUS Score

This shows an example of one of the SUS completed by a participant in the usability test.



Test 2 3

Noen spørsmål om systemet du har brukt.

Vennligst sett kryss i kun en rute pr. spørsmål.

	Sterkt uenig				Sterkt enig
1. Jeg kunne tenke meg å bruke dette systemet ofte.	1	2	3	4	X 5
2. Jeg synes systemet var unødvendig komplisert.	X 1	2	3	4	5
3. Jeg synes systemet var lett å bruke.	1	2	3	4	X 5
4. Jeg tror jeg vil måtte trenge hjelp fra en person med teknisk kunnskap for å kunne bruke dette systemet.	X 1	2	3	4	5
5. Jeg syntes at de forskjellige delene av systemet hang godt sammen.	1	2	3	✓ 4	5
6. Jeg syntes det var for mye inkonsistens i systemet. (Det virket "ulogisk")	X 1	2	3	4	5
7. Jeg vil anta at folk flest kan lære seg dette systemet veldig raskt.	1	2	3	X 4	5
8. Jeg synes systemet var veldig vanskelig å bruke	X 1	2	3	4	5
9. Jeg følte meg sikker da jeg brukte systemet.	1	2	3	X 4	5
10. Jeg trenger å lære meg mye før jeg kan komme i gang med å bruke dette systemet på egen hånd.	X 1	2	3	4	5

SUS
Norsk versjon ved Dag Svanæs
NTNU 2006

J.4. SUS results

This section presents the SUS results by all the participants in the usability test. Both from the co-created prototype of digipost.no and also the prototype developed from the current version of digipost.no.

Nettside: digipost.no	1 (Sterkt uenig)	2	3	4	5 (Sterkt enig)
1. Jeg kunne tenke meg å bruke dette systemet ofte			D		ABCE
2. Jeg synes systemet var unødvendig komplisert	ABCE	D			
3. Jeg synes systemet var lett å bruke				AED	BC
4. Jeg tror jeg ville måtte trenge hjelp fra en person med tekninsk kunnskap for å kunne bruke dette systemet	ACED			B	
5. Jeg synes at de forskjellige delene av systemet hang godt sammen			B	ACD	E
6. Jeg syntes det var for mye inkonsistens i systemet (Det virket "ulkogisk")	CDE	AB			
7. Jeg vil anta at folk flest kan lære seg dette systemet veldig raskt				ACDE	B
8. Jeg synes systemet var veldig vanskelig å bruke	ACDE	B			
9. Jeg følte meg sikker da jeg brukte systemer			B	ACD	E
10. Jeg trenger å lære meg mye før jeg kan komme i gang med å bruke dette systemet på egenhånd	CDE	A	B		
	Totalscore				
A	85				
B	72.5				
C	92.5				
D	82.5				
E	95				
SUM	85.5				

Nettside: digipost.no	1 (Sterkt uenig)	2	3	4	5 (Sterkt enig)
1. Jeg kunne tenke meg å bruke dette systemet ofte			BC	A	DE
2. Jeg synes systemet var unødvendig komplisert	CDE	A	B		
3. Jeg synes systemet var lett å bruke			AB	CDE	
4. Jeg tror jeg ville måtte trenge hjelp fra en person med tekninsk kunnskap for å kunne bruke dette systemet	C	ADE		B	
5. Jeg synes at de forskjellige delene av systemet hang godt sammen			ABCE	D	
6. Jeg syntes det var for mye inkonsistens i systemet (Det virket "ulkogisk")	CDE	A	B		
7. Jeg vil anta at folk flest kan lære seg dette systemet veldig raskt			A	BCD	E
8. Jeg synes systemet var veldig vanskelig å bruke	CDE	A	B		
9. Jeg følte meg sikker da jeg brukte systemer			AC	BE	D
10. Jeg trenger å lære meg mye før jeg kan komme i gang med å bruke dette systemet på egenhånd	ADE			BC	
	Totalscore				
A	40				
B	50				
C	72.5				
D	90				
E	87.5				
SUM	68				

K. Original Quotes Used in Findings

This appendix contains the original quotes in Norwegian used in the findings chapter of this thesis.

"Det kommer til å bli færre steder man kan reservere seg fra å være digital i fremtiden". (Lindbøl)

"Vi har ikke lov til å la være" (deltaker)

"Det som skremmer meg er at utviklingen går så fort og at myndighetene har satt tempo, og at eldre på en måte blir litt skviset, og det liker jeg dårlig" (deltaker)

"Hvis de eldre ikke får gjøre det selv lenger (om personlige ting som økonomi) vil de føle seg umyndiggjort" (deltaker)

"Det er en kombinasjon av utfordringer rundt ferdighetene, det å tørre å prøve, og det at systemene er utfordrende."

"Trodde pcen ikke virket mer, var en liten beskjed i hjørnet om at en oppdatering var nødvendig - den var så liten at hun med svakt syn ikke så den". (Rønning)

"Et annet eksempel var en sak som var på dagsrevyen om en mann med skjelving. Kona satt i rullestol og var helt borte, og han klarte ikke bruke web tjenestene. Dette ble tatt opp i Stortinget og han fikk beskjed om at man kunne gå på kurs." (Rønning)

"Farger som vises for et gammelt øye? Det er svart og hvit det. Ikke sånn grønn og sånn. Hvis det er bakgrunnsfarge kan det bli vanskeligere å lese" (deltaker)

"Jeg har kompiser som ikke klarer å sende en SMS engang." (deltaker)

"Jeg skriver ofte ting ned, som passord og stegene som er nødvedig for å gjøre det jeg skal. "I går glemte jeg passordet, men det har jeg funnet igjen, tror jeg" (deltaker)

"Hvis noen viser meg noe, så skriver jeg det kanskje ned, også roter jeg bort den lappen, også har jeg ikke muligheten til gjøre det neste gang." (deltaker)

"Jeg er litt redd for at personlige opplysninger skal lagres på nettet, da lurer jeg på hvem som har tilgang til det, det kan jo bli hacket av hvem som helst" (deltaker)

"I går kom det en skummel advarsel, og dermed så prøver jeg ikke det igjen, før jeg nå fikk hjelp til å fikse det." (deltaker)

"Jeg synes jeg er veldig tapper som prøver, hvis ikke blir man helt utenfor" (deltaker)

"Jeg gjør alt jeg kan for å følge med" (deltaker)

"Jeg er ikke noe flink til å prøve nye ting. Når noe endrer seg på nettsiden blir det vanskelig å forstå hva jeg skal gjøre, siden notatene mine ikke stemmer". (deltaker)

"Det går vel bort hvis jeg fortsetter å skrive?" (om forslagene til navn som kom opp når hun skrev inn emnet i tilfeltet) (deltaker)

"Det var så enkelt ja! Godt dere var her og kunne vise meg, for nå hadde jeg egentlig gitt opp. " (deltaker)

"Når jeg har en mulighet til å få hjelp, så gjør jeg det" (deltaker)

"Barnebarna hjelper meg, så er det veldig lettvint for meg, men de er så raske at jeg får ikke med meg hva de gjør. Jeg har løst problemet der og da, men det kan oppstå igjen og da er jeg like hjelpesløs neste gang." (deltaker)

"Tilbudet er opprinnelig for alle, men det er i stor grad de eldre som benytter seg av det, fordi det er de som trenger det." (deltaker)

"Alle får muligheten til å få to en-til-en opplæringstimer hver. Etter det sender vi dem til seniornett. Vi har ikke kapasitet til mer dessverre". (deltaker)

"Vi fokuserer på å heve kompetansen hos de som jobber i kommunene, bibliotek, servicetorg, frivillighet slik at de kan lære bort videre til innbyggerne med mål om å minske det digitale skillet i samfunnet. Fylkesbiblioteket gjennomfører også kurs rettet direkte mot innbyggerne i Trøndelag, i samarbeid med folkebibliotekene" (trøndelag fylkeskommune)

"Hvis man inviterer til kurs er det ikke sikkert det sitter igjen så mye av det som er sagt. Vi oppfordrer folk til å komme igjen flere ganger. De må få det inn i fingrene. De praktiserer ikke nok hjemme." (SeniorNet)

"Jeg tenker at det er noen som sitter der som kan hjelpe hvis jeg ringer" (deltaker)

"Denne er laget for de som er kanskje 60-70 eller 80 år, og da synes jeg det ser veldig mye mer oversiktlig. Men det er jo håndverkere og kontorfolk som skal takle dette med digital postkasse uansett hvor mye de kan fra før. Jeg er jo håndtverker og har ikke jobber mye med data i jobben. Jg ser jo for meg et sånt bilde, det er mye enklere å se på enn et sånt oppsett som ofte er i dag. Der er det jo nesten bare skrift. For meg er dette mye mer oversiktlig, i mot sånne oppsett vi har idag". (deltaker)

“Det er noe med logistikken i hodet ditt. Hvordan du tenker. Da tenker jeg litt i aktiviteter når jeg skal gjøre noe på nett. Det virker ofte som det er en spesiell rekefølge man må følge, en slags prosedyre. Men det er ikke alltid sånn at dem som har laget prosedyren er så veldig lure heller” (deltaker)

“Jeg liker det som er visuelt, men jeg synes det er bra med et bilde sammen med en tekst” (deltaker)

"Det er lettere å skjønne at det kan klikkes på når det er sånn strek under". (deltaker)

“Det må være klart og tydelig og ikke for mye. Slik at ikke folk gir opp før de har kommet seg inn.” (deltaker)

Der skjønner jeg ikke hva dem mener" (om språket) (deltaker)

“Det er mye lettere å trykke på noe som er avlangt enn en liten knapp. Hvis en bommer på knappen, så sitter en der. Hundre år og ser dårlig”. (deltaker)

"Vi kjørte i 2016 en helhetlig brukertest av eksisterende brukerflate" (deltaker)

"Involveres direkte? "ja, via brukertesting" (deltaker)

"Brukere involveres gjennom intervjuer i innsiktsfasen for å lage brukerreiser og tjenestedesign, men de involveres ikke i designfasen" (Skatteetaten)

"Har vært en tankegang om one size fits all i hele offentlig sektor, men vi prøver å endre denne tankegangen" (NAV)

"Vi er på vei men det tar nok litt tid før alle offentlige og private har implementert løsninger som tar hensyn til eldre og de med funksjonshemming." (Lindbøl)

"Vi prøver også å komme i forkant ved å gjennomføre mindre tjenestedesignprosjekter som vi kan skissere konsepter rundt og forhåpentlig greie å selge inn til aktørene i helsesektoren så de bestiller saker også sett fra innbyggers perspektiv, men dette arbeidet er vanskelig å finansiere." (helsenorge)

“Det er vanskelig å bruke for folk som er nye.“ (Deltager, co-design)

"Skatt og helse kom tidligere i posten, nå har de egne meldingstjenester på altinn og helsenorge digitalt. Hvorfor kan ikke dette være i digipost? Det blir så mange plasser man må gå inn på etterhvert." (deltaker)

"Hva er det viktigste å ha i digipost? Sikkerhet. At det du gir fra deg er på et sikkert sted." (deltaker)

"For å finne igjen ting som kom i fjor. Så kunne det kanskje vært sånn at NAV kom for seg og skatt kom for deg, altså litt mer systematikk i det” (co-design)

"Nå skal jo vi gjøre om det her, sånn at det skal bli bra. Sånn at det skal bli enkelt" (deltager, co-design)

“Denne var jo enklere, for meg”. “jeg bruker egentlig tankekart, så det der ble egentlig veldig likt det”. (deltaker)

“Synes den virket veldig logisk oppbygget. Det er det at jeg er i sentrum, også er alt annet rundt her i bokser." (deltaker)

“Men det jeg synes var veldig fint på den andre (nye) var de rutene over som det sto stat, kommune, osv, i stedet for at alle ligger under hverandre. Da er det liksom fast sortert og finne det du leter etter.” (deltaker)

"Verdi for brukere og for samfunnet, mer ut av pengene. 1/3 av statsbudsjettet går til NAV - over 500 milliarder. (NAV)

"Vi vil spare både kostnader og miljø" (digipost)

"Lettere for avsendere å kommunisere med sluttbruker" (digipost)

"Slippe at sluttbruker må logge inn i mange portaler for å få info om seg selv, samle på et sikkert sted" (digipost)

"Det er ikke en ideell digipost i dag. Ting går tregt, særlig med det offentlige" (digipost)

"I korte trekk, er helsenorge.no et dugnadsprosjekt, der vi mottar bestillinger fra aktørene i helsesektoren for å finansiere arbeidet vårt. Investeringene som gjøres har føringer i en rekke stortingsmeldinger". (Helsenorge, om deres utviklingsporsses)

"Vi må fokusere på å effektivisere helsetjenstene for å kunne håndtere eldrebølgen som kommer. Derfor må innbyggernes behov komme i andre rekke. (helsenorge)

"Stortingets- og Finansdepartements beslutninger, lovgivning, juiridske og skattefaglige hensyn pleier å spille en mye større rolle enn brukernes ønsker i hva som blir prioritert." (skatteetaten)

"Hvorfor skal kritisk informasjon og kjernejournal stå som to separate innslag? Dette er jo overlappende informasjon. Forvirrende!" (deltaker)

"Vi hadde fint lite penger til brukertesting (selv om vi vet det hadde gitt høyere verdi av tjenestene) våre første, spede leveår." (helsenorge)

"Vi står i fare for å få en gruppe med digitale analfabeter. De som er mest utsatt er i hovedsak eldre over 65 år, førstegenerasjons innvandrere fra ikke-vestlige land, men også de som står utenfor arbeidslivet, blant andre trygdede/hjemmeværende og mennesker med ulike nedsatte funksjonsevner" (trøndelag fylkesbibliotek)

"Det er ikke bare de eldre som blir stående utenfor. Vi har også en gruppe unge som har droppet ut av ungdomsskolen eller videregående for å mekke på biler, osv. De har også problemer med de digitale løsningene, men det snakkes det ikke så mye om."

L. Thematical Analysis

This appendix contains some of the analysis of the collected data from the data generation methods. The analysis was done iterative, and the documents were continuously updated. Earlier versions of the analysis is not included in this appendix. First the overall analysis after all data were collected is shown. Further, the data brought to a meeting with the supervisor and the results from the questionnaires are shown.

L.1. Overview of the Codes Based on Data Sources

The most important information based on the transcription, retrospectives and other notes related to each data source were included in one document sorted after the sources. The information were coloured with the code it belongs to. The analysis is shown below.

Koder/kategorier	Oversiktsbildet	Språk og terminologi	Grunnleggende datakunnskap
	Hjelp/ Pårørende	Samfunnsperspektivet	Mestring av tilværelsen
	Design	Kognitiv	Kommunikasjon på nett
	Symboler	Hukommelse og repetisjon	Motivasjon
			Frykt
Datakilde			
DNB	Simplifisering (få trinn, lite info, ta bort støy)	Enkelt språk	Store flater
	Utestengelse fra samfunnet		
Styret i Seniornett	Rask endringer	Offentlige tjenester er en utfordring	25 av 190 har ikke epost
	Passord	Må lære nettbank	Fysiske begrensninger
	Norge.no		
Intervju:	Repitisjon	Vanskelige systemer	Mye å huske
Læringssenteret	Språk	norge.no	Ressurskrevende
Intervju: eksperter	Kan ikke gjøre ting de mestret før lenger	Redd for å gjøre feil	Burde vært en standard
	Passord	Hjelp må være at de får prød selv	Språk
	Kognetive	Oversikt	Utestengelse fra samfunnet
	Nye ting, stor forandring	Hjelp: Privatisert problem	Alle bruker nettbank fordi de må
	Kjønnsforskjeller?	Motivasjon	Fra artikkelen deres:
	Artikkel: "Hvordan få bestemor på nett"		Challenges, connectedness og expanding.
Intervju: Pettersen	Heve digital kompetanse	Digital analfabete	Kurs og en til en opplæring
	Ting er bare på nett	Motivasjon: finne gleder ved det digitale	Utrygge
	For mye info	Digipost er vanskelig å forstå	Altinn er lite brukervennlig
	Reservasjonsretten er underkommunisert	Tvinges over	Repitisjon
	Språk		
Intervju: Lindbøl	Forvaltningskompetanse	Frykt, redd for å gjøre feil (tør ikke trykke)	Legger ned kontorer
	Kommunene har ansvaret for opplæring	Nav sluttet å sende i posten	Bevilger penger
	digidel	universell utforming	Føler seg tvunget
	Difi	digitaliseringsrådet	Artikkel: digidel
	Artikkel: digihjelpen	Artikkel: undersøkelse på Frogner	deltasenteret (universell utforming)
	Blir lett utenfor	Fokus på å heve komptansen	Likt brukergrensesnitt (banker vil ikke dette)
	Blir færre steder man kan reservere seg fra	Digitalt førstevalg	Reservasjonsrett
Temamøte	Kostnad	Arbeid for offentlig	Tvang
	Liten gruppe som har problem	Uenig i at det gir bedre kommunikasjon	Reservasjon, men ikke mot alt
	Ting skal være samlet i digipost,		beskjed via sms og epost hvis det skjer noe
	men er ikke det	norge.no	forvirring
	Seniorsmart	Senior IKT	
Kurs bibliotektet:	passord	automatisk lagring	har ikke med seg ting (epostadresse, passord)
Sky	Tekniske problemer, oppsett, osv	Spam	
Kurs bibliotektet:	problem selv å trykke på samme som kursho	har ikke med seg bankid	norge.no
Offentlige digitale tje	skeptisk til å lære av oss		
Datacafé:	lyst til å lære	snarveier på skrivebordet	kan nettbank
Gulhuset	Lavt kunnskapsnivå	Blir lurt	Spam
	Vedlegg til epost	Sliten i rygg og hodet	Trenger ikke se brev fra NAV, apotek
	Har ikke med seg bankbrikke eller telefon	Skytjeneste	Redd for å prøve seg frem

Datacafé:	Tekniske problemer, oppsett, osv	Prioiterer ikke å øve	Problemer med ny fane
Hornemansgården			
Intervju: person 1	Lyst til å lære	uredd, (bruker ikke oppskrifter)	Godt oversiktsbilde, sytematisk
	Lyst til å gi opp pga problem med helsenorge	Språk	Oppsett av elementer (tror stopper før det gjør)
	Det ukjente føles utrygt	Bruker chat, eller ringe	Vet hvor hun finner kontakt oss
	Aldri vært inne før	Ikke mulig å få hjelp, annet enn seniornett	
Intervju: person 2	Dårlig oversiktsbilde	Leter etter et spesifit ord, scroller ikke	Passord
	Tør ikke prøve, usikker	Mulig å få hjelp, men ikke når hun vil	Mangler elemntær forståelse
	Skriver manualer for å huske, roter bort	Usystematisk: ser ikke det uleste brevet	(lukke vs minimere nettleser)
	Vet at hun må praktisere	øverst som er uthevet og det sårt "ulest"	
	Flytter seg ikke fra til feltet til emnefeltet	Ser ikke likhet med mailoppsett	Tror den er sendt, men må trykkes to ganger
	Problemer med helsenorge vs min helse	Vet ikke hva ramme rundt bokser betyr	Flink til å scrolle helt ned
	Ny fane	Trykker rett etter til, der er det ikke et felt	Kommuniserer ikke over nett (bare epost)
Intervju: person 3	Ikke redd for å trykke/prøve	Ingen tanke om hva som skjer	Mangler oversiktsbilde (ser ikke endre x 20)
	Ting er smått og tett	Mye urelevant info (for han)	Skjønner ikke oppsettet til altinn
	Skjønner ikke at elementer henger sammen	Skjønner ikke at man kan søke	(hvor man skal legge inn hva)
	når de har litt avstand mellom seg	i kommuner (lang liste)	Ser ikke at det kommer opp ny boks til høyre
	Vanskelige ord	Kommuniserer ikke over nett (bare epost)	Har mange å spørre om hjelp,
			men da gjør de det for han
Intervju: person 4	Dårlig oversiktsbilde	Leser ikke	Prøver å trykke to ganger for å komme videre
	Ser ikke at pdfen blir lastet ned og havner ne	Husker ikke passord	Skjønner ikke sjekke om det er på caps lock
	Skjønner ikke hva hun skal med digipost	Trykker på "nytt brev" for å se innboks	Trykker rett etter til, der det ikke er noe felt
Intervju: person 5	Fortsetter å skrive i til-feltet	Skjønner ikke at det ligner på mail	Må trykke to ganger på send (skjønner ikke)
	Ser ikke feilmeldingen om at hun må ha	Trykker på logo	Skjønner ikke prikkene i steg til nytt passord
	innhold (den er over det bildet vi ser)	Skjønner ikke flere faner	
Temamøte:	Symboler er utfordrende	Spørsmålstegnet har få vært borti	Info de trenger drukner i annen info
helsenorge	Ikke kjent med hvor hjelpfunksjoner ofte er	Fint med hjelp	Stadig nye ting
	Hjelp fra barnebarn, men det går for fort	Forvirrende, ulogisk	Tekniske problemer
	Vanskelig å se detaljepiler	Åpne og lukke faner er utfordrende	Hvem bruker informasjonen?
	Statestikk på hvor mange som bruker kjerne	men tør ikke prøve	Ikke vist å legge inn hvis ingen bruker det
Temamøte:	Skjermoppløsning/scallering	oversikt	kognitivt
digipost	dårlig oversiktsbilde		
Co-creation	Sikkerhet	Enkelt/ikke rotete	Tenker i aktiviteter
	Leseretning	Prioriterte ting mest synlig	filtrering, finne igjen ting
	Påtvunget	Ser fordelene, men like best papirbruk	symboler med tekst
	tilbaeknapp	tilpass egne ønsker	
Prototype	Viktige elementer tydelig plassert	Symboler + tekst	oversiktsbilde
	Aktivitetsbasert	Tankekart (finn kilde for dette?)	billedlig design
	tydelig feedback (varsle at brev er sendt og	store flater	Forklarende begreper (ordbruk)
	"last opp" var vanskelig å forstå	For mye informasjon ødelegger oversiktsbil	viktig med sikkerhet
	tilbakeknapp er viktig fordi de går tilabke uar	flere tok i bruk "søk"-knappen	"Hjelp"- knappen ble brukt
	Samle ting på ett sted. Ha piler ut fra digipost	(også nettbank)	
	Store forskjeller i nivå		

L. Thematical Analysis

The information coloured after codes were later sorted after the category they belonged to. Equally information were reduced to one copy. Similar information were suggested one code combining the information.

	Koder				
	Oversiktsbildet		Hjelp/ Pårørende		Samfunnsperspektivet
1	Dårlig oversiktsbilde	1	Kurs og en til en opplæring	3	Heve digital kompetanse
5	Leter etter et spesifit ord, scroller ikke for å finne mer	2	Skeptisk til å lære av oss (flinke)	1	Legger ned kontorer
5	Ingen tanke om hva som skjer hvis han prøver noe	2	Hjelp må være at de får prøvd selv	1	Digital analfabete
1	Leser ikke	3	Fint med hjelp	2	Arbeid for offentlig
4	Usystematisk: ser ikke det uleste brevet øverst	3	Mulig å få hjelp, men ikke når hun vil	2	Ressurskrevende
	som er uthevet og det står "ulest"	1.2	Hjelp fra barnebarn, men det går for fort	2	Kostnad
3	pop-up:Ser ikke at det kommer opp en ny boks til høyre	3	Hjelp: Privatisert problem	1.2	Reservasjon, men ikke mot alt
3	Ser ikke at pdfen blir lastet ned	1	Ikke mulig å få hjelp, annet enn seniornett	1	Ting skal være samlet i digipost, men er ikke det
1	Ikke kjent med hvor hjelpfunksjoner ofte er	2	Har mange å spørre om hjelp, men da gjør de det	3	Kommunene har ansvaret for opplæring
4	forvirring	1	Hjelp fra familie, ingen, kurs	1	Liten gruppe som har problem
4	ulogisk	2	Går for fort, de er for flinke	2	Reservasjonsretten er underkommunisert
5	Flink til å scrolle helt ned	3	Privatisert hjelpeproblem	3	Kjønnsforskjeller?
2	Skjønner ikke flere faner			2	Digitalt førstevalg
2	Åpne og lukke faner er utfordrende		Grunnleggende datakunnskap	1	Problem for eldre
1	Dårlig oversiktsbilde		Tekniske problemer, oppsett, osv	2	Fordel for norske stat
2	Faner		Spam	3	Tiltak for de med lav kompetanse
3	Endring i bildet (pdf-popup, info-popup)		Vedlegg til epost		
4	Logikk (forvirring, oppsett, ting som hører sammen står sammen)		Tekniske problemer, oppsett, osv		Kognitiv
5	Lete seg fram til ting		Problemer med ny fane		Hukommelse og repetisjon
			snarveier på skrivebordet	3	Mye å huske
	Mestring av tilværelsen		Lite digitale, men har nettbank	2	Fysiske begrensninger
	Frykt		Mangler elemntær forståelse (lukke vs minimere nettleser)	1	Simplifisering (få trinn, lite info, ta bort støy)
1	Rask endringer		problem selv å trykke på samme som kursholder	2	Sliten i rygg og hodet
2	25 av 190 har ikke epost		Skjønner ikke hvordan man kan sjekke om det er på caps lock	2	Store flater
3	Offentlige tjenester er en utfordring		Lavt kunnskapsnivå	4	Aldri vært inne før
2	kan nettbank			3	Glemmer
2	Utestengelse fra samfunnet			3	har ikke med seg ting(epost,passord,bankid)
2	Må lære nettbank		Design	3	Husker ikke passord
2	Utestengelse fra samfunnet		Symboler	4	Prioiterer ikke å øve,men vet at man må praktisere
3	Blir lurt	1	Burde vært en standard	4	Repitisjon
2	Ting er bare på nett	3.5	Vanskelige systemer	3	Skriver manualer for å huske, roter bort
2	Nav sluttet å sende i posten	4	Digipost er vanskelig å forstå	1	Simplifisering
3	Kan ikke gjøre ting de mestret før lenger	1	universell utforming	2	Fysiske begrensninger
2	Trenger ikke se brev fra NAV, apotek (Sølvberg art.)	4	Oppsett av elementer (tror det stopper før det gjør)	3	Hukommelse
1	Stadig nye ting	2	Ting er smått og tett	4	Repetisjon
3	Skjønner ikke hva hun skal med digipost	3	Mye urelevant info (for han)		
1	Nye ting, stor forandring	4	Skjønner ikke at elementer henger sammen når det er avstand		Språk og terminologi
2	Blir lett utenfor	2	Altinn er lite brukervennlig		Språk
2	Alle bruker nettbank fordi de må	4	automatisk lagring		Enkelt språk
2	Tvinges over	5	Prøver å trykke rett etter til, men der er det ikke et felt		Trykker på "nytt brev" for å se innboks
4	Tør ikke prøve	4	Prøver å trykke to ganger for å komme videre inn på meldingen (altinn)		Forvaltningskompetanse
4	Tør ikke prøve, usikker	3	Info de trenger drukner i annen info		Vanskelige ord
4	uredd, (bruker ikke oppskrifter)	1	Ser ikke likhet med mailoppsett		
4	Redd for å gjøre feil	4	Flytter seg ikke fra til feltet til emnefeltet		Sikkerhet
4	Frykt, redd for å gjøre feil (tør ikke trykke)	3	Skjønner ikke at man kan søke i kommuner (lang liste)		Sikkerhet
4	Utrygge	4	Fortsetter å skrive i til-feltet		viktig med sikkerhet
4	Det ukjente føles utrygt	2	Vanskelig å se detaljepiler		Sikkerhet
4	Redd for å prøve seg frem	4	Tror den er sendt, men må trykkes to ganger		Sikkerhet
4	Ikke redd for å trykke/prøve	1	Likt brukergrensesnitt (banker vil ikke dette)		
1	Rask endring	4	Problemer med helsenorge vs min helse		Kommunikasjon på nett
2	Tvang / utenfor i samfunnet	5	Ser ikke feilmeldingen om at hun må ha innhold i mail		Uenig i at det gir bedre kommunikasjon
3	Problem for eldre	6	Vet ikke hva ramme rundt bokser betyr		beskjed via sms og epost hvis det skjer noe
4	Frykt	6	Skjønner ikke prikkene i steg til nytt passord		Vet hvor hun finner kontakt oss
		4	Skjønner ikke oppsettet til altinn (hvor man skal legge inn hva)		Bruker chat, eller ringe
	Motivasjon	7	Trykker på logo		Kommuniserer ikke over nett (bare epost)
	Motivasjon: finne gleder ved det digitale	7	Symboler er utfordrende		Hvem bruker informasjonen? Ikke vist å legge inn hvis ingen bruker det
	Lyst til å lære	7	Spørsmålstegnet har få vært borti		
	Gir opp ved motgang	1	Standard		
	Hadde lyst til å gi opp pga problem med helsenorge vs min helse	2	Smått og tett		
		3	Simplifisering		
		4	Logikk		
		5	Dårlig design av enkeltelementer		
		6	Forsåelse av webdesign		
		7	Symboler		

The categories and codes were further combined. The researchers ended up with the following possible themes: cognitive limitations, motivation, mastery of everyday life, basic computer knowledge society perspective, help, communication and supporting network, design, overview and terminology.

	Oversiktsbildet		Hjelp/ Pårørende		Samfunnsperspektivet
1	Dårlig oversiktsbilde	1	Hjelp fra familie, ingen, kurs	1	Problem for eldre
2	Faner	2	Går for fort, de er for flinke	2	Fordel for norske stat
3	Endring i bildet (pdf-popup, info-p	3	Privatisert hjelpeproblem	3	Tiltak for de med lav kompetanse
4	Logikk (forvirring, oppsett, ting sc				
5	Lete seg fram til ting				
	Kognitiv				Design
	Hukommelse og repetisjon		Motivasjon		Symboler
1	Simplifisering		Motivasjon	1	Standard
2	Fysiske begrensninger			2	Smått og tett
3	Hukommelse			3	Simplifisering
4	Repetisjon			4	Logikk
				5	Dårlig design av enkeltelementer
				6	Forsåelse av webdesign
	Grunnleggende datakunnskap			7	Symboler
	Grunnleggende datakunnskap				
					Mestring av tilværelsen
	Språk og terminologi		Kommunikasjon på nett		Frykt
	Språk og terminologi		Kommunikasjon på nett	1	Rask endring
				2	Tvang / utenfor i samfunnet
				3	Problem for eldre
				4	Frykt

L.2. Data and Analysis Brought to a Meeting with the Supervisor

As mention in the method chapter, findings and analysis were brought to a meeting with supervisor where the themes were decided. Some of this material is listed on the following pages. First, the quotes are listed, then the articles brought to the meeting is listed, and further different main findings and analyzed material from each data source are presented. The overview of the possible themes brought to the meeting are described on the top of this page.

L. Thematical Analysis

Datakilde	Sitat
Nr 1 (DNB)	Hvis de eldre ikke får gjøre det selv lenger (om personlige ting som økonomi) vil de føle seg umyndiggjort
	Vi har gjort en del innsiktsarbeid der vi har snakket med eldre
Nr 2 (Senironett styret)	Hvis man inviterer til kurs er det ikke sikkert det sitter igjen så mye av det som er sagt.
	Vi oppfordrer folk til å komme igjen flere ganger. De må få det inn i fingrene. De praktiserer ikke nok hjemme.
Nr 4 (Bibliotektet)	Tilbudet er opprinnelig for alle, men det er i stor grad de eldre som benytter seg av det, fordi det er de som trenger det.
	Det er en kombinasjon av utfordringer rundt ferdighetene, det å tørre å prøve, og det at systemene er utfordrende.
Nr 5 (Sølvberg)	En ting er hva de ser, en annen ting er hva de oppfatter
Nr 6 (Frode Pettersen)	Kommer til å bli færre steder man kan reservere seg fra å være digital i fremtiden.
	Vi holder på å få en gruppe med digitalt analfabete. Det gjelder de eldre,
	men det gjelder også fremmedspråklige og de som har falt utenfor av ulike grunner, eller de som velger det bort.
	Vi fokuserer på å heve kompetansen hos de som jobber i kommunene, bibliotek, servicetorg,
	frivillighet slik at de kan lære bort videre til innbyggerne med mål om å minske det digitale skillet i samfunnet.
	Fylkesbiblioteket gjennomfører også kurs rettet direkte mot innbyggerne i Trøndelag, i samarbeid med folkebibliotekene
Nr 7 (Stian Linbøl)	De eldre har forvaltingskompetanse (forstår språket som brukes), men sliter med det digitale. Motsatte av de unge.
	Det kommer til å bli færre steder man kan reservere seg fra å være digital i fremtiden.
	Vi er på vei men det tar nok litt tid før alle offentlige og private har implementert løsninger som tar hensyn til eldre og de med funksjonshe
	Implementering av et EU direktiv: Accessability of websites and mobile applications have been limited to public sector
	and the scope in the Norwegian law covers the public and private. Private must compile with the regulations.
	Spesielt i Norge at de prøver å få de private inn i reguleringen av det med tilgjengelighet. Viktig å score bedre på tilgjengelighet.
	Fokuserer på å heve kompetansen på de som jobber i kommunene, slik at de kan lære bort videre.
Nr 8 (Temamøte)	"Har man egentlig et valg?"
	Vi har blitt enige om at det ikke er alt vi skjønner
	"Hva er vitsen med digipost hvis jeg ikke kan få meldinger fra NAV der?
Nr 9 (Bibliotek skytjene	"Dette synes jeg høres skummelt ut"
	"Var det en her som hadde en gmail?" Svar: "Ja, men jeg har den hjemme nå"
Nr 10 (datacafe)	"Det er fint at noen kan hjelpe meg, jeg har ingen andre som kan det"
Nr 12 (intervju 2)	"Det må jeg skrive ned til neste gang" - pass på å finne det direkte sitatet
Nr 13 (intervju 3)	"Der skjønner jeg ikke hva dem mener" (om språket) - pass på å finne det direkte sitatet
Nr 14 (intervju 4)	"Da er det enda en ting å logge seg inn på" - om å få digipost
	"Det går vel bort hvis jeg fortsetter å skrive?" - om å skrive emnet i til-feltet (Finn direkte sitat)
Nr 15 (temamøte helse	"den er jo rød da, så vi vet jo det" (om at resepten er ekspedert)
	"Det vet jeg ikke, jeg aner ikke" (uten å prøve)
	"Blir vel tvinga til å gjøre det"
	"Hva betyr det der da"
	Barnebarna lærer meg ting jeg ikke kan.
	Å beherske komplekse programmer som Excel er vanskelig [det sa pensjonert fastlege].
	Hvorfor skal kritisk informasjon og kjernejournal stå som to separate innslag? [når de handler om overlappende informasjon]. Forvirrende
Nr 17 (co creation)	"At det ikke hadde vært så rotete".
	Vi må ikke ha for mye inne på digipost, for da kan det bli forvirrende.

Datakilde	Sitat
	“Det er mye lettere å trykke på noe som er avlangt enn en liten knapp. Hvis en bommer på knappen, så sitter en der.
	Hundre år og ser dårlig”
	"For å finne igjen ting som kom i fjor. Så kunne det kanskje vært sånn at NAV kom for seg og skatt kom for deg, altså litt mer systematikk
	“Skulla lagt bilder som man er redd for på digipost istedenfor å legge det ut på SMS”
	“Det er viktig at det er likt, at en ikke blir forvirret av at det er rotete”
	“Farger som vises for et gammelt øye? Det er svart og hvit det. Ikke sånn grønn og sånn.
	Hvis det er bakgrunnsfarge kan det blir vanskeligere å lese”
	"Jeg har kompiser som ikke klarer å sende en SMS"
	“Det må være klart og tydelig. Slik at ikke folk gir opp før de har kommet seg inn.”
	Nå skal jo vi gjøre om det her, sånn at det skal bli bra. Sånn at det skal bli enkelt.
	Akkurat like lett eller vanskelig som å betale regninger. Det klarer vi jo
	Vi har ikke lov til å la være.
	Skatt og helse kom tidligere i posten, nå har de egne meldingstjenester på altinn og helsenorge digitalt. Hvorfor kan ikke dette være i dig
	“Jeg fikk frem brevet, men hvordan får jeg det ut? Skrive det ut.”
	Blir så mange plasser man må gå inn på etterhvert. Hadde vært greit å kunne samle det inne på digipost.”
	“Jeg tror det er veldig viktig med visuelle bilder”
	“Chatte er ganske smart” - Billigere
	“Jeg liker det som er visuelt”
	Jeg tenker at det skal bli så mye tryggere enn andre ting jeg driver på med. Posten er ikke 100% trygg den.
	Hvem som helst kan skrive ut en regning og bare sette på et banknummer.
	Vi må ikke ha for mye inne på digipost, for da kan det bli forvirrende.
	“Jeg synes passord skal være langt oppe, det er viktig for meg.”
	“Egentlig kan den se ut litt som telefonlista. Sånn som det ser ut på kontakter”
Viktig	“Det er noe med logistikken i hodet ditt. Hvordan du tenker. Da tenker jeg litt i kroker, i hvertfall jeg gjør det.” “Ja, jeg også gjør det”
	“Så dermed måtte jeg prøve med fem ganger før jeg,åja jeg må skrive det opp en gang til altså, 1, 2, 3. Rekkefølge
	, 1, 2, 3, denne rekkefølgen må man ta før man kommer på send. Det er noen sånne prosedyrer.” “
	Men det er ikke alltid sånn at dem som har laget prosedyren er så veldig lure heller” “Nei”
Viktig	Denne er laget for de som er kanskje 60-70 eller 80 år, og da synes jeg det ser veldig mye mer oversiktlig.
	Det dere lager det er veldig greit det også altså, det er ikke noe farlig med det. Men det er jo håndverkere og kontorfolk som skal
	takle dette med digital postkasse, og jeg er jo håndtverker, og jeg ser jo for meg et sånt bilde,
	det er mye enklere å se på enn et sånt oppsett som ofte er i dag.
	For meg er det mye mer oversiktlig, i mot sånne oppsett vi har idag. “Og det er no bare det som er her da, for det er jo bare skrift da.”
	Ja, det er jo greit det, hvis du har et hode til å jobbe med sånt da, men det er ikke alle som har hode til å sitte å bare se på sånne ting,
	og da synes jeg det er mye bedre å se på sånt som dette”. Andre sier seg enige. Ja vi har lært det i bokser vi vet du”
	“Det er jo sånn at de offentlige har forstått at det er viktig med visuelle bilder. At det er lettere å forstå bilder enn tekst”.
	En svarer: “I allefall når vi er blitt eldre enn vi er i dag”
	“Jeg synes det er bra med et bilde sammen med en tekst”
	“Ja, vi lager jo ikke ting til 20-åringer, vi lager jo ting til dem som har passert 67.”
	“Offentlige ting er viktigst, da kan det være på høyre siden, så kan det private være på venstre side.”
	Filtrering: “Ja, så kan man velge hvilken av visningene man vil ha ved å trykke på knapper”. Nr 1: “Litt som med regneark.

L. Thematical Analysis

Datakilde	Sitat
	Filtrering: "Ja, så kan man velge hvilken av visningene man vil ha ved å trykke på knapper". Nr 1: "Litt som med regneark.
	Det er jo så lett det med regneark, så hvis man klikke etter hvordan man vil det det. Så kan du ha det etter dato, men jeg har det etter nav
	"Jeg har sett at det er mye mer sortert etter fornavn. Før sorterte vi jo etter etternavn Det synes jeg er rart."
	Ei annen: " Ja, det er jo flere fornavn enn etternavn, så det er bedre å sortere etter etternavn"
	BankId synes jeg er viktig, fordi da kan man ha det sikkert lagret.
	Strek under til å klikke på. "Ja, det er det jo på banken. Sånn strek under til å klikke på". (finnes en artikkel på dette)
Nr 18 (designere i digi)	Lettere for avsendere å kommunisere med sluttbruker
	Sparer både kostnad og miljø
	Slippe at sluttbruker må logge inn i mange portaler for å få info om seg selv, samle på et sikkert sted, viktig info
	Gjøre hverdagen enklere
	Det er ikke en ideel digipost i dag. Ting går tregt, særlig med det offentlige
Nr 19 (designere helse	I korte trekk, er helsenorge.no et dugnadsprosjekt, der vi mottar bestillinger fra aktørene i helsesektoren for å finansiere arbeidet vårt.
	Vi kjørte i 2016 en helhetlig brukertest av eksisterende brukerflate
	Vi prøver også å komme i forkant ved å gjennomføre mindre tjenestedesignprosjekter som vi kan skissere konsepter rundt og
	forhåpentlig greie å selge inn til aktørene i helsesektoren så de bestiller saker også sett fra innbyggers perspektiv,
	men dette arbeidet er vanskelig å finansiere.
	Vi må fokusere på å effektivisere helsetjenstene for å kunne håndtere eldrebølgen som kommer.
	Derfor må innbyggernes behov komme i andre rekke
Nr 20 (NAV)	Har vært en tankegang om one size fits all - i hele offentlig sektor, prøver å endre denne tankegangen
	Det som virker for meg, virker ikke for deg
	Verdi for brukere og for samfunnet, mer ut av pengene (⅓ av statsbudsjettet går til NAV - over 500 milliarder)
Nr 21 (skatt)	Stortingets- og Finansdepartements beslutninger, lovgivning, juiridske og skattefaglige hensyn pleier å spille en mye større
	rolle enn brukernes ønsker i hva som blir prioritert
	Brukertesting er en del av vår konspetutviklingsprosess, og det er måten vi involverer brukere i utforming av online skjemaer.
	Som regel intervjues for at de skal få innsikt, der de gir input som påvirker den endelige brukerreisen som blir dokumentert.
Nr 22 (p 1, g)	"Vanskelig å bruke for folk som er nye. "
Nr.22 (p1, ny)	"Denne var jo enklere, for meg". "jeg bruker egentlig tankekart, så det der ble egentlig veldig likt det".
	"Ville valgt den siste. Jeg liker bilder bedre enn jeg liker tekst. Jeg tror egentlig at folk flest gjør det bedre med bilder"
	"spesielt folk med dysleksi"
Nr 22 (p 2)	Hvem var enklest å bruke? "Jeg synes den "nye" var enklere å bruke"
Nr 22 (p 2, ny)	"Synes det var kjempefint jeg! Det var flott det herre her"
Nr 22 (p 3, ny)	"Likte denne forsiden." Hvorfor? "Det er det at jeg er i sentrum, også er alt annet rundt her i bokser."
Nr22 (p 4,n	Hvilken likte du best? "I den gamle ser du jo alt på en gang, så den er jo veldig grei den og da"
	"Men det jeg synes var veldig fint på den andre (nye) var de rutene over som det sto stat, kommune, osv,
	i stedet for at alle ligger under hverandre. Da er det liksom fast sortert."
Nr 22 (p 5, n)	"Synes den virket veldig logisk oppbygget"
Nr 23	Det er ikke bare de eldre som blir stående utenfor.
	Vi har også en gruppe unge som har droppet ut av ungdomsskolen eller videregående for å mekke på biler, osv.
	De har også problemer med de digitale løsningene, men det snakkes det ikke så mye om

Artikler
Older adults in the digitalization
Yuan, 2018. "Coming of old age: Understanding Older Adults' Engagement in Coproduction Activities and Exploring Technological Support for Hea
Vassli, 2018. Acceptance of Health-Related ICT among Elderly People Living in the Community: A Systematic Review of Qualitative Evidence
Vassli, Farshchian, 2017. "A Study of ICT Acceptance Among Seniors"
Slettemeås, 2014. (Difi) «Staten må tenke annerledes for å gjøre oss til flinkere brukere» -motivasjon og barrierer for digital kommunikasjon med d
DAMVAD-rapporten-tiltak_digital_deltagelse
difi-2014-digital-nok-motivasjon-og-barrierer-for-digital-kommunikasjon
difi-notat-2014-1-kor-mange-innbyggjarar-kan-kommunisere-med-forvaltninga-digitalt-ny
Digidel_2017_sluttrapport
Older Adults' Coping with the Digital Everyday Life (Rønning & Sølvberg) (2017)
Vicki L. Hanson, 2001. "Web Access for Elderly Citizens"
Norsk mediebarometer 2015
Designing universal access: web-applications for the elderly and disabled
Mobile applications in an aging society: Status and trends
(2013). What matters to older people with assisted living needs?
Fisk, Rogers, Charness, Czaja, Sharit, 2009. "Designing for Older Adults"
Chadwick-Dias, Tedesco, Tulli, 2004. "Older adults and web usability: is web experience the same as web expertise?"
Chadwick-dias, McNulty, tullis 2003. "Web usability and age: how design changes can improve performance"
Hussain, Dilwar; Ross, Penny and Bednar, 2018. "The Perception of the Benefits and Drawbacks of Internet Usage by the Elderly People"
Xavier et al. 2015. "Recommendations for the Development of Web Interfaces on Tablet/iPads with Emphasis on Elderly Users"
Nielsen, J. 2013 (2002?). Usability for senior citizens (motivasjon for at eldre alltid vil ha et problem + designforslag for eldre)
Redesigning websites for older adults: a case study (Patsoule, 2014)
UCD and PD
Understanding your users: A practical guide to user requirements methods, tools, and techniques (Courage, 2005)
The methodology of participatory design (Spinuzzi, 2005)
Co-creation
Sanders, 2008. Co-creation and the new landscapes of design
Sanders, 2002. From user-centered to participatory design approaches
Hartson & Pyla, UXBook 2012. "Chapter 9.8 More about participatory design"
Demirbilek, Oya, 1999. Involving the elderly in the design process: a participatory design model for usability, safety and attractiveness
Stefan Holmlid, 2009. Participative, co-operative, emancipatory: From participatory design to service design
Wetter-Edman et al. 2014. Design for Value Co-Creation: Exploring Synergies Between Design for Service and Service Logic
Dahl. Co-Designing Interactive Tabletop Solutions for Active Patient Involvement in Audiological Consultations
Public and co-creation: http://charlesleadbeater.net/wp-content/uploads/2007/03/PSRG3.pdf
Benefits of co-design in service design projects (Steen, 2011)
The value of customer cocreated knowledge during the innovation process (Mahr, 2014)
Creative connections: user, designer, context, and tools (Stappers, 2006)
Understanding the context of design: towards tactical user centered design (Svanæs, 2008)
The tacit dimension (Polanyi, 2009)

L. Thematical Analysis

Artikler
The value of customer cocreated knowledge during the innovation process (Mahr, 2014)
Creative connections: user, designer, context, and tools (Stappers, 2006)
Understanding the context of design: towards tactical user centered design (Svanæs, 2008)
The tacit dimension (Polanyi, 2009)
Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions (Hanington,2012)
Activitybased design
Norman, 2006. Logic Versus Usage: The Case for Activity-Centered Design
Mental and conceptual model
Greca & Moreira, 2010. "Mental models, conceptual models, and modelling"
Hartson & Pyla, UXBook 2012. "Chapter 8. Mental models and conceptual design"
van der Veer &Melguizo, 2003. "Mental models" and "Designing computer systems for Older adults"
Johnson & Henderson. 2002. Conceptual Models: Begin by Designing What to Design
Fidgeon, T 2006. Usability for older web users (snakker om weaker mental model)
The Glossary of Human Computer Interaction (Papantoniou, 2002)
Cognitive science and science education (Carey, 1986)
Conceptual models: begin by designing what to design (Johnson, 2002)
Avisartikler
Kommunenes sentralforbund: http://www.ks.no/fagomrader/utvikling/digitalisering/vil-unnga-digitale-klasseskiller/
Nrk: https://www.nrk.no/ytring/fem-tips-til-bedre-digital-inkludering-1.13975248
Aftenposten: https://www.aftenposten.no/norge/i/gPp38L/Norge-er-i-digitaliseringstoppen-400000-mennesker-star-utenfor
Situational awareness
Situation awareness: Does it change with age? (Bolstad2001)
Information privacy SA: construct and validation (2012)
Theoretical underpinnings of situation awareness: a critical review
Designing for situation awareness: An approach to user-centered design.
Design and evaluation for situation awareness enhancement.
Kalimullah & Sushmitha 2017: Influence of design elements and mobile applications on user experience of elderly people
Affordance
Motivational affordances: reasons for ICT design and use (Zhang, 2008)
The Theory of Affordances, Perceiving, acting and Knowing (Gibson, 1977)
The Ecological Approach to Visual Perception (Gibson, 1979)
Understanding effects of proximity on collaboration: Implications for technologies to support remote collaborative work. (Kraut et al, 2002)
Affordance Theory in the IS Discipline: A Review and Synthesis of the Literature (Pozzi, 2014)
"Affordance, Conventions, and Design.", (Norman, 1999)
Cognitive, physical, sensory, and functional affordances in interaction design. (Hartson, 2003)

Digipost	Helsenorge
Gjøre hverdagen enklere sikkert sted, viktig info Sparer både kostnad og miljø	Kjører brukertesting, geriljatesting, questbacks
Ting går tregt, særlig i offentlige sektor	I korte trekk, er helsenorge.no et dugnadsprosjekt, der vi mottar bestillinger fra aktørene i helsesektoren for å finansiere arbeidet vårt. Investeringene som gjøres har føringer i en rekke stortingsmeldinger
Tar utgangspunkt i brukerundersøkelser, brukertester, brukertest i lab, teste ut ny funksjonalitet Low-key brukertesting i posthuset + ute i felt (tilfeldig hvem)	mottar bestillinger fra aktørene i helsesektoren
For å teste brukeropplevelsen,bekrefte om det funker og hva som mangler. Mest for nye innspill, men kan også være klager Mange kanaler, er en helhet	Bestillingene som vi får har føringer i en rekke stortingsmeldinger
Betaløsning - kundepanel som tester før det er ute (rundt 1000 -Svarer i et skjema	Innbyggers behov egentlig avledet av at vi må effektivisere helsetjenesten
Universell utforming? Kanskje ikke flinke nok, men har et fokus på det Har brukertest med blindeforbundet innmellom	Kjører raske prototyper og brukertester på forskjellige nivå – både overfor innbyggere – og helsepersonellet som sitter på "baksiden" av løsningene.
Hvem er brukerne? Hele norge Men prøver å spisse inn, f.eks de som skal eller akkurat har kjøpt seg bolig. Har de involvert eldre?Ikke spesielt tenkt på eldre	Mindre tjenestedesignprosjekter som vi kan skissere konsepter rundt og forhåpentlig greie å selge inn til aktørene i helsesektoren
Hvem er med ws? Tar med folk fra teamet + marked Workshops, value propositions canvas, ser etter verdi	Prøver å få dem til å bestiller saker også sett fra innbyggers perspektiv, men dette arbeidet er vanskelig å finansiere
2 interaksjonsdesigner, 30 totalt, 15 utviklere	"designsprint", som er en forsøksvis lettbent, kjapp, iterativ prosess
Validere eller teste en hypotese	fint lite penger til brukertesting i våre første spede leveår
Får de rapporter de bruker som utgangspunkt?Ja	30 som jobber med design av Helsenorge
Demografi? De fleste mellom 40-49	Vi brukertester i tidligfaser, under sprint og helhetlig etter at løsningen er lansert
Digipost ønsker at alle skal bli digitale	Ingen målgruppe
Smidig, jobber tett med utviklere	Eldre involveres på lik linje som andre demografiske målgrupper.
	Fokus på universell utforming
NAV	**Skatt**
Har vært en tankegang om one size fits all - i hele offentlig sektor, prøver å endre denne tankegangen	Brukere involveres gjennom intervjuer i innsiktsfasen for å lage brukerreiser og tjenestedesign, men de involveres ikke i designfasen
Det som virker for meg, virker ikke for deg Verdi for brukere og for samfunnet, mer ut av pengene	Virtuelle Kundeassistenter til å ta mye av første kontakt med skatteyter
⅓ av statsbudsjettet går til NAV - over 500 milliarder	Skatteløsninger er ikke knyttet til spesifikke grupper
Sitter tett med brukerne og ser at det blir tatt i bruk Snakker mye med brukerne	Stortingets- og Finansdepartements beslutninger, lovgivning, juridiske og skattefaglige hensyn pleier å spille en mye større rolle enn brukernes ønsker i hva som blir prioritert
Har ca 30 designere nå (15 faste)	
Analyserer bruksmønster, hva bruker man til å åpne et digitalt brev? Når åpnes det, hvem åpner, osv.	
Hvordan involverer de brukere? Brukertester	
Tester ift universell utforming	

L. Thematical Analysis

Intervju med læringssenteret	Intervju med Frode Pettersen	Intervju med Stian Lindbøl
Repitisjon	Heve digital kompetanse	Forvaltningskompetanse
Vanskelige systemer	Digital analfabete	Frykt, redd for å gjøre feil (tør ikke trykke)
Mye å huske	Kurs og en til en opplæring	Legger ned kontorer
Språk	Ting er bare på nett	Kommunene har ansvaret for opplæring
norge.no	Motivasjon: finne gleder ved det digitale	Nav sluttet å sende i posten
Ressurskrevende	Utrygge	Bevilger penger
	For mye info	digidel
	Digipost er vanskelig å forstå	universell utforming
	Altinn er lite brukervennlig	Føler seg tvunget
	Reservasjonsretten er underkommunisert	Blir lett utenfor
	Tvinges over	Fokus på å heve komptansen
	Repitisjon	Likt brukergrensesnitt (banker vil ikke dette)
	Språk	Blir færre steder man kan reservere seg fra
		Digitalt førstevalg
		Reservasjonsrett

Intervju med Astri Sølvberg og Wenche Rønning
Fra artikkelen deres: Challenges, connectedness og expanding.
Kan ikke gjøre ting de mestret før lenger
Redd for å gjøre feil
Burde vært en standard
Passord
Hjelp må være at de får prød selv
Språk
Kognetive
Oversikt
Utestengelse fra samfunnet
Nye ting, stor forandring
Hjelp: Privatisert problem
Alle bruker nettbank fordi de må
Kjønnsforskjeller?
Motivasjon

Kontakt med styret i Seniornett
Rask endringer
Offentlige tjenester er en utfordring
25 av 190 har ikke epost
Passord
Må lære nettbank
Fysiske begrensninger
Norge.no

Temamøte med Seniornett (offentlige tjenester)	Kurs med Trondheim kommune: Skytjenester	Kurs med Trondheim kommune: Offentlige digitale tjenster
Kostnad	passord	problem selv å trykke på samme som kursholder
Arbeid for offentlig	automatisk lagring	har ikke med seg bankid
Tvang	har ikke med seg ting (epostadresse, passord)	skeptisk til å lære av oss
Liten gruppe som har problem	Tekniske problemer, oppsett, osv	
Uenig i at det gir bedre kommunikasjon	Spam	
Reservasjon, men ikke mot alt		
Ting skal være samlet i digipost, men er ikke det		
norge.no		
forvirring		
beskjed via sms og epost hvis det skjer noe		
Seniorsmart		
Senior IKT		

Temamøte: Helsenorge	Temamøte: digipost
Symboler er utfordrende	Skjermoppløsning/scallering
Spørsmålstegnet har få vært borti	oversikt
Info de trenger drukner i annen info	kognitivt
Ikke kjent med hvor hjelpfunksjoner ofte er	dårlig oversiktsbilde
Fint med hjelp	sikkerhet
Stadig nye ting	
Hjelp fra barnebarn, men det går for fort	
Forvirrende, ulogisk	
Tekniske problemer	
Vanskelig å se detaljepiler	
Åpne og lukke faner er utfordrende	
Hvem bruker informasjonen? Ikke vist å legge inn hvis ingen bruker det	
Statestikk på hvor mange som bruker kjernejournal?	
men tør ikke prøve	

Datacafé: Gulhuset	Datacafé: Hornemansgården
lyst til å lære	Glemmer
snarveier på skrivebordet	Lite digitale, men har nettbank
kan nettbank	Problemer med ny fane
Vedlegg til epost	Tekniske problemer, oppsett, osv
Sliten i rygg og hodet	Prioiterer ikke å øve
Trenger ikke se brev fra NAV, apotek	
Har ikke med seg bankbrikke eller telefon	
Skytjeneste	
Redd for å prøve seg frem	
Lavt kunnskapsnivå	
Spam	
Blir lurt	

Co-design
Sikkerhet
Enkelt/ikke rotete
Tenker i aktiviteter
Påtvunget
Ser fordelene, men like best papirbruk
symboler med tekst
Leseretning
Prioriterte ting mest synlig
filtrering, finne igjen ting
tilbakeknapp
tilpass egne ønsker

DNB
Simplifisering (få trinn, lite info, ta bort støy)
Enkelt språk
Store flater
Utestengelse fra samfunnet

L. Thematical Analysis

Intervju person1	Intervju person2
Lyst til å lære	Dårlig oversiktsbilde
uredd, (bruker ikke oppskrifter)	Leter etter et spesifit ord, scroller ikke for å finne mer
Godt oversiktsbilde, sytematisk	Passord
Hadde lyst til å gi opp pga problem med helsenorge vs min helse	Tør ikke prøve, usikker
Språk	Mulig å få hjelp, men ikke når hun vil
Oppsett av elementer (tror det stopper før det gjør)	Mangler elemntær forståelse (lukke vs minimere nettleser)
Det ukjente føles utrygt	Skriver manualer for å huske, roter bort
Bruker chat, eller ringe	Vet at hun må praktisere
Vet hvor hun finner kontakt oss	Usystematisk: ser ikke det uleste brevet øverst som er uthevet og det står "ulest"
Aldri vært inne før	Flytter seg ikke fra til feltet til emnefeltet
Ikke mulig å få hjelp, annet enn seniornett	Ser ikke likhet med mailoppsett
	Tror den er sendt, men må trykkes to ganger
	Problemer med helsenorge vs min helse
	Vet ikke hva ramme rundt bokser betyr
	Flink til å scrolle helt ned
	Ny fane
	Prøve rå trykke rett etter til, men der er det ikke et felt
	Kommuniserer ikke over nett (bare epost)

Intervju person3	Intervju person4
Ikke redd for å trykke/prøve	Dårlig oversiktsbilde
Ingen tanke om hva som skjer hvis han prøver noe	Leser ikke
Mangler oversiktsbilde (ser ikke endre x 20)	Prøver å trykke to ganger for å komme videre inn på meldingen
Ting er smått og tett	Ser ikke at pdfen blir lastet ned og havner nede på oppgavelinjen
Mye urelevant info (for han)	Husker ikke passord
Skjønner ikke oppsettet til altinn (hvor man skal legge inn hva)	Skjønner ikke hvordan man kan sjekke om det er på caps lock
Skjønner ikke at elementer henger sammen når de har litt avstand	Skjønner ikke hva hun skal med digipost
Ser ikke at det kommer opp en ny boks til høyre	Trykker på "nytt brev" for å se innboks
Skjønner ikke at man kan søke i kommuner (lang liste)	Trykker rett etter til, der det ikke er noe felt
Kommuniserer ikke over nett (bare epost)	Fortsetter å skrive i til-feltet
Har mange å spørre om hjelp, men da gjør de det for han	Skjønner ikke at det ligner på mail
Vanskelige ord	Skjønner ikke at hun må trykke to ganger på send
	Ser ikke feilmeldingen om at hun må ha innhold (den er over det bildet vi ser)
	Trykker på logo
	Skjønner ikke prikkene i steg til nytt passord
	Skjønner ikke flere faner

L.3. Analysis of Results from Questionnaires

This section provide some of the results from the questionnaires from the courses held by the researchers. Some of the participants refused to fill out the questionnaire. A comparison of the results and a short analysis are shown on the bottom of the table.

Alder	Kjønn	Bakgrunn IT	Kunnskap (1-5)	Bra med system	Vanskelig med system	Forslag til forbedring
83	Kvinne	Nei	3	Ganske oversiktilig	Skifte mellom min helse og helsenorge	
72	Mann	Ja	2		Komme inn på mine resepter umulig med firefox	-
70	Kvinne	I jobb	3	God oversikt når du endelig kom inn (pga nett)	Trenger litt tid til å leke litt	Vanskelig å være konkret
68	Kvinne	Nei	1	Bra oversikt	Finne frem til det du ville vite	Usikker
72	Mann	Ja	4	Omfattende og nyttig	Brukergrensesnittet - ikke alt var like innlysende	Bedre grensesnitt
71	Kvinne	Nei	3	Prøve seg frem. Går bra	For mye fram og tilbake	Problem registrering av pårørende
68	Kvinne	Ja	4	Greit, men det er mange boxer som ikke er i bruk	Finne hjelpetasten "v"	Tydeligere hjelpe "v"
84	Mann	Litt	4	Enkelt når en får lært det	Litt problemer/krøll, med litt erfaring gikk det bedre	Vaksiner bør finnes i kjernejournal
77	Mann	Ja	4	Får en enkel oversikt	Innlogging, kommer ikke inn ved bruk av firefox	
72	Kvinne		3	At alt er samlet på et sted om min helse, alt	Vet ikke alltid hvor jeg skal trykke tilbake,	At det blir litt mer utviklet
				innklusive resepter og alt som berører min helse.	hvilken linker trykke for å komme frem og tilbake	
73.7	Flere kv	Litt over halvp	3.1	Oversiktlig (bokser)	Ikke så logisk	Bedre grensesnitt (tema: design)
					Finne hjelpetasten "v"	Legge inn manglende funksjonalitet
					Navigasjon	Vaksiner bør finnes i kjernejournal
						(tema: oversikt og logisk struktur)

Alder	Kjønn	Bakgrunn IT	Kunnskap(1-5)	Bra med system	Vanskelig med system	Forslag til forbedring
70	Kvinne	Nei	2	Forhåpentligvis enkelt	ikke brukt systemet enda, så kan ikke svare	
79	Kvinne	Nei	5	når jeg får det til er det genialt	Før jeg har lært meg det antagelig	det var ikke enkelt på ipad
74	Mann	I jobb før	4	Hittil har det gått ok, bare brukt	Har sikkert mange muligheter jeg	
				til å åpne post og legge brev i mappen	ikke har utforsket	
70	kvinne	nei	3	Blitt fortalt at det er en sikker måte å se	Masse nytt. Kort og elektroniske kvitteringer	Mere veiledning. Mere trening
72	mann	ja	4	Sikkerhet, alt på en plass, arkivfunksjor	At ikke alle etater følger opp	vet ikke
71	kvinne	-	3	Sikkert system		
89	mann	nei	2	Å bli et brukbart sted for å holde rede p	å lære seg riktig bruk	
69	Kvinne	litt	3	fin kontakt med offentlige post	mye ny tenkning	
78	kvinne	litt	3	Alt enkelt når du lærer det. Etter vært tr	Vanskelig å vite hvordan sende brev	
71	Mann	nei	3	sikkehet	Manøvrering mellom åpning av brev	Instrukser/spm om hva de ønsker å gjøre
					-> tilbake til postkasse	
71	kvinne	ja	2	sikkerhet	nettet var for dårlig	brukervennlighet mht ipad
-	-	litt	3	en del	en del	
72	Mann	Nei	3	-	ikke noe spesielt	
72	Kvinne	Nei	3	St all post blir samlet på ett sted	Litt uoversiktlig å finne fram,	Litt mer logisk oversikt- litt mer forenklet
					feks å sende brev	
73.69	Flere kvinner e	Flest uten ba	3.071428571	Sikkerhet	Nytt og uvant, ny teknologi	Logisk oversikt
					Uoversiktlig (tema: oversikt)	Forenkling
					Lite feedback	

M. Abstract Sent to Omsorgskonferansen 2018

This appendix presents the the abstract that was sent to the conference "Omsorgskonferansen".

KOSTNADEN VED Å IKKE INVOLVERE ELDRE I UTVIKLINGSPROSESSEN

Hege Louise Borge, Andrea Leikvold og Babak Farshchian
Norges teknisk-naturvitenskapelige universitet

Bakgrunn:
I 2014 innførte regjeringen "digitalt førstevalg", som innebærer at all offentlig kommunikasjon skal skje digitalt. Det viser seg at de digitale tjenestene som det offentlige tilbyr er utfordrende å bruke, spesielt for noen grupper i befolkningen. Blant annet eldre står i fare for å bli stående utenfor.

Mål/Hensikt:
Målet med forskningen var å forstå hvordan tidlig og direkte involvering av brukere praktiseres i dag, og hvordan mangel på dette kan påvirke kostnaden av å digitalisere. Det var også et mål å kartlegge eldres opplevelser i bruk av offentlige digitale tjenester, deriblant helsenorge.no, samt støttenettverket rundt dem.

Metode:
En utforskende casestudie ble gjennomført ved observasjoner av eldres bruk av digitale tjenester, intervju med relevante interessenter deriblant Seniornett og Kommunal- og moderniseringsdepartementet, samt intervjuer med eldre, og utviklere av tjenestene. Det ble også gjennomført samskaping med målgruppen, prototyping av nytt design, brukertesting og evaluering.

Resultater:
Funnene fra forskningen viste at eldre har begrensninger som gjør det vanskeligere å bruke dagens offentlige digitale tjenester og er avhengig av hjelp. Det ble derfor laget spesifikke anbefalinger som gjør designet bedre for eldre. I dag involveres brukerne i utviklingsprosessen gjennom brukertesting som verifiserer om designet er godt nok. Ved å involvere brukerne direkte i designfasen viser denne studien at nye løsningsformer fremkommer. Disse løsningsformene er nærmere knyttet til brukernes mentale modeller og vil bidra til mer intuitive systemer. Ved å ta seg tid og råd til å lage intuitive og brukervennlige systemer fra begynnelsen vil dette spare samfunnet i det lange løp. Da trengs mindre ressurser i forbedring av designet, til opplæring av brukere og hjelp til de som faller utenfor. Det vil også ha effekt på individnivå ved større mestringsfølelse og beholdt selvstendighet.

Konklusjon:
Tidlig og direkte involvering kan gi store økonomiske besparelser for samfunnet, samtidig som det bedrer situasjonen for den enkelte.