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Towards Guidelines for Standardization of Public Digital Services

NTNU
Kunnskap for en bedre verden

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Sammendrag

Stadig flere offentlige digitale tjenester har blitt digitalisert og forventer at den norske befolkningen skal håndtere både store og små gjøremål på egenhånd ved å ta i bruk de digitale løsningene. Mens dette er noe som for mange både er tidsbesparende og forenkler hverdagen, er det også mange som opplever at dette tvert imot ikke har forenklet livene deres i særlig grad. Når en mengde mennesker ikke klarer å bruke en løsning er dette sannsynligvis fordi løsningen er for dårlig designet, noe enkelte grupper er mer sårbare for enn andre. Et steg mot å finne en løsning på dette er å innføre standardisering av designet på de offentlige digitale tjenestene. Denne studien forsøker å identifisere hva det er med dagens løsninger som gjør dem vanskelig for voksne å bruke, og dermed foreslå de viktigste komponentene som burde standardiseres for å best imøtekomme målgruppen. Et gjentagende funn er at tjenester det ikke er strengt nødvendig å bruke blir valgt bort, og resten blir kun brukt noen få ganger i året. Dette fører til at det ofte brukes lang tid på å huske hvordan oppgaver skal utføres eller finnes frem til på de ulike tjenestene. Det er grunn til å tro at det er viktig å standardisere plassering av nøkkelelementer på tvers av de offentlige tjenestene for å kunne gi brukerne overføringsverdi fra en offentlig tjeneste til en annen, og på den måten bli raskere kjent med hvordan man skal navigere sidene da det alltid gjøres på samme måte.

Denne studien henter informasjon fra litteraturgjennomgang samt gjennomfører intervjuer for å samle innsikt for å bedre kunne forstå hvilke hindringer enkelte voksne møter når de bruker offentlige digitale løsninger, og hvordan en kan tilnærmes en mulig løsning. Basert på denne informasjonen fremstilles retningslinjer med intensjonen at de kan lenes på mens man designer for standardisering, for å forsikre at man ikke mister synet av det faktiske målet; brukervennlighet. Videre foreslås spesifikke standardiseringer basert på disse retningslinjene, som kan implementeres i de offentlige digitale tjenestene.

Abstract

An increasing number of public digital services have become digitized, expecting the Norwegian population to handle both large and small tasks on their own by using these digital solutions. While this is something that, for many, both saves time and simplifies everyday life, there are also many who unfortunately find that this has not simplified their lives to any great extent. When a significant number of people are unable to properly use a service, it is most likely the result of it being poorly designed, something some groups are more vulnerable to than others. A step towards finding a solution to this, is to standardize the design of the public digital services. This study seeks to identify which factors make it difficult for adults to use the services we have today, and based on this suggest which components is most important to standardize in order to best meet the target group's needs.

A recurring finding is that services that are not strictly necessary to use, are often ignored by the target group, and the remaining services are only used a few times each year. This results in often becoming a time-consuming event in order to remember how tasks are to be performed or found on the various services. There is reason to believe that it is important to standardize the placement of key elements across public services in order to provide users with transfer value from one public service to another, and thus become more familiar with how to navigate the pages when it is always done the same way.

The study gathers insight from a literature review of previously done research and conducted interviews to better gain an understanding into the obstacles some adults face when using public digital services, and how to approach a possible solution. Based on this information, guidelines were created with the intent of providing something to lean on when designing for standardization to ensure that one does not lose sight of the real goal; usability. Furthermore, specific standardizations based on these guidelines that could be implemented in the public digital services are proposed.

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1.0 Introduction

In an effort to include those who fall outside the current solutions we have on public digital services, this study aims to identify causes which makes it challenging to use the public digital services we have in Norway today and propose general guidelines to be used in the process of standardizing to best cater to the target group. The purpose of these guidelines is to collect existing knowledge and information gathered during the research phase and interviews into set guidelines that will be helpful in the development of standardization of public digital services. Standardization of the public digital services is by the researcher believed to be a way to eliminate the need to learn and remember how to use multiple systems and navigational schemes by modeling one system that can be used across the specter of public digital services.

These guidelines will be applied when presenting specific suggestions on how to standardize the services. The suggested standardizations will aim to be user friendly, logical and intuitive while providing something familiar for the users each time they enter a public digital service whether they have previously used it or not. While this on its own most likely will not eliminate the difficulties some are facing, it will hopefully be a valuable step in the right direction to make the world of digital services a little less daunting. The goal of this study will be to suggest how one can standardize the public digital services in a way that allows the users to only needing to use one of the services in order to be able to recognize how the site is set up, thus making the process of navigating and orient themselves within the services more straightforward and unchallenging. If you are familiar with how to use one of the services, you will be familiar with them all. Retaining the services individuality in order to avoid creating a new challenge by making the services too similar will also be touched on.

1.1 Keywords

Standardization, guidelines, public digital services

1.2 Problem Description

With the use of technology and internet steadily increasing, so many of our daily tasks and actions now require the use of digital services. Some people find this to be something that greatly simplifies their life, eliminating the need to stand in line, rely on making it to an office during opening hours or wait on the phone for long periods of time to receive help. With the access to digital solutions at the tip of our fingers, often literarily in the palm of our hands, we are able to take care of a great number of tasks in a short amount of time no matter the time of day or where we are located. While this is an amazing asset, some does however struggle to keep up with the increased need to use digital solutions. Many who have grown up using analog solutions most of their life are now faced with making the adjustment to join the digital wave or risk being left behind. While there are many reasons some may struggle to make this transition, it is our duty as interaction designers to do our best to find solutions that make it as easy as possible.

1.3 Motivation and Benefits

As digital services become more advanced and a part of daily life, the providers simultaneously reduce what they provide in their physical locations, relying on the users to make use of the digital options. Being an employee at a supermarket providing bank services, provided first-hand experience watching numerous people struggle with the digital service provided by the bank as well as often being asked to help them fill out sensitive information because they have no one to help them and cannot manage it on their own. Witnessing people risking their lives driving in the dark on icy roads simply to transfer money between their own accounts or pay a bill, being forced to pay large fees and trusting strangers to do so, sparked an interest that has since expanded to include all necessary digital services.

   This subject is however too vast and needed to be narrowed down, resulting in the main focus becoming how to improve digital services provided by the government through standardization. Don Norman explains that people often blame themselves if they do not manage to use a product, while it in reality is the result of a badly designed product that does not take the users into account. Human psychology stay the same while the technology

keeps advancing, and one must make products adapted to people, not make people adapt to the products (Norman, 2016).

Through a set of guidelines based on research with the human mind in center to be used when standardizing public digital services, this study aims to simplify the existing public digital services, making the services less intimidating for those capable, but struggling, to use digital services by themselves. Benefits that would come with the success of this study will be that more people can manage without help from others, having a greater sense of independence and achievement. This would additionally save time for all involved, including the individuals themselves who are currently struggling when using said services, those who help them such as their children or spouses, customer service and employees of the institutions that provide the services.

1.4 Research questions

Based on relevant literature about the topic, some preliminary research questions built upon a selection of interesting questions linked to usability and standardization of public digital services will be presented. The main questions to be addressed is:

«How can standardization simplify the user experience?»

«What is most important to standardize?»

And « How should it be standardized?»

1.5 Clarification

In the context of this thesis, public digital services have been classified as online services provided by, or recommended to use by official government agencies in Norway. This includes, but is not limited to, services as Nav, Skatteetaten, Altinn, digital mail, Helsenorge, Samordna opptak, Lånekassen, Vigo, Brønnøysundregistrene, *kommunale sider* etc. The focus in this research will be on adults who are likely to need to be able to use these services at least from time to time. Adults being persons over the age of 18 who are responsible for their own life and economy, meaning that they are of sound mind and are mentally well functioning without any known underlying diseases interfering with their memory, their learned knowledge or prevents them from obtaining new knowledge, such as Alzheimers or dementia. The target group will in this study be referred to as intermediate

users, as they are not quite novice users and can handle some or most tasks on their own but does occasionally need help and are not entirely comfortable with using the digital services.

As 98% of the Norwegian population has access to the internet (Statistisk Sentralbyrå, 2019), it is in this thesis not considered a key factor for not using public digital services, and the research is done on the assumption that the population in question has regular access to the internet. Most of the study will refer to BankID as the log in method for these services. This is because this is what all the interview participants answered that they use even though there are other options such as MinID available. Participants refers to those who were interviewed while user refers to people in general who uses the services.

2.0 Background

2.1 Digital solutions

Increased access to the internet by the average citizen has opened up new opportunities for both private and public services. Where one previously had to make personal visits to offices, make a phone call to get questions answered or wait for mail delivery of documents, one can now simply go online for most of these things (West, 2005). In Norway, new regulations from 2014 stated that communication between the state and its resident should as a main rule happen digitally. This is intended to simplify everyday life for the residents while providing better services and shorter response time (Norge.no, 2018). Numbers from SSB show that Norway in 2018 was one of the countries in Europe where the biggest share of households use public digital services, most commonly used to search for information (Kommunal-og moderniseringsdirektoratet, 2019). While this on a general basis is great news, it makes it even more important that we are able to include all citizens and prevent the few from being left behind and make sure there are equal opportunities for all members of the society to take advantage of said services. The report from Kommunal- og moderniseringsdepartementet (2019) also admits that putting the user in the center is not always compatible with the efficiency of the public sector. There is however no point in making innovative solutions for efficiency if the users are unable to utilize it. A study measuring the internet skills of the Dutch population shoved that the governments assumptions that every Dutch citizen with access to the internet would be able to complete set tasks were in fact wrong (van Deursen and van Dijk, 2009). One of their proposed solutions were to provide two versions of the government websites; one version for the more experienced users with access to advanced functions, and a simplified version with explanations of how to use the site for those with less experience using the internet (van Deursen and van Dijk, 2009).

2.2 Existing standardizations in public digital services

There are already a multitude of standardizations in place regarding public websites. Some of these are minimum requirements that are legally required to use, and others are more of a suggestion on how you can best meet the requirements. These rules and standardizations apply to almost anything on the internet that are meant to be available to Norwegian

citizens and customers, of course including public digital services. The regulation on the design of information and communication technology (ICT) solutions states that web solutions must be designed in accordance or equivalent with Web Content Accessibility Guidelines (WCAG) 2.0 (Lovdata, 2013) on levels A and AA.

Directorate of Digitization (Digitaliseringsdirektoratet) has published a series of solutions one can use to meet these standardizations. This consists of detailed explanations on how to implement the content, for example pictures or text. These guidelines are however quite technically oriented; for example how one should use alt-attribute in the HTML-file to ensure that the right information is read out through for example hearing aids (Digitaliseringsdirektoratet, 2019). Likewise concerning navigation and use of color, the focus lies on the importance of how to use color to carry meaning as well as having sufficient contrast. The navigation should have large enough surfaces for clicks and the right amount of space between buttons. While the standardizations presented are immensely important to ensure universal design, accessibility and user friendliness, they are what forms the base of the digital solutions. The visual design is practically rule-free. This makes sense as the proposed solutions are meant to apply not only to government-run services, but all Norwegian internet services. This does still leave the public digital services free to do as they please with their visual design, allowing separated design departments that are all creating solutions and designs for their service and their service only. This creates a large variation of design solutions, and as a result, not two public service webpages are built the same.

2.3 Understanding users

To understand how one can create solutions to help those that do not find it easy to use digital services, the first step is to understand why they struggle. Earlier research suggests that adult learners among other things can have a great deal of pride coupled with set habits and may sometimes be bewildered by options. Often they would like to choose for themselves what to learn (Thoms, 2001), and it might rub them the wrong way to be «forced» into digital services by the government and other cooperations rather than to choose it themselves. There can also be a failure in seeing the need, if they have done something all their lives and it has been working, why change? Having motivational access to technology is crucial to using it (van Dijk, 2005). Previous research in psychology indicate that motivation can explain behavior, where a negative attitude will reduce the chance that an

individual will use the internet (van Deursen and van Dijk, 2019). Internet anxiety can be an example of a negative attitude, where one will express negativity towards the internet and attempting to spend as little time as possible using it. This could become a spiral where one without great skills of internet usage feels negative towards digital solutions for fear of doing something wrong, leading to less or no use of the internet which again results in never further developing one's skills.

As explained by Jeff Johnson: Humans have poor memory, so we prefer to move as much of the weight from memory over to recognition. Software should be designed in a way that encourages people to make it habitual and automatic. One way to do this is make sure the websites are consistent, so the user learns quickly because they do not have to heavily rely on memory to remember where certain items are placed. Inconsistent systems take a long time to learn as one must learn how all the different functions work, making it a time consuming and difficult process. We as humans prefer familiar paths, and are designed to recognize things quickly, while retrieving memories is often much harder. It is therefore a less time-consuming task to meet something familiar that one recognizes rather than digging up a memory on how to navigate a particular site (Johnson, 2014).

2.4 Theoretical background

The world is becoming increasingly more focused on self-service, allowing businesses, as well as the government, to cut back on the traditional face to face contact, with advantages such as freeing up the time and resources of the employees and cutting cost simultaneously as they are able to reach a larger audience and expand business hours (Van Der Geest *et al.*, 2013). These services are largely designed upon the conception that if one has access to the internet, one also knows how to use it. Numerous studies on the digital divide shows that there are several degrees of division within internet access and usability. The first-level digital divide refers to the binary divide between those with access to digital solutions, including internet, versus those who do not, creating a divide within a population. The second-level digital divide addresses the differences in how those with access to the internet uses it and their skill-level. Lastly, the third-level digital divide highlights the tangible outcomes of internet use (Scheerder, van Deursen and van Dijk, 2017).

A study done in 2002 showed that the gap in internet usage was mostly based on level of education, finding that those with higher educational background tend to use the internet

in an instrumental way while those with lower educational backgrounds seemed to use the internet only for entertainment (Bonfadelli, 2002). A more recent study centered on the ages from 60 to 80 years comparing factors such as age, gender, level of education and income revealed that there is still a noticeable difference. Firstly between the age groups where the youngest participants were deemed most technically able, as well as showing that those with the highest level of education were the most skilled internet users amongst the participants, acknowledging that both education and income are positively correlated with internet skills, benefitting the more privileged users (Hargittai, Piper and Morris, 2019).

A literature study done by Twizeyimana and Andersson about e-government analyzed 53 articles and identified six overlapping dimensions of the public value, defined in the article as citizens' collective expectations in respect to government and public services, of e-government (Twizeyimana and Andersson, 2019); improved public services, improved administrative efficiency, open government (OG) capabilities, improved ethical behavior and professionalism, improved trust and confidence in government, and improved social value and well-being. Further analysis of the relationships between these dimension resulted in three overarching dimensions: *Improved Public Services*, *Improved Administration* containing the dimensions improved administrative efficiency, Open Government capabilities and Improved ethical behavior and professionalism, and *Improved Social Value* containing the dimensions Improved trust and confidence in government and Improved social value and well-being, as shown in the figure below.

Improved Public Services	Improved Administration	Improved Social Value
	- Improved administrative efficiency - Open Government (OG) capabilities - Improved ethical behavior and professionalism	- Improved trust and confidence in government - Improved social value and well-being

Figure 1: *The six main dimensions of the public value of e-government divided into three overarching dimensions.*

Findings in this study suggest that the center of value in e-government is the improvement of public services, which to some extent also will improve the public administration and thus the well-being of the society (Twizeyimana and Andersson, 2019).

In accordance with the quote by Jakob Nielsen *«When people have problems using a design, it's not because they are stupid. It's because the design is too difficult»* (2001), Tone Bratteteig, a professor in informatic alleges that there is a design-problem if people do not manage to use a service (Geard, 2018). This is backed up by Lexie Kane who states that digital products often fails the elderly in particular with bad design consisting of for example illegible text, small targets and startling sounds (Kane, 2019). While elderly is defined as those above the age of 65, studies has shown that adults ability to use websites decline steadily by 0,8% yearly already from the age of 25 by needing more time to understand pages, scan the text and extract the information (Nielsen, 2008). He explains reasons why web design should have standards as ensuring users know what features to expect, how they work and look in the interface, where to find them, how to operate them. He also points out that users don't have to ponder over meanings of unknown design elements, don't miss important features and don't get nasty surprised when something doesn't go as expected (Nielsen, 2004). The same study also classifies three levels of standardization: *Standard*, where 80% or more of the compared websites use the same design approach, *convention*, where 50-70% of the compared websites uses the same design approach, and lastly *confusion,* where at most 49% uses the same design approach, but there is no single approach dominating (Nielsen, 2004). Design elements that are classified as a standard is according to this study that the logo is placed in the upper right corner, there is a search box on the front page, breadcrumbs are listed horizontally when used and there is no splash page. These elements are expected to be this way because this is what the majority does. Elements classified as a convention where a user will usually expect the element to work this way is changing the color of visited links, placing the shopping cart in the upper right corner and placing links to topics with the same information architecture level in the left-hand column. Lastly, confusion often encircles the main navigation schemes, placement of the search feature, the sign-in process and the placement of help. These elements are done in many different ways and the user can never predict where to find them or how they work (Nielsen, 2004).

2.5 Heuristics and guidelines

Guidelines and heuristic evaluations go hand in hand, and have in recent years been given large amounts of attention when designing digital solutions, as they help keep the focus on key criteria within usability, and being aware of them when designing raises awareness of what the user is trying to do and how the website responds (Preece, Rogers and Sharp, 2015). There are many existing lists of heuristics and guidelines for user interface design, many of them quite similar to each other as they are based upon human psychology: how people perceive, learn, reason, remember and convert intentions into action (Johnson, 2014).

Shown in table 1 is a list some well-known previously established guidelines. The common goal is to ensure good usability, but with some variations on how to reach it.

Nielsen (Nielsen, 1994)	Shneiderman and Plaisant (Johnson, 2014)	Norman (Norman, 2016)	Budd (Budd, 2007)
Consistency and standards, Visibility of system status, Match between system and real world, User control and freedom, Error prevention, Recognition rather than recall, Flexibility and efficiency of use, Aesthetic and minimalist design, Help users recognize, diagnose and recover from errors, Provide online documentation and help	Strive for consistency, Cater to universal usability, Offer informative feedback, Design task flows to yield closure, Prevent errors, Permit easy reversal of actions, Make users feel they are in control, Minimize short-term memory load	Discoverability, Feedback, Conceptual model, Affordances, Signifiers, Mappings, Constraints	Design for user expectations, Clarity, Minimize unnecessary complexity and cognitive load, Efficiency and task completion, Provide users with context, Consistency and standards, Prevent errors, Help users notice, understand and recover from errors, Promote a pleasurable and positive user experience

Table 1: *List of guidelines*

2.6 Benefits and drawbacks of standardization

There are both benefits and drawbacks to using standardization in interfaces.
Benefits include consistency in look, feel and behavior, giving the users a seamless and comfortable experience across platforms and improves the users' ability to quickly learn as they can predict the applications behavior based on previous experiences (Cooper *et al.*, 2014). Don Norman classifies standardization as a major breakthrough in usability, using examples such as learning to drive a car: if you know how to drive one car, you can feel fairly confident that you are able to drive any car (Norman, 2016). Jakob Nielsen also support the use of standardization, listing reasons such as users know where to find certain features on the site/page, know how to operate the features to reach their goals, know what features to expect and what they look like. This provides the benefit of giving users' a sense of mastery and increases their ability to get things done and feel satisfied with the experience (Nielsen, 2004). From a cost perspective, it is also beneficial to the vendors as the ease of learning and consistency reduces the need for customer training and technical support, thus reducing staff costs, the decision-making process is simplified as well as reducing costs on maintenance as the code and design can be reused (Cooper *et al.*, 2014).

Drawbacks with standardization is that it can take an incredible long time to implement. In Norway, the process of developing a standard is a joined effort of both private and public organizations led by Standard Norge to reach a final result using different committees such as Technical Committee and Working Committee (Standard Norge, 2020). A product can also never be better than the standard itself, making it a possible pitfall to create a product based upon standards that fails to truly be a usable interface (Cooper *et al.*, 2014). This also applies when using standards across sites, being too rigid may cause more problems than it solves if a standard suits one particular type of content, forcing other types of content to comply with a standard that violates the user's mental models (Cooper *et al.*, 2014).

How to avoid these pitfalls: With complex sites loaded with different information such as the public digital services, it is important to take into consideration how they differ from each other. While the use of standardization is beneficial, it must not be at the expense of the overall usability. They should therefore be viewed as exactly what they are: guidelines, or a framework, not rigid rules or laws. There must be room to make exceptions to accommodate the individual services' character and specialties when necessary.

3.0 Methods

This section will explain the choice of method and research design used in the study. The method for data collection, sample strategy and sample size will be presented, as well as an explanation of the data processing and analysis. It will also be discussed measures taken to ensure that the reliability, validity and ethical considerations for this thesis were sufficient.

3.1 Choice of methods

As explained in the introduction, the purpose of this study is to understand where the obstacles the target group faces when using public digital services are and how to alleviate some of these difficulties through standardization by understanding exactly what needs to be standardized and how, to have the greatest impact. A qualitative approach will be most beneficial to collect and analyze the information required, as it is well suited for revealing the complex nature of situations, processes and people (Leedy and Ormrod, 2015).

This will allow for a deeper understanding of the target groups struggles with digital solutions and how to best employ standardizations to make it more user friendly.

A case study consisting of face to face in depth interviews to gain knowledge of users experiences and opinions of public digital services, which is often used in qualitative methods was originally chosen. A case study is explained by Leedy and Omrod (2015) as a study where one often combines data from interviews, observations and documents with the purpose of understanding one person or situation in depth. To do this, semi-structured interviews that allow for predefined questions as a framework as well as being able to go off script by asking appropriate follow-up questions will be used. This will consist of both open-ended and closed-ended questions that allows for deviating from the order as well as the questions when necessary (Baxter, Courage and Caine, 2015).

Due to the current situation with Covid-19, the chosen approach needed to change significantly to adhere to government regulations to preserve the safety of the participants as most of them are considered to be in the high-risk group. This made face to face meetings undoable. In order to adapt to this turn of events, all communication prior to the interviews, including sending and receiving signatures for the consent-form, was done trough e-mail. The interviews were instead conducted over the phone. Challenges associated with this is

the fact that interviews where the interviewer and participant cannot see each other is lacking nonverbal communication cues such as body language, facial expressions and gestures as well as cues about identity, which provides important information. It may also lead to participants being more cautious to reveal certain information as phones can be perceived to be quite impersonal (Baxter, Courage and Caine, 2015).

Observation of how the participants use public digital services was not possible to carry out, causing the study to no longer be able to use triangulation by doing observations in the field in addition to the interviews and theoretical research.

Any prototype of the suggested standardizations would face the same challenges, and was therefore replaced by simple visual representation in addition to explanatory text.

3.2 Identifying user groups and participants

The participants for this research will be people who to some degree struggle to be a full member of the digital self-sufficiency society. These people are often adults who grew up using analogue solutions and have been unable to make an entirely smooth transition into the digital realm. Additionally, an interview with an expert user will be conducted to be able to gain insight on whether there are any specific or large differences or similarities in how an expert and an intermediate user uses the same services. The expert participant will therefore be asked the same questions as the intermediate participants.

To ensure there is enough data collected from different points of view, there should be no less than five participants in addition to the expert. To reach the desired target group, a person known to be meeting said criteria was contacted. This participant led to more relevant people within the target group that also accepted to participate in the study as well as referring to additional potential participants. This allowed for coming in contact with people it would have been otherwise difficult to locate, but is still a purposive sampling where they were chosen specifically because they would be able to provide the most information about the topic (Leedy and Ormrod, 2015).

3.3 Interview guide and completion of interviews

Based on the gathered theoretical background, a semi-structured interview consisting of twelve main questions was created by first writing down any questions that came to mind before beginning the process of removing irrelevant questions, combining and refining the

remaining ones until being left with only relevant questions that would conceivably provide informative answers. The idealized interview flow from Baxter, Courage and Caine (2015) was used to structure the interview into sections: ice breaker with simple questions about the participants background before the introduction where the topic is introduced which included questions such as what digital services they use and how often. This was followed by questions about the primary interests of the interview, namely what they experience as negative and positive about current solutions and potential pain-points. Next comes summary where the questions are put in a broader perspective, asking more loosely about their thoughts on the topic, before wrapping up by letting the participants share any thoughts they have that was not mentioned in previous questions (Baxter, Courage and Caine, 2015). Considering all participants are native Norwegian speakers, the interview guide was created and conducted in Norwegian in order to avoid any confusion, misunderstandings or language barriers, as well as putting the participants more at ease.

Before conducting an interview, the participant received a PDF with consent form through e-mail requiring a written permission. These were kept separate from the collected data, and all participants were labeled as «participant number 1», «participant number 2» and so on in the data to ensure their anonymity. The audio recordings were labeled the same way and kept separate from other data.

3.4 Pilot interview
To ensure the quality of the interview-guide, a pilot interview was conducted. This was done with a relative within the target group to see if the estimated timeframe of lasting approximately 45 minutes was accurate as well as check if the questions' wording could lead to misunderstandings and need clarification or if there were any potentially leading questions. The data would not be able to be used in the study as a relative will be viewed as biased, but it gave valuable information in determining if the questions in the interview-guide was good enough to provide a solid foundation. Based on the pilot interview, some changes were made that encouraged more detailed and in depth-answers from the participants, such as rephrasing some questions and divide other questions into follow-up questions rather than being a part of the original question. This way the participants were able to focus on only one aspect at the time. The questions were worded in a way that attempts to avoid potential bias or leading questions.

3.5 Data analysis

All interviews conducted will be audio recorded, and will afterwards need to be transcribed as it is critical to replicate the participants answers in their own exact words (Baxter, Courage and Caine, 2015). The initial transcription will be verbatim where everything is written down, including pauses and when participants backtrack and change their answer. A summarized transcript will be presented in the results chapter. All interviews will be conducted prior to the process of analyzing the data begins.

The method used to analyze and understand the data collected will be affinity diagraming, a technique that allows for relatively quick analyzing of qualitative data, such as participants responses to open-ended questions by pulling out key points from each participants data and writing down each one on individual sticky notes (Baxter, Courage and Caine, 2015). This allows for making groups of notes that show similarities, making it possible to identify and organize patterns, themes and trends in the data (Preece, Rogers and Sharp, 2015). The process consists of several steps, beginning with the creation of the cards, in this case utilizing color-coding to indicate the difference between what applies to the existing solutions and what refers to the proposed standardization. When all the cards are created, they should be shuffled to remove any preexisting order before they are placed on the wall. The cards will then be grouped with similar cards, placing similar or identical cards on top of each other, which identifies recurring issues. Seeing if there are recurring groups or smaller groups that could belong in larger ones, a regroup might be necessary. When this is done, the groups can be labeled (Baxter, Courage and Caine, 2015).

3.6 Creating guidelines

The guidelines in this thesis was created by combining existing guidelines and heuristics discussed in the background chapter with relevant results from the interview analysis to be able to see what the most important guidelines would be to keep in mind when designing for standardization. Using affinity diagramming as described above at a smaller scale, 10 final guidelines was created based on a total of 71 original guidelines and heuristics. Another method used is «the 5 whys» with the motive of discovering the root cause of problems by reviewing problem-statements that emerged from the interviews, asking why said statement is a problem (Gray, Brown and Macanufo, 2010). This helps ensure that the purpose of the guidelines did not become lost in the process.

3.7 Reliability and validity

A research's reliability is how reliable the data is, depending on how they were collected and later used. Ways to make sure qualitative research is reliable is to make the research process transparent by describing strategy and methods in a detailed manner and making explicit the theoretical stance the interpretation takes place (Silverman, 2014).

The measures taken to make sure this thesis is reliable consists of recording the interviews, as well as taking notes during each interview, this way making sure that the information is correct and can be analyzed accurately. Questions were asked in a way that was not leading or implying that there was a right or wrong answer, this way ensuring the participants point of view was correctly conveyed.

The validity of a research is whether it yields accurate, meaningful and credible results, allowing for precise conclusions regarding cause-and-effect as well as other relationships within the data (Leedy and Ormrod, 2015). There are two forms of validity; internal and external. In this study, the *internal validity* can be ensured by using triangulation, collecting data from multiple sources by doing both in depth-interviews as well as observations in the field. *External validity*, the extent to which the conclusions can be generalized to fit other contexts, can be enhanced by using a representative sample of the population that one wishes to draw conclusions about (Leedy and Ormrod, 2015).

3.8 Ethical and legal considerations

There are several potential ethical issues that must be taken into consideration before a study is conducted. There are three requirements from Leedy and Ormrod (2015) deemed important to this study:

- Voluntary and informed participation
- Right to privacy
- Honesty with professional colleagues

When conducting an interview, it is important that it is a *voluntary and informed participation*. In some countries, including Norway, it is required by law that participants know the nature of the study and to provide written permission stating that they voluntary consent to participate (Leedy and Ormrod, 2015). Before any interviews were conducted, an application

was sent to, and granted approval by, the Norwegian Center for Research Data (NSD). Based on guidelines set by NSD, an informed consent form was created and provided to the participants, informing that it is voluntary and they are able to withdraw from the study at any time without consequence, subsequently deleting any collected data, as well as informing of exactly who would have access to the data. The forms were sent to the participants by email prior to scheduling the interviews, and all participants responded in writing by email that they wanted to participate and consented to being recorded while being interviewed.

The *right to privacy* entails that a research report should never under any circumstances be presented in a way that makes it possible for anyone to understand how a particular participant has responded (Leedy and Ormrod, 2015). All participants were informed that they would remain anonymous. Measured taken to ensure this was to not collect any personal information except for age, field of employment and level of education. The consent signatures were kept separate from the data. Before the interviews begun, the participants were again asked if they consented to having their voices recorded, assuring them the recordings would be deleted immediately after the completion of the study. All participants gave their permission to do so both orally and in writing.

Honesty with professional colleagues is to honestly and accurately report the research findings without misrepresenting or intentionally misleading others (Leedy and Ormrod, 2015). The voice recordings of the interviews are in this study a way to guarantee that the data presented is done so accurately and have not subconsciously been skewed to support personal biases and wishes for the direction of the research. Academic honesty is an important aspect of any research; to give credit and acknowledgement to those who's thoughts and ideas has helped form the study.

4.0 Results

4.1 Interviews

In total, six interviews were individually conducted. Four of the participants were female and two were male. Five of the participants are not frequent users of public digital services, though they do use them occasionally. The sixth interview was an expert user that uses public digital services on a daily basis through work and is therefore very familiar with several of the public digital services. All participants were within the ages of 50-63 and coincidentally all have completed some level of higher education. Firstly, the answers of the intermediate participants will be analyzed, and later compared with the expert interview which will be analyzed by itself.

The interview is built up by first addressing the current solutions to understand how the participants are interacting with them and how often. All of the participants answered that they use Skatteetaten, and some had also used Altinn and Nav when they needed to. They had all opted out of using services they did not absolutely have to use, such as Digipost and Helsenorge. One participant said they like to pretend the digital versions does not exist, while another participant disclosed that did not usually explore new things online. On the question of how they usually use the services, the answers were that they used them when they got a notice that something needed to be filled out and sometimes to search for information. Frequency of use varied between the participants from the least frequent being 6-8 times a year to the most frequent which was use on a monthly basis. Next the participants were asked how the frequency of their use affected how they use the services. One participant answered that it was an unnatural source of information for them, and they only used it if they got a notification either through mail or on the phone that they had to use the services to check or make changes. Another participant answered that they struggled to remember how to log in when it's long in between uses. One participant discussed that it made it hard to navigate and it feels like they have to start from scratch every time they used one of the services. All participants said they believe it would become easier if the services were used frequently, one describing it as a vicious circle where one does not use it because it is difficult, but it is difficult to use because they avoid using it.

Next, the users were asked what they find positive and works well with the current solutions. The availability, the possibility to use it whenever and wherever you are, offered

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by these services was mentioned by several participants, as well as the access to large amounts of information. One participant mentioned that it was an advantage to not have to deal with sheets of paper as well as not having to travel to the post office or pay for postage.

Another question then asked if there were anything in particular that made it difficult to use the public digital services and if they had any thoughts on how to improve this as a follow-up question. One of the participants explained how some words and concepts were hard to understand in some forms, and had to ask for help to be able to fill them in. They suggested a solution where each section in the forms could have easily available supplementary explanations. Some of the participant discussed how it is a challenge to navigate and figure out where to go or know where to find the information they are seeking, frequently struggling to distinguish between who has what information of Altinn and Skatteetaten as they both are such vast sited with huge amounts of information available. In addition to this, one of the participants pointed out that they struggle with the search-function as it can tend to be too specific. A proposed solution was to be offered practical training on how to use the services. It was also mentioned that it feels generalized and impersonal, and occasionally having to fill in information that is not necessarily relevant to the situation.

Building off of the previous question, the participants were asked what their biggest challenges are when using the services and whether there are any measures they have thought of to make it easier. Aside from technical problems such as too many visitors on the website at the same time or a lack of internet connection when needed, a repeating discussion was that it was challenging to navigate and remember what to do when using the services where the participants placed blame on themselves because they do not use it often enough and believe it would be easier if they used it more frequently.

On the question of what the participants found to be advantageous with using BankID to log into the public digital services, replies were that it is easy and a great benefit to be able to use the same log in information for all the sites and not having to remember several different passwords. Participants felt it contributes to lowering the threshold for trying new services as it is safe and familiar. Only one of the participants felt a dislike against using it for anything other than the online bank, but still felt it is a secure solution. While there are other services one can use to log in with, such as MinID, all participants preferred using BankID as they all were familiar with it from using it in their online banks.

The participants were then asked what disadvantages there were with using BankID. One of the participants was not able to identify any disadvantages, while the rest expressed that is was vulnerable in a way that there is a lot of personal information available if it wound up in the wrong hands.

Following that, participants were asked what their thoughts are on how these websites are designed and if they are easy to tell apart. None of the participants have any trouble telling the sites apart and find it easy to see what site they are on, though what sets the sites apart from each other was more difficult to pinpoint.

There was then the question of the language used, and all participants find it to be understandable and no more difficult than what they used to receive on paper previously.

The next question was whether the use of one particular public digital service more than others made it any easier to use the other public digital services. While the majority of the participants feel that it has no impact neither positive or negative, a couple pointed out that while it does not make it easier to navigate other sites, the fact that one is comfortable with one site makes the hill a little less steep to climb, gaining courage to try something new. One of the participants said they believe it has transfer value from one digital space to another.

Nearing the end, the next question asked was what their thoughts were on implementing standardizations and guidelines on public digital services. All the participants answered that they believe this would be an advantage that would simplify the use, making it easier to operate different pages after using one of them. Some had concerns that the sites could become too similar, making it difficult to tell them apart, expressing the importance of keeping the individuality of the different sites. Two of the participants unprompted suggested a solution that gathers the log in for all public digital services in one where the different services are displayed for example as logos for easy access.

4.2 Expert interview

The expert interview was conducted with a participant that uses public digital services on a daily basis through work, as well as being an active user at home. The participant was asked the same questions as the intermediate users to be able to determine if there are noticeable differences or similarities in pain-points and what they find positive with the current solutions. The participant regularly uses the services Skatteetaten, Altinn, Brønnøysundregistrene and occasionally Helsenorge and Nav, mostly to receive and search

for information and announcements. They find the log in process to be effortless and most of the services to be quite straightforward to navigate, but emphasizes that there is a notable difference in ease of use depending on how familiar they are with the service, finding it more difficult and time-consuming when navigating services that they don't use as frequently as others. Their biggest obstacle is that often unforeseen amounts of time is spent simply trying to search for information, feeling that they do not always know where to search and struggling with the search-engines being too specific with the search-words or showing a large assortment of non-relevant results. They find labels and navigation to mostly be logical, but have experienced that it is does not always lead to where they expected they would, though this has become more improved in recent times.

On the subject of standardization they stated that it would be an advantage to always know where certain items are placed, such as never having to wonder where to find the log out-button or the menu. When asked about potential concerns with standardization they mostly expressed sympathy for the designers that would have the task to sort and label all the information.

4.3 Affinity diagram

A total of 273 post-its were placed on the wall to create an affinity diagram that were then grouped together with similar findings and concepts to identify themes. This process originally created 8 categories that remained unlabeled, including a "various" category. The categories were again analyzed and by combining similar categories and re-analyzing the labels placed in the "various"-category resulted in finding suitable placements for them in existing categories with similar goals. In the end, the number of groups were finally reduced to 5 labeled main categories with subcategories. The main categories were Challenges in current solutions, Practical in current solutions, Expectations of standardization, Concerns regarding standardizations and Proposed solutions. To indicate repeating statements that were identical or similar to each other, parentheses containing the number of times a statement was made will be placed behind each statement.

Figure 2: *Affinity diagram*

Challenges in current solutions:

Technical issues

- Problems due to too many using the service at the same time (I)
- Cannot access if there are issues with the internet (I)
- Attachments difficult if one does not have the right equipment to transfer documents to computer (I)
- Cannot access the services if you do not have your BankID available (I)

Starting process

- Gives up when meeting difficulties (II)
- High threshold for feeling the need to create an account and use a service (II)
- Opts out of using services that are not absolutely necessary (IV)
- Do not explore new things online (I)
- Dreads using new services (I)

Stressors

- Everything happens so fast (II)
- Not enough time to think (I)
- Easier to make mistakes digitally (II)
- Not easy to understand all words and terms (III)
- Too generalized (I)
- Fear of not being accurate and of being misinterpreted (I)
- One answer may affect another in an negative way (I)
- Fear of forms (I)
- Difficult forms (I)
- Substantial amounts of text (I)
- Expectations from others that it is easy when it's not (I)

Navigation

- Hard to find what you are looking for (IV)
- Time consuming (III)
- Do not know where to begin (I)
- Too much information makes it hard to navigate (I)
- Cannot remember where something is located and must begin from scratch each time a service is used (III)
- Can sometimes be directed from one service to another (I)
- Do not always know which service that has what information (II)
- Can happen that you click on something and end up in a completely different place than expected (not logical) (II)
- Sometimes hard to find simple tasks such as log out (I)
- Many steps (I)
- Hard to find the right search-term (II)
- Cumbersome (I)
- Time consuming (III)

Use

- Takes longer time to navigate services which is not used as often (I)

- Not easier to navigate other pages by using one of them (II)
- Finally learn something and then it is replaced or changed (II)
- No time to learn (I)
- Not a natural source of information (I)
- Prefer paper forms and letters (III)
- Would probably be easier if used more often (VI)
- Does not replace human contact (III)

Help
- Needs to be offered more practical training (III)
- Must ask for help when using the services (II)
- Takes too long to fix mistakes when asking for help (I)
- Not possible to physically show the problem or receive visual explanations when receiving help over phone (I)

BankID
- A lot of information available if it comes into the wrong hands (V)
- Dependent on bringing the code chip in case you need to access any of the services (I)

Practical in current solutions

Navigation
- Can use logic to understand where something leads when clicking on it (III)
- Straightforward (II)
- Easier and more comfortable when you get to know the services (II)
- Search for information (III)
- Easy to navigate (I)

Clarity
- Easy to understand the language used (V)
- Clear visual difference between services (VI)
- Always aware which service you are on (III)

- Letters from public services easy to understand (I)

Ease of use
- Plenty of information available (IV)
- Can do a lot by yourself (III)
- Always available (III)
- Log in process simplified with BankID (VI)
- No problem to access the services (II)
- Can access on the smartphone (I)
- No need to leave the house (II)
- Sense of achievement when mastering (II)
- No charges (I)
- No need for paper (I)

BankID
- Feeling of security (IV)
- Easy to use (IV)
- Can be used on all services (VI)
- Can be used on smartphone (II)
- Personal signature/authentication (I)

Expectations of standardization
- Less daunting to try new services when acquainted with other services (I)
- Easier to find what you are searching for (III)
- Would be a benefit (VI)
- Clear they are public services and sets them apart from non-public websites (I)
- Transfer value from one service to another (III)
- Easier to navigate (III)
- Easy to recognize and locate objects (II)
- Easier to get help (II)
- Clearly indicate where to enter information (I)

Concerns regarding standardizations

- Could be harder to distinguish between services if too similar (III)
- Design and language of great importance (I)
- Distinctly enough what the services specialty is (I)
- Security (I)
- Complex to display information (II)

Proposed solutions

- One standard for personal use and one for professional use (I)
- Collect related themes in one place (I)
- Common platform presenting all services (II)
- Easier hits on search-words (II)
- Guidelines/help when filling in forms easily available (III)
- Receive templates by e-mail (I)

Recurring themes in the interviews emerged during the affinity diagramming. On the negative side of the services it often came back to the user and the amount they use the services. The participants talked about how they believe it would be much easier for them to use the public services if only they used them more, and often put blame on themselves for not doing so. Several of the users chooses to not use the services that are not absolutely necessary, ignoring letters that encourages to use digital mail-services and preferring to call their doctors office to schedule an appointment or inquire about prescriptions instead of using Helsenorge because they do not want to branch out to and explore additional unknown systems. One participant stated that they become provoked by everything needing to be digital, and will always prefer to hear human voices, even though the digital solutions functions well as an emergency measure when this is not possible.

Several participants felt they cannot get comfortable and take their time while using digital services, but when asked if a session had ever timed-out while they used it, they answered that that had never occurred. Particularly in forms or applications, some terms and words can be challenging to understand, and participants expressed wishes for more readily available help to interpret the questions. Regarding navigation, while it is presented

by the participants as mostly fine, most of them have experienced that it could be a time-consuming experience to find what they need, including the expert user who stated that they spend larger amounts of time when navigating sites they don't use as often. It was also mentioned by two of the participants that it feels like starting from scratch every time they are using a public service because they don't remember what to do or where to go. Another issue pointed out by both the expert and one intermediate user was that the search function can occasionally be somewhat inadequate and hard to use, sometimes showing too many results where some of it may be irrelevant, or experienced that they have to phrase something in a certain way to get the correct results.

Recurring positive aspects of the current solution is that they are very easy to distinguish from one another and have never experienced any confusion in knowing which site they are on. The language used is clear, and in most cases the labels lead exactly where expected. The use of BankID is a positive experience for the participants, and they find it effortless to use as well as a source of relief to not have to remember so many different usernames and passwords.

On the subject of standardization, the most mentioned concern was that the services would become too similar looking and difficult to tell apart at a glance. All participants, including the expert, answered that they believe it would be a benefit to standardize the services, some pointing out that this would add transfer value, making it more familiar and easier to use the services when having used one of them.

4.4 Creating guidelines and explanations

To ensure that the usability and the users interactions with the services remains in focus during the process of introducing standardizations, the designer(s) should have set guidelines to adhere to. Based on the guidelines and heuristics listed in table 1 as well as insight gathered from the interviews, a broad list of guidelines was created. Using the same method as earlier in the study, affinity diagramming, a total of 71 guidelines were listed on post its and placed on the wall to help visualize and combine into categories.

Figure 3: *Affinity diagram for guidelines*

This initially created 16 categories that remained unlabeled. Following this, the method of «the five whys» were conducted to ensure the focus of the guidelines were still maintained on the users (Gray, Brown and Macanufo, 2010).

  Why is it important to standardize?
-   To reduce the need to learn and remember how to use multiple systems.
    Why?
-   To make it easier for the users to learn how to navigate the public digital services.
    Why?

- So that they can become more comfortable using the services and thus less dependent on needing help.
  Why?
- Because more and more services are moved into the digital realm
  Why?
- So that the users are not left behind or possibly taken advantage of by not being able to manage their own contact with the government.

Based on the themes found and methods conducted, the guidelines were again analyzed and combined into similar categories, trimming them down and finally resulting in 10 categories that were then given labels: *Context, Error prevention, Cognitive load, Consistency, User experience, Clarity, Feedback, Documentation and help, Minimalist design and Flexibility.*

- Context
  The user should always know where they are on a site and how they got there. The current location should always be highlighted in the navigation, as well as using breadcrumbs to show the user how they arrived at said location. If there is a process involving several steps, the user should always be aware of how many steps there are and which step they are currently on. Titles should always be clear and purposeful.
- Error prevention
  Errors should be prevented to the extent it is possible, and when an error does occur it should be given well designed error messages containing information on how the users can diagnose and recover from the error and provide easy access to help or technical support.
- Cognitive load
  Meeting something familiar that one recognizes is a much less time-consuming process than remembering how to use or navigate a website and minimizes the memory load for the user. Objects, actions and options should always be visible so the user is aware at all times what actions is possible rather than rely on memory to figure out if an action is a possibility or not. If instructions are necessary they

should be easy to retrieve. This reduces the amount of attention the user needs to devote to accomplish their task.

- Consistency

  The more predictable something is, the easier it is to learn the functions and how to use it. Consistency allows for creating a habit. There should therefore be consistent use of styles, object placement, vocabulary and sequences of actions. The terminology must fit the task and there should never be used different terminology for the same concept, or the same terminology for different concepts. Objects should always be placed the same so the user never have to wonder where to find it.

- User experience

  The user should be left with a feeling of being respected and have a good user experience after interacting with the service. Goals should be easy to achieve, and the design should be easy to navigate and not disturbing to the user. User experience should always be at the center when designing, as it is the users we are designing for.

- Clarity

  The system should be as clear as possible for the intended users. This includes using language they can understand, meaningful icons (preferably with accompanying text) and labels who do not need interpretations or guesswork.

- Feedback

  Feedback can come in many forms, for example as a progress bar showing that the system is working to complete the task, or a confirmation message indicating that an action has been registered or to give closure when a task has successfully been accomplished, or if it failed to go through. The users should always be informed of the system status and what is going on.

- Documentation and help

  Ideally websites should be easy enough to use without needing documentation, but it may in some cases be necessary to provide extra help. This help and documentations should be easy to find or search for and should list concrete steps that the user can carry out without being too large.

- Minimalist design

  There should not be displayed information that is not relevant to the user as it creates distractions and takes attention away from the important information. Everything displayed should serve a purpose. Use of color can be practical to indicate differences in information, but should not be used in excess.

- Flexibility

  A service should be able to cater to both experienced and novice users. Methods to accomplish this can be to have several ways to reach the same goal and allowing the users to tailor it to their specific needs, such as saving frequent actions or preferences to improve efficiency.

4.5 Suggested standardizations

A suggestion for standardization of the public digital services was created while keeping these guidelines in focus. These suggestions are created with the focal point being on personal use. As will become apparent, the guidelines become intertwined with each other and work together to form a cohesive solution.

Keeping *context* in mind, the current location of the user on the webpage could be emphasized by using bold and underlined text. Most of the public digital services uses breadcrumbs today except for Digipost and Samordna Opptak. All the services have placed them horizontally beneath the header of the page. This should be continued, as this placement is where it is expected to be found when in use (Nielsen, 2004). It could be implemented to the sites that are not currently using them, as it provides an understanding of their location in relation to the rest of the site, as well as give information about the current site. Particularly with sites where the menu is too big to be displayed at all times it is important to use breadcrumbs to help the user orient themselves. In processes spanning over several pages, such as when filling out forms and applications, it could always be displayed how many pages the user will have to go through, and which page they currently are on. This could be placed under the title of the page/form/application, so it is easy to locate, as well as on the bottom so it is visible when they are ready to proceed to the next step/page.

To *prevent errors*, the services should be designed in a way that does not allow for serious errors to happen, and if an action results in dire consequences for the user, it should be not

only possible but easy to undo. For example forms could be designed where it is easy to navigate back and do changes, if you in the overview after filling out a form see that you have answered wrong you could simply be able to click on said answer to change it.

When an error does occur, which most likely it will sooner or later no matter how well a site is designed, the proper *feedback* is immensely important and must explain what went wrong and how to fix it, such as a linked form having been removed, the error message should contain information on which forms have replaced them or other reasons the form is no longer available. There is nothing more unhelpful than getting the message «oops, something went wrong».

Designing for *consistency* across the services is a way to reduce the *cognitive load* and letting users rely more on recognition. Taking this into account, some principles will be designed upon the basis of what is most frequently used and therefore "expected" by the users. There are simple ways to ensure consistency, such as always placing objects in the same location. Elements that will be included and should always be visible on the services in the suggested standardization is logo, menu, log in/log out-button, breadcrumbs, search-field, help/contact, profile, language-and font size options.

The logo should be placed in the upper left corner, as this is most frequently used across websites and will therefore often be expected by users to be in that location (Nielsen, 2004). The sites search box could always be present, both on the front page and on all sub-pages so the users do not have to return to the front page in order to use it. There are no standard or conventions on where to place the search-box, and it varies on the public services in question as well, but most commonly used on the relevant sites is in the top right corner. The search box could therefore always be placed in the top right corner to keep as much familiarity as possible. When searching for a term, the term could always be displayed together with the results, as we humans often have a very small capacity for short-term memory and will often forget what we searched for (Johnson, 2014). The main navigation scheme is often a source of confusion as it is not any set way that is more common than others. The public digital services vary in both the placement and layout of main navigation, sites with few menu items often display all the options while those with a lot of options usually hide them behind a menu-icon that drops down. I in this case, a rigid standardization would not be beneficial as the sites with a large amount of menu options would be highly confusing if it all were to be displayed prominently at every moment, as

well as hiding them on the sites that have very few options would be meaningless and create extra work for the user. It is therefore recommended that the option to do it both ways is available. However: the menu could always be placed in the same spot, and when being represented by an icon it could always be accompanied by explanatory text, as an icon alone might not always be self-explanatory, particularly to those with little internet/digital experience. This goes for all icons used across the services.

Consistent use of color is important as well, but presents another issue; not making the services *too* similar so they may be confused with each other, but rather ensuring that they retain their individuality. The recommended approach would be to stick to existing color-schemes the services is currently using, as it is a recognizable and individualizing feature that provides easy visual ques to let users know which service they are currently using. Still, elements of standardizations can be implemented here as well, such as using the sites colors in the same way. This includes changing the color of visited links to a dark blue/purple color to indicate that a link has been clicked on, and keeping this color consistent across the services. In addition, the colors could be implemented in the same way: in the navigation the sites main color can be used to underline text, and the secondary color to differentiate between links and regular text.

To maintain *clarity,* it is important to not only use language the users can understand, but also make certain that labels created are meaningful and clearly indicates what will happen or where it will lead when clicked on. All public digital services have information on their websites on how to contact them, often called "contact" or "help" that refers to a page with both frequently asked questions and contact information. While the reasoning behind this is quite understandable, it is not clear that you will be directed to frequently asked questions when clicking on "contact". This section on the websites could therefore be labeled "help and contact" to emphasize to users what to expect when clicking on it. The title of a page could always conform with the title of the navigational options that brings the users to said page.

It is important to not only provide but also make easily available *documentation and help.* This is why the "help and contact" could be placed on the top of the sites as well as in the footer which is where many websites chooses to place it. If the purpose of visiting the service is to contact support to ask for help, scrolling all the way to the bottom of the page is not necessarily the most logical action. Forms with questions or terms could have further

explanations within reach, never forcing the user to leave the page to search for further clarification. Lånekassen uses a colored link called "help" next to the statement in question, where users can click if they have need for elaboration, but when the service-provider is already aware that users might need help understanding the question, it is unnecessary to hide it. A colored link may create confusion of whether the user will be directed away from a half-filled form and lose their progress or not. The elaborations could rather be visible at all times, written directly beneath the associated question.

A *minimalist design* does not mean that it cannot be visually pleasing but rather that all design elements should serve a purpose. This again can be seen in the use of color: all the services could have white backgrounds for bodies of text, while the text itself could be black. Links can be emphasized by using color from the services existing individual color-schemes.

To make the services *flexible*, the options for changing the language or font size could be clearly visible on the front page, and they could remember the choices made for next time the user visits the site and apply across the services, as it is unlikely that they suddenly change their language preference or gain improved vision between visits. One should however not assume that this cannot happen, thus these options must be easy to change at any time.

Together these standardizations create consistent platforms with a good user experience in focus, where the users are able to navigate easily without relying too much on memory. It could be more convenient for those who do not use these services often without taking away from the functionality that the expert users rely on. Following this, three simple visualizations of how the services could look when using these standardizations will be shown. Figure 4 shows how a template for how the standardizations mentioned could look.
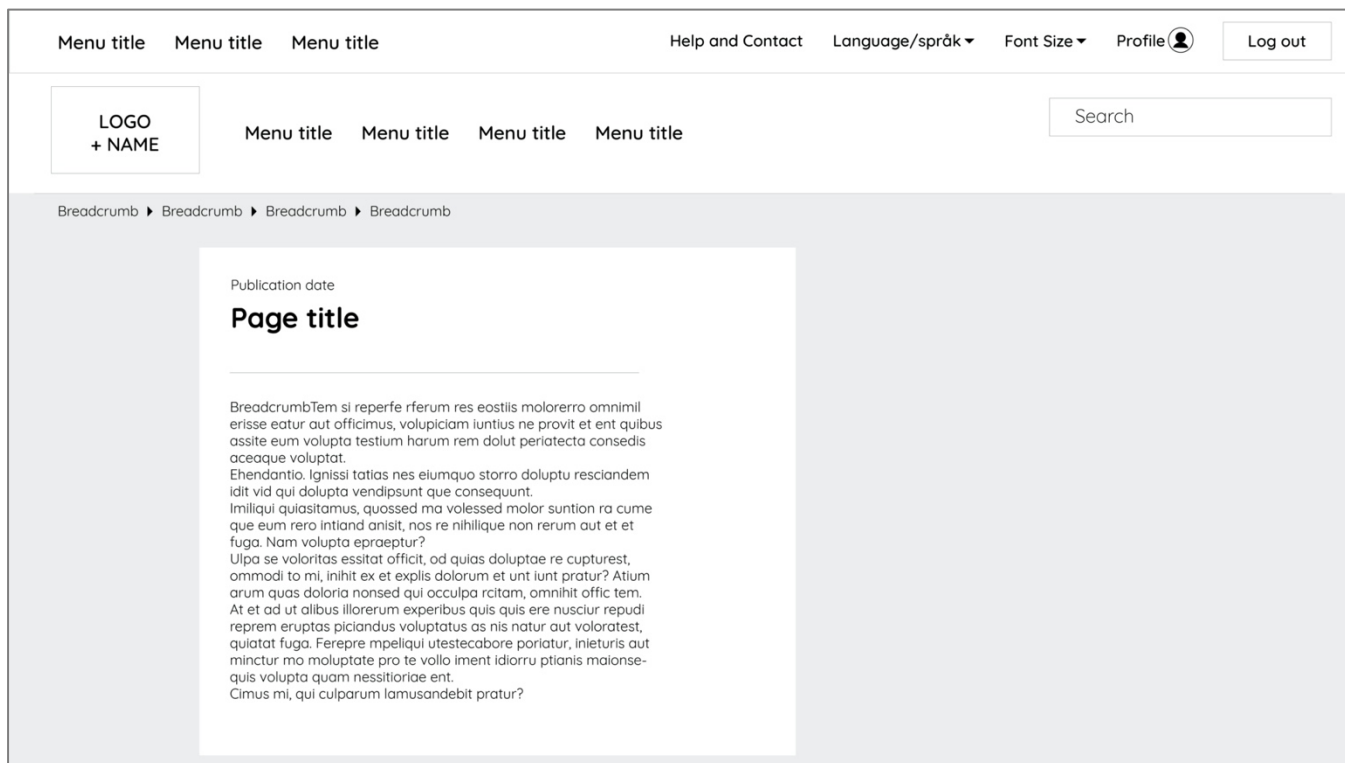
Figure 4: *template for how the standardizations could look*

Figures 5 and 6 show how two different services, Nav and Skatteetaten, where Skatteetaten uses a horizontal menu displaying all navigational options while Nav has the menu hidden behind the "menu-button" can be designed with the suggested standardizations.
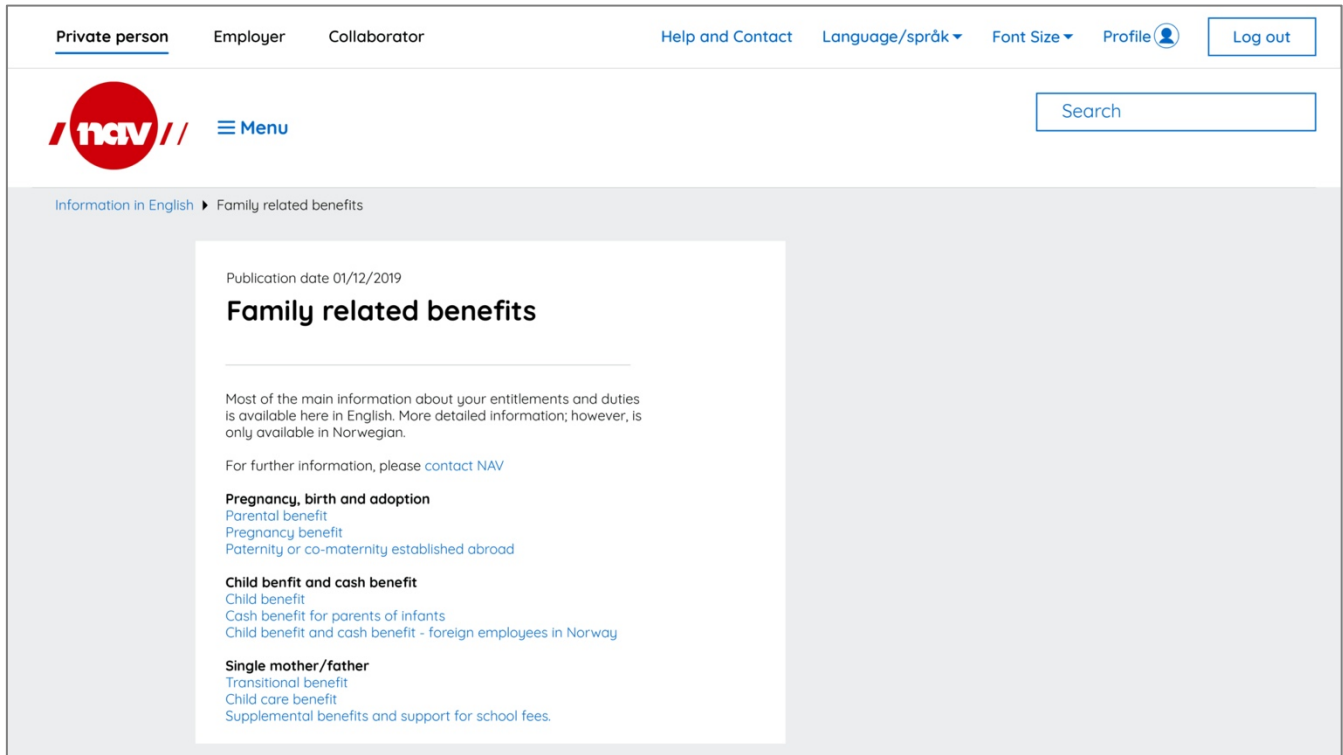
Figure 6: *Visualization of how Nav can be designed with the suggested standardizations*
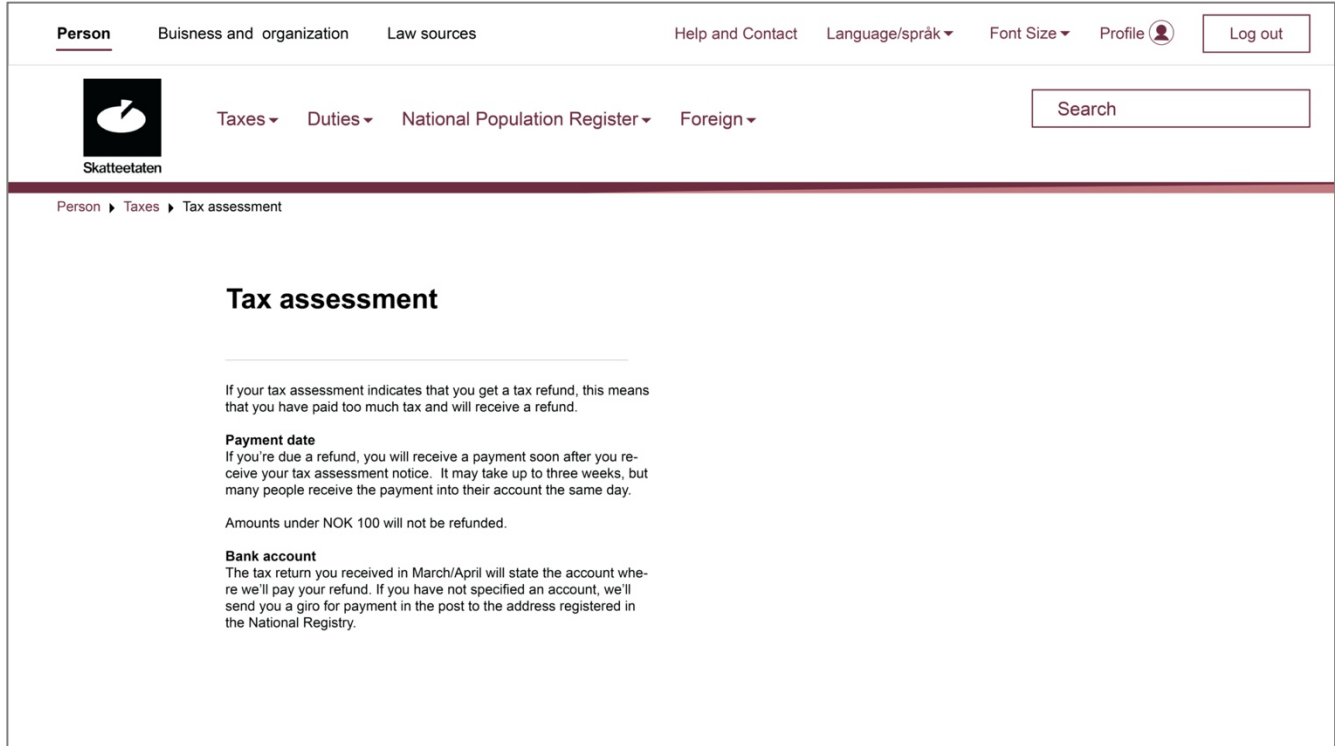
Figure 5: *Visualization of how Skatteetaten can be designed with the suggested standardizations*

A common platform solution is to make a page where all the public services is presented and easy to find, based on suggestions that emerged during the interviews. To reduce the issue of not knowing where to begin or what page to go on when intending to search for something specific, the search field on this page could allow for searches across the different services. This solution will not eliminate the direct path to the services, and it will still be possible to go directly to the desired service using the current URL, as it should not make it more complicated or make those who know exactly where to go have to go through obstacles to reach it. Particularly if using this solution, it is an advantage to keep the color schemes in current solutions as is, so the users may see at a glance and be reassured they are on the service they intended.

Searches could clearly show which service the individual results refer to and be sorted by relevance, as it seems the sites are mostly doing already. It could also be possible to filter the search by for example "forms", "private person" and "business" to easier find relevant results as it could potentially be displayed great amounts of results, depending on the search-term. This platform should conform with the other services and be built on the same standardizations and placement of objects. To add flexibility and possibilities for customization it should be possible to hide services the users deems to not be needed while being easy to add back again in case of need. This, as well as choices made for language and font sizes could be remembered for the next use and applied to all services. Figure 7 shows a visualization of how this platform could look.
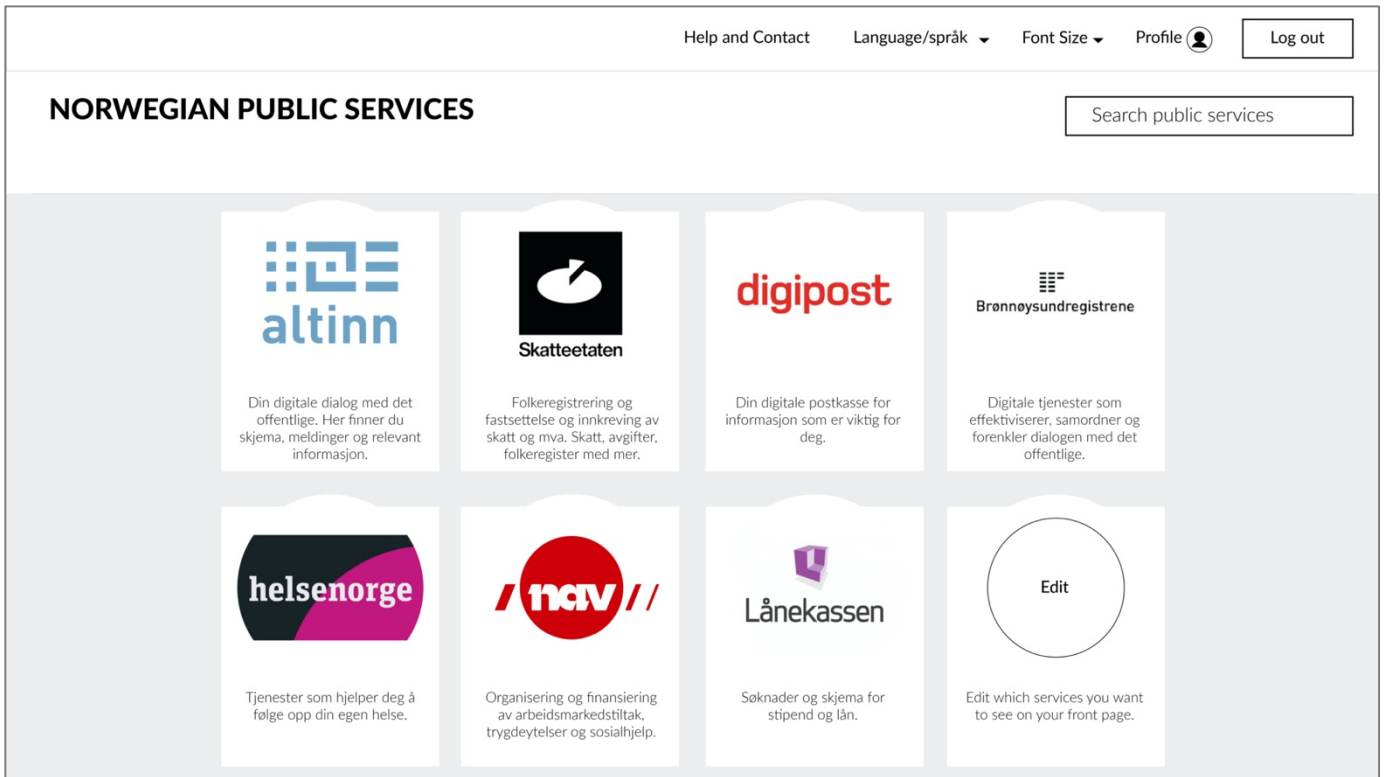
Figure 7: *Suggestion for a solution for a common platform*

5.0 Discussion

5.1 Limitations

As most studies, this has some limitations. Firstly there is the time-constraints that limits the amount that is possible to research in order to do it as thoroughly as it deserves.

The interviews were all conducted in Norwegian to accommodate the participants as they all have Norwegian as their first language. While this is something that strengthens the study by not having a potential language barrier that opens up for confusion or misinterpretation of what the question really means, it allows for a potential weakness by risking that some statements may be inadequately translated later.

There is always a possibility that bias is introduced to the research, where participants give answers they believe the researcher wishes to hear rather than what they actually believe (Baxter, Courage and Caine, 2015). The study also has a rather small sample size with five interviews of intermediate users and one interview with an expert user. Additionally, it turned out to be a quite small age range with all participants within the ages of 50 and 63 as well as all being of rather similar educational levels. This means the data collected is not enough to be able to properly generalize to the population of the target group.

The developed guidelines and suggested standardizations need further in-depth testing and iterations. All interviews, translations, methods, guideline creation and suggested standardizations were done by one person. Particularly affinity mapping and «the five whys»-method are often recommended to be done in teams to provide several points of views. There is therefore no guarantee that the same results would be found if the study were to be conducted again by another researcher.

5.2 Interviews

One of the research questions in this thesis was «How can standardization simplify the user experience?» The focus on BankID in the interviews was to be able to gain valuable insight on how something that is already standardized in the public digital services are being perceived and received by the users. Results show that even though BankID has a more complicated three-step log in process compared to most other websites which typically relies on a username and password, the participants have found it to be very beneficial because it is standardized; it has become automatic and they instantly recognize and know

how to use it, the lack of needing to rely on memory to remember multiple usernames and passwords and where they belong has greatly simplified the process of accessing the public digital services. Even when they have never logged in to a particular service before, they know exactly how to do it. This confirms the theory that users prefer familiar paths, functioning faster and more effortlessly when relying on recognition rather than recall (Johnson, 2014).

All participants except for the expert revealed that they actively chose to ignore encouragements from the government to use services that they do not absolutely need to use, which corelates to the statement saying adults often would like to choose for themselves what to learn or not (Thoms, 2001), as well as it becoming a negative spiral where a negative attitude towards the services results in less use, again enforcing the negativity because they are faced with difficulties when the need to operate the services presents itself (van Deursen and van Dijk, 2019). Differences and similarities between the expert and intermediate users were uncovered: Expert find it to not be difficult but more time consuming to use services they are not that used to, but still manages without large difficulties, relying on the fact that they are used to the digital realm and therefore has a high general digital capacity, making them capable to understand how to do or find what they need. Intermediate users do on the other hand generally do not find that using and becoming comfortable with one service helps in any particular way on using the other services. The expert participant was more aware that faults lie with the service itself while intermediate users tend to blame themselves and assume it is their own fault for not understanding or doing it right, creating a circle where less use makes it difficult, and it is difficult because it is used so rarely.

Interestingly, all participants coincidentally have some form of higher education. This is not what is considered the typical or expected target group, as it is often emphasized that those who struggle are older or have lower education, preferably a combination of the two (Bonfadelli, 2002) (Hargittai, Piper and Morris, 2019). Participants of this study ranged in age from 50 to 63 years old, placing them below or in the lower end of what is considered to be older adults, which is often defines as 60 years of age or above. Combined with their educational levels, these participants should theoretically be more tech-savvy then they are.

The participants of this study were exclusively chosen on the fact that they are adults that struggle using the public digital services to some extent, and did not aim to compare

differences based on age and educational levels. Being aware of the fact that the studies used in the research are conducted in other countries raises the question of this being a Norwegian phenomenon or if it is purely coincidental.

A repeated study on a younger generation in a few years would be interesting to do in order to be able to compare whether they are faced with the same challenges as described in this study. It could also be exiting to do a study seeking to uncover if there are any noticeable difference within the age range that has larger variations in degrees of education.

5.3 Proposed guidelines and standardization

As previously discussed, the purpose of the created guidelines is to provide a guide to be used when designing for standardization of public digital services. There are numerous guidelines and hierarchies created for a multitude of uses, such as Nielsen's 10 usability heuristics for user interface design (1994) and Budd's heuristics for modern web application development (2007), but none directed specifically towards the purpose of standardizing. These guidelines seek to answer the research question «how should it be standardized?». As these guidelines have been designed with public digital services in focus, they may therefore as a whole not necessarily be suitable for other user cases.

In order to limit the study into a feasible size, it firstly sought to understand whether standardization would be a helpful implementation towards creating more user-friendly services. When this was confirmed, the next step was to through interviews answer the research question «What is most important to standardize?» This was pinpointed to be consistency regarding object and label placements and their names, in order to improve the ease of navigation.

There is much more regarding the public digital services than what have been suggested in this study that can and should be standardized. One example is search engines on the individual sites as well as on the suggested common platform to provide easier search experiences. This study has not considered the different structures and hierarchies used to build the sites, which plays a large part in how users are able to understand and navigate the services.

6.0 Conclusion

All participants seemed very positive to the idea of standardizations across services, though it cannot be completely excluded that this may be a result of the participants being informed beforehand that this was the objective of the study. There was however no way to get around providing this information beforehand while also keeping in line with the ethical considerations of informed participation. Nonetheless, considering they all made contributions regarding concerns, expectations and suggestions to standardized solutions, it should be possible to say they were able to form their own opinions about the subject, at least to a certain extent. The participants in this study strongly believe standardization would, if not solve the problem, at least make it somewhat easier. It is unlikely that the pattern of use would change considerably for the target group any time soon, as the underlying issues of not *wanting* to use them will not be solved by standardizing. It is therefore important to design the services on the assumption that they will be used rarely, highlighting the importance of making the services as recognizable as possible to shift the load away from recall over to recognition. Benefits of using standardizations instead of implementing «simplified» solutions or similar, is that it does not take away functionalities or create unnecessary obstacles for those who do *not* struggle to use the current solutions, but rather making it a smoother and more efficient experience for them as well. It is not believed that the standardization of public digital services would solve all problems, but it is a step in the right direction towards a more inclusive digital society.

6.1 Future work

This report focused on personal use, and future research would benefit from investigating how to, if necessary, make adjustments to accommodate professional use as well.

The developed guidelines and suggested standardizations need further in-depth testing and iterations to determine if there are any faults or possible improvements that needs to be addressed before it could be used by the public digital services.

Particularly the search-monitors would need more research to determine how it is most beneficial to display the results and what filter-functions would be most valuable for the users in order for them to be able to take full advantage of it.

This study focuses on a very narrow aspect of the public digital services, mostly on finding the most important aspects to standardize and make specific suggestions on how to do so. There is however a lot more to these sites that needs to be dug deeper into, such as ensuring all identical or very similar terms are consistent in being labeled the same way across the services, creating hierarchies that follow the same user centered approach etc.

Concerning the target group itself, it would as mentioned in the discussion be interesting to do further studies on whether there are noticeable differences, specifically within the Norwegian population, in abilities to use these services based upon age and educational levels in adult users.

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Appendix

NSD-approval

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD sin vurdering

Prosjekttittel

Retningslinjer for standarisering av offentlige digitale tjenester

Referansenummer

591944

Registrert

02.03.2020 av Julie Rebecca Nordby - juliern@stud.ntnu.no

Behandlingsansvarlig institusjon

Norges teknisk-naturvitenskapelige universitet NTNU / Fakultet for arkitektur og design (AD) / Institutt for design

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Frode Volden, frodv@ntnu.no, tlf: 93227262

Type prosjekt

Studentprosjekt, masterstudium

Kontaktinformasjon, student

Julie Rebecca Nordby, juliern@stud.ntnu.no, tlf: 46815315

Prosjektperiode

06.01.2020 - 16.06.2020

Status

02.06.2020 - Vurdert

Vurdering (2)

02.06.2020 - Vurdert

NSD har vurdert endringen registrert 02.06.2020.

Vi har nå registrert 16.06.2020 som ny sluttdato for forskningsperioden.

I tilfelle det skulle bli aktuelt med ytterligere utvidelse av den opprinnelige sluttdato (02.06.2020), må vi vurdere hvorvidt det skal gis ny informasjon til utvalget).

NSD vil følge opp ved ny planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til videre med prosjektet!

Kontaktperson hos NSD: Mirza Hodzic
Tlf. Personverntjenester: 55 58 21 17 (tast 1)

03.03.2020 - Vurdert

Det er vår vurdering at behandlingen av personopplysninger i prosjektet vil være i samsvar med personvernlovgivningen så fremt den gjennomføres i tråd med det som er dokumentert i meldeskjemaet med vedlegg den 03.03.2020, samt i meldingsdialogen mellom innmelder og NSD. Behandlingen kan starte.

MELD VESENTLIGE ENDRINGER
Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til NSD ved å oppdatere meldeskjemaet. Før du melder inn en endring, oppfordrer vi deg til å lese om hvilke type endringer det er nødvendig å melde:

https://nsd.no/personvernombud/meld_prosjekt/meld_endringer.html

Du må vente på svar fra NSD før endringen gjennomføres.

TYPE OPPLYSNINGER OG VARIGHET
Prosjektet vil behandle alminnelige kategorier av personopplysninger frem til 02.06.2020.

LOVLIG GRUNNLAG
Prosjektet vil innhente samtykke fra de registrerte til behandlingen av personopplysninger. Vår vurdering er at prosjektet legger opp til et samtykke i samsvar med kravene i art. 4 og 7, ved at det er en frivillig, spesifikk, informert og utvetydig bekreftelse som kan dokumenteres, og som den registrerte kan trekke tilbake. Lovlig grunnlag for behandlingen vil dermed være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 bokstav a.

PERSONVERNPRINSIPPER
NSD vurderer at den planlagte behandlingen av personopplysninger vil følge prinsippene i personvernforordningen om:

- lovlighet, rettferdighet og åpenhet (art. 5.1 a), ved at de registrerte får tilfredsstillende informasjon om og samtykker til behandlingen
- formålsbegrensning (art. 5.1 b), ved at personopplysninger samles inn for spesifikke, uttrykkelig angitte og berettigede formål, og ikke behandles til nye, uforenlige formål
- dataminimering (art. 5.1 c), ved at det kun behandles opplysninger som er adekvate, relevante og nødvendige for formålet med prosjektet
- lagringsbegrensning (art. 5.1 e), ved at personopplysningene ikke lagres lengre enn nødvendig for å oppfylle formålet

DE REGISTRERTES RETTIGHETER
Så lenge de registrerte kan identifiseres i datamaterialet vil de ha følgende rettigheter: åpenhet (art. 12), informasjon (art. 13), innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18), underretning (art. 19), dataportabilitet (art. 20).

NSD vurderer at informasjonen om behandlingen som de registrerte vil motta oppfyller lovens krav til form og innhold, jf. art. 12.1 og art. 13.

Vi minner om at hvis en registrert tar kontakt om sine rettigheter, har behandlingsansvarlig institusjon plikt til å svare innen en måned.

FØLG DIN INSTITUSJONS RETNINGSLINJER
NSD legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

For å forsikre dere om at kravene oppfylles, må dere følge interne retningslinjer og/eller rådføre dere med behandlingsansvarlig institusjon.

OPPFØLGING AV PROSJEKTET
NSD vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Lykke til med prosjektet!

Tlf. Personverntjenester: 55 58 21 17 (tast 1)

Vil du delta i forskningsprosjektet

"Retningslinjer for standardisering av offentlige digitale tjenester"?

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å sette opp et ideal for offentlige digitale tjenester som vil forenkle bruken. I dette skrivet gir jeg deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål

Formålet med dette prosjektet er å sammen med brukere komme frem til retningslinjer for design og informasjonsarkitektur på offentlige digitale tjenester. Dette skal skape en sammenheng mellom alle offentlige plattformer slik at brukeren vil kunne kjenne seg igjen uansett hvilken tjeneste de benytter. Det endelige målet vil være å kunne tilby et gjennomgående oppsett på de digitale tjenestene som brukerne kjenner igjen, som vil skape trygghet og forenkle prosessen da man slipper å lære seg flere forskjellige systemer. På denne måten skal vi kunne inkludere de som i dag har lav digital kompetanse og sliter med å bruke offentlige digitale tjenester på egenhånd.

Dette prosjektet er en del av min masteroppgave i interaksjonsdesign gjennom NTNU i Gjøvik.

Hvem er ansvarlig for forskningsprosjektet?

NTNU i Gjøvik, institutt for design er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Du blir bedt om å delta fordi jeg ønsker å komme i kontakt med mennesker som har tilgang til å bruke offentlige digitale tjenester (tilgang til data/nettbrett/mobil o.l og internett), men som finner det vanskelig å bruke en eller flere av disse tjenestene. Dette skal gi innsyn og forståelse for hvorfor det er vanskelig og hva som kan gjøres for å forbedre disse tjenestene. Det vil være mellom seks og åtte personer som blir spurt om å delta i dette prosjektet.

Hva innebærer det for deg å delta?

Hvis du velger å delta i dette prosjektet, innebærer det et personlig intervju. Det vil ta ca. 40 minutter. Intervjuet inneholder spørsmål om din personlige bruk av offentlige digitale tjenester og dine tanker rundt nåværende løsninger. Dine svar fra intervjuet registreres ved hjelp av notater og lydopptak.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykke tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Jeg vil kun bruke opplysningene om deg til formålene jeg har fortalt om i dette skrivet. Jeg behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

- Kun meg selv og veileder vil ha tilgang til dine opplysninger. Navnet ditt og kontaktopplysninger vil bli erstattet med en kode som lagres på en egen navneliste adskilt fra øvrige data for å sikre anonymitet. Datamaterialet vil være lagret digitalt og med passordbeskyttelse.
- Som deltaker vil all data bli anonymisert, og det vil ikke bli mulig å gjenkjennes i publikasjon.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Prosjektet skal etter planen avsluttes 16.06.2020. Både lydopptak, transkripsjoner og andre opplysninger som ikke er selve publikasjonen, vil bli slettet så fort studien er avsluttet.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra NTNU i Gjøvik har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
- NTNU i Gjøvik ved veileder Frode Volden, på epost (frodv@ntnu.no) eller telefon: 93 22 72 62.
- Rebecca Nordby, på epost (juliern@stud.ntnu.no) eller telefon: 46 81 53 15.
- Vårt personvernombud: Thomas Helgesen, på epost (thomas.helgesen@ntnu.no) eller telefon: 93 07 90 38.
- NSD – Norsk senter for forskningsdata AS, på epost (personverntjenester@nsd.no) eller telefon: 55 58 21 17.

Med vennlig hilsen

Frode Volden   Rebecca Nordby
   Veileder   Student

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet «Retningslinjer for standardisering av offentlige digitale tjenester», og har fått anledning til å stille spørsmål. Jeg samtykker til:

- å delta i intervju
- at det vil bli tatt i bruk lydopptak

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, . 16.06.2020.

(Signert av prosjektdeltaker, dato)

Intervjuguide

Introduksjonsspørsmål
- Kan du si litt om deg selv og din bakgrunn? a) Alder, utdannelse, arbeidsforhold (ikke spesifikk arbeidsgiver)

Digitale tjenester

1.   Hvilke offentlige digitale tjenester bruker du? *Eksempler: Nav, Skatteetaten, Altinn, Brønnøysundregistrene, Kommunale sider, Digipost, Helsenorge, Samordna opptak, Vigo*

a)   Kan du fortelle hvordan du hovedsakelig/vanligvis bruker disse offentlige digitale tjenester?

2.   Hvor ofte vil du si at du bruker disse tjenestene?
         a) Hvordan påvirkes din bruk av at du bruker det så ofte/sjeldent?

3.   Hva synes du er positivt med offentlige digitale tjenester?
         a) Hva fungerer bra?

4.   Har du tenkt over spesifikke ting som er vanskelig eller kunne vært bedre? (Kan være generelt eller spesifikke ting)
         a) Har du noen tanker om hvordan det kunne vært forbedret?

5.   Hva er dine største utfordringer når du bruker offentlige digitale tjenester?
         a) Er det noen tiltak du kommer på som kunne gjort dette lettere for deg?

6.   BankID/MinID blir i dag brukt til alle offentlige digitale tjenester. Hva tenker du om dette?
         a) Fordeler
         b) Ulemper

Utforming

1.   Hva er dine tanker om hvordan de offentlige digitale tjenestene er designet?
          a) Synes du at de skiller seg merkbart fra hverandre? Hvordan/hvorfor?

2.   Hva er dine tanker om språket som er brukt på disse tjenestene?

3.   Hvis du bruker én tjeneste mye/mer enn andre, føler du dette har noen innvirkning på
hvor   lett eller vanskelig det er å bruke andre offentlige digitale tjenester?

4.   Hva er dine tanker om standardisering av offentlige digitale tjenester? Altså at det er gitte
          retningslinjer som sørger for at alle disse tjenestene har samme grunnleggende design,
språk   og utforming og generelt blir mer like hverandre?
          a) Fordeler
          b) Ulemper

5.   Hva skal til for at du vil bruke disse tjenestene hyppigere?

Avslutning

1. Er det noe annet du vil tilføye?

Tusen takk!