Enhancing usability through participatory design

A case study of the Norwegian Tax Administration's website.

A master thesis in Media development (Media and Communication)

Department of Journalism and Media Studies

Himani Rohatgi

Oslo, May 2022

Candidate:126

Oslo Metropolitan University

SEMESTER:

Vår 2022

FORFATTER:

Himani Rohatgi

VEILEDER:

Dagny Stuedahl

TITTEL PÅ MASTEROPPGAVE:

Enhancing usability through participatory design: A case study of the Norwegian Tax Administration's website.

EMNEORD/STIKKORD:

Usability, Redesign, UX-design, Interaction design, Encoding/Decoding, Skatteetaten, Gen-Z,

SIDETALL: 58

ANTALL ORD: 15 382

OSLO DATO/ÅR 13.05.2022

Abstracts:

With rapid digitalization and the wide use of websites for e-governance, most of the interaction between users and governmental authorities takes place online. It is of importance that the websites are designed keeping in mind the experiences and digital competency of different user groups. Within the perception that Gen Z is more digitally inclined, the common assumption is they are far more at ease with digital technology.

This thesis draws on theories from media science, perspectives from communication studies, along with principles from the field of interaction design. The focus in the study is on web-based interaction, by looking at how first-time tax filers (born 1997 - 2012) experience the website of the Norwegian National Tax Administration. Placed within the methodological framework of participatory design, data is gathered through a combination of qualitative interviews, a practical prototyping workshop, and finally a usability test. The test is conducted on a redesigned website, developed using the web-builder WIX.no. In order to comply with ethical consideration, no pictures or direct link to the redesigned page have been included in this thesis.

Despite being considered digital natives, the first-time users in this study find difficulty in navigating the website, completing key tasks, and grasping the used terminology. the conclusion based on results from a usability test of the redesign supports that the redesign improves the usability, and enhances participation satisfaction. The empirical findings underline those design elements such as interactive features, feedback, and user-targeted content help improve the overall usability.

The findings underline that the continued digitalization of the public sector needs to take into account the growing gap in digital competency, between the designers on one hand, and the younger generation on the other.

Acknowledgement

Firstly, I would like to extend a very special thanks to Dagny Stuedahl, for being my mentor throughout my higher studies. You have encouraged me in my work and provided invaluable guidance along the way. I feel privileged to have you as my supervisor, and thank you for providing me with the freedom to wander around and exploring new ideas, with the often tug on my sleeve that pulls me back to the world of Media Sciences.

Secondly, a special thank you to my participants, without their contribution this endeavor could not have been completed. Their insights, and honest inputs have proved to be vital to this research. Additionally, I would also like to thank Skatteeaten, for their support along the way.

Without the care and affection from Manvi, Hilde, and Nita, I would certainly not have reached this point. Lastly, I would like to specially thank my parents, who have continuously pushed me to master my thesis, and guided me along the way.

Himani Rohatgi,
Oslo, May 2022

Table of Contents

List of figures

List of tables

1.0 Introduction

During the last ten years, Norway has undergone a substantial digitalization in the public sector, where the majority of communication between the citizens and the government authorities has moved away from paper format to digital format. Submission of applications, invoicing, filing taxes, accessing health information, or receiving details about education and salaries all happen online. This elaboration of e-governance implies that each citizen is now made responsible for their services being completed, as "they to an extent become their own caseworker" (Skaarup, 2020). For instance, The Norwegian Digitalization Agency reported that about 92% of the population communicated digitally with the public sector in 2021 (Digdir, n.d). At the same time, they underline that while citizens prefer to use electronic self-service features over non-digital communication forms, this reduces intact with the degree of situational complexity (Ibid.).

Attempting to gain a better understanding of the dynamics at play, this thesis looks at the user experience of first-time tax filers on the Norwegian Tax Administration's website and how a redesign of this website can enhance usability. However, in line with Skaarup (2020), it can be argued that simply stating that a website should be user-friendly is only half the battle. The empirical knowledge and theoretical understanding of the user's own experiences are very important, but likewise, digital competency and strategies of interacting with the government online are also of key interest. As an imperative function of the Norwegian e-governance, the choice of digitizing their public communication and services, skatteetaten.no must be able to keep up with the generational changes with regards to how its website operates. Furthermore, their website must be able to distinguish between different user groups and their respective needs or goals.

As these e-government websites are supposed to be used by all citizens in all age groups, this study particularly focuses on how Skatteetaten's website is perceived by Generation Z (born 1997 - 2012), more specifically, Gen Z users in their first meeting with the information provided on the website about tax payment. Gen Z's use of technology today can be seen as a unique characteristic compared to other generations such as Millennials (born 1981-1996) or Gen X (born 1965-1980), (Hansen, 2022). In this study Generation Z is categorized as citizens born between 1997 and 2012 and will focus specifically on first-time users of Skatteetaten's

online tax services. Perspectives from both media science with communication studies are used in this thesis, with a focus on web-based interaction design. The research places participatory design at its core, as users of skatteetaten.no are not only informants who responded to interview questions, but informants take an active part in developing the final redesign website. Furthermore, the conclusion is based on results from a usability test of the redesign, analyzed within the theoretical framework mentioned above.

1.1 Digitalization process in the Norwegian public sector

Notably, this shift in governance is not a matter of coincidence, instead has been carefully targeted as a policy. The 2012 report *Digitizing public sector services Norwegian eGovernment Program* outlined that digital communication should be the general rule for communication within the public sector. In extension, their first principle states that "The public sector is to provide unified and user-friendly digital services" (Norwegian Ministries, 2012, p. 16). This has further been substantiated by the report *Digital agenda for Norway in brief*, which underlines "a user-centric and efficient public administration", as one of the government's main objectives for ICT policy (Norwegian Ministry of Local Government and Modernizations, 2019).

A prerequisite for successful e-governance is digitally competent citizens that can make use of the digitalized services offered. In order to achieve the goals for good e-governance, web designers and programmers consider the user's needs and digital competencies and make the products and services accessible to a diverse audience that caters to different needs. Hence, this thesis seeks to understand how to design solutions that can make public websites more usable. As a case example, the study uses the Norwegian Tax Administration's website (skatteetaten.no) and its user-friendliness.

1.2 Research question

Public services have undergone major digitization processes, in which the processes of information society have transformed the online presence of public institutions into digital self-service. It, therefore, becomes vital for media studies to understand the gap between users' understanding of the website content and the goals of the public institution. In order to better highlight the dynamics involved in this problem, this thesis is looking at how the Norwegian

Tax Administration website (skatteetaten.no) can improve its usability and experience for first-time tax filers. In turn, this can reveal knowledge about whether or not the process of digitalization has been successful in including the first-time tax filers. More importantly, this thesis aims to provide insight into how we relate to terms such as digital competency, usability, digital participation, and generational differences that can be relevant to designers, policymakers, and academia.

Based on the research problem stated above, the research questions for this thesis are formulated as both exploratory and interpretive questions (Kalleberg & Holter, 2002) as this study aims to learn about how the skatteetaten.no is experienced by first-time users "without preconceived notions to it or attributing bias". Moreover, by interpreting how Gen Z "makes sense of shared experiences and attributes meaning to various settings", the process is followed up by a design phase that explores how their user experience can be improved by a redesign of the website.

In light of the context presented above, two research questions have been formulated for this thesis:
RQ1: How is the current Norwegian Tax Administration website (skatteetaten.no) experienced by first-time tax filers?
RQ2: How can a redesign of the Norwegian Tax Administration website (skatteetaten.no) apply concepts from media studies in combination with interaction design to improve the User experience of first-time-tax filers?

1.3 Thesis structure

- ⇒ Chapter one: As Norway is a highly technological country with mass e-government, it is interesting to look closer at how this type of government functions is experienced and used by first-time users.
- ⇒ Chapter two: Background. This thesis looks at Gen Z and how e-government usability can be enhanced through designing with this particular literacy gap in mind. Secondly, this section creates a baseline of relevant information about the Norwegian Tax Administration and its role and use. Finally, key digital characteristics of Gen-Z and their web-design preferences are presented.

⇒ Chapter three: Theoretical framework. In order to sufficiently answer the research questions, theoretical perspectives are combined from different fields relating to media science and UX design, as the focus is placed on both why and how the user can meaningfully interact with e-government websites, as well as what practical design choices can be applied to cater to their needs.

⇒ Chapter four: Methodology. Explaining participatory design and its implication for this thesis, this section provides an overview of who the participants are, how data has been collected and disseminated, and finally, what considerations need to be taken into account when regarding the findings.

⇒ Chapter five: Empirical findings. The findings obtained through all three phases of the data collection are presented in their respective subsections (interview, wireframe-workshop, and redesign, usability test). An attempt is made to structure the findings in accordance with the two research questions.

⇒ Chapter six: Discussion. This section seeks to analyze the findings in light of chosen theoretical framework and seek a deeper understanding of how existing knowledge can help interpret the obtained findings. Following the structure of chapter 5, each research phase is discussed individually in order to reach a logical and coherent conclusion.

⇒ Chapter seven: Conclusion. The overarching research problem and individual research questions are answered.

2.0 Background

E-governance aims to address all needs of the general public through the integration of Information and Communication Technology (ICT) (Biswas, 2022). Along with the pace of digitalization, the use of the term digital competency has also been on the rise. Understanding the term digital competence, however, can be demanding as there is no single common definition that is globally used. The term is specially used within the context of education, in particular when regarding curriculums. One way to understand the underlying complexities is by diving deeper into the building blocks the concept consists of. Scholars argue that digital competence is more than just the ability to use digital platforms in practice and should rather be understood as the ability to combine skills, knowledge, and attitudes appropriate to the context (Skov, 2016). The term can be understood through the following different learning domains; Instrumental skills for using digital tools and media; Theories, knowledge, and

principles related to technology; Attitudes towards strategic use, creativity, accountability, critical understanding, and independence (Skov, 2016).

As messages today come in both different forms and through different mediums, the term media literacy expands on the traditional concept of literacy and goes beyond only reading and writing. Media literacy can be understood as the ability to access, analyze, create, evaluate and act using all forms of communication (Uhis & Robb, 2017). As a subcategory of literacy in general, media literacy acts as the "key that unlocks meaning behind messages that we see…" (medialiteracynow.org, n.d) Both the terms digital competence and media literacy become more and more relevant in our everyday life as they help highlight the baseline engagement required in our society.

When we talk about engagement in society in this new digital world, it is important that the users are able to efficiently participate in public and community activities and get an opportunity to influence media creators and their products for better designs. In the report Confronting the challenges of participatory culture (Jenkins, 2009), scholar Henry Jenkins helps underline the concept and implications of participatory culture. Jenkins argues that the instant access to participatory culture shapes which youth will succeed and which will be left behind as they enter school and the workplace. However, there are certain concerns, one being the Participation Gap, which is "the unequal access to the opportunities, experiences, skills, and knowledge that will prepare youth for full participation in the world of tomorrow" (Jenkins, 2009). Furthermore, Jenkins poses that youth acquires a set of key skills and competencies on their own through their interactions within society. This difference in baseline technological literacy between generations needs to be taken into account and continually adapted.

2.1 The Norwegian Tax Administration (NTA)

In the plethora of Norwegian public website-domain, the website of the Norwegian Tax Administration (NTA) could be regarded as one of the most important e-governance interactions, as tax payment is mandatory for everyone who is liable for tax in Norway. In contrast to other e-government websites, such as The Norwegian Health Services (Helsenorge), the Norwegian Labor and Welfare Administration (NAV), or the Norwegian State Educational Loan Fund (Lånekassen), interaction with skatteetaten.no is not a matter of choice; convenience or preference. For instance, one can choose to book a doctor's appointment, claim

for welfare schemes, or apply for a student loan but cannot choose to avoid paying taxes. NTA or commonly known as Skatteetaten, states that they do not measure statistics on individual users; however, Google Analytics, does provide them with data on user sessions, providing an estimate of the user traffic on skatteetaten.no. For instance, in 2019, there were registered around 19 570 111 individual cookies Google Analytics has communicated with (L. Rønn, personal communication, 9. May 2022). While it is important to underline that one person can be counted several times, depending on which device they are using, this number is still valuable in grasping the amount of traffic skatteetaten.no has had during the time period.

Moreover, skatteetaten.no caters to different user groups such as the elderly, immigrants, and businesses, whom all have distinct needs, expectations, and preferences. Among these are first-time tax filers every year, which contains both young adults and foreign nationals paying taxes in the Norwegian tax system for the first time. However, this thesis focuses on *first-time tax filers* as young adults, between 16 and 24 years old, or those born after the year 1998.

2.2 Understanding Gen Z

Marc Prensky (2001) first coined the phrase "Digital natives" when describing the gap between how different generations interact and deal with the internet. Generation Z, or *zoomers* (Mendez, 2021), more specifically those born between the years 1997 and 2012, are the first generation to be born "after the widespread adoption of digital technology" (Techopedia, 2020), and can thus be categorized as digital natives, as they "understand and adapt to the digital language of computers, video games, and the internet instantaneously, and they "are comfortable using technology without an instruction manual" (Prensky, 2001, p.1). Prensky argues that these natives have developed an almost instinctual understanding of technologies, differentiating them from the older, off-line generation of "Digital Immigrants". These immigrants have had to adapt to the rapid introduction and continuous change of technology later in life.

Having grown up with the digital technology at their fingertips, key characteristics of digital natives have been outlined by several factors: Digital Natives are known to quickly receive and process information. They prefer graphics rather than text and random access to things like different types of hypertexts. They thrive on frequent rewards and instant gratification and function best when networked. Moreover, they "multitask, moving quickly from one activity

to another, sometimes performing them simultaneously" (Prensky, 2001). Additionally, Mendez (2021) underlines that Gen Z, at any step, values customized content. He further highlights how in contrast to older generations, they, in particular, like motion-based navigation, as they are used to swiping their way around content.

Gen Z's, also referred to as the Google-generation (Nicholas, Rowlands & Williams 2011), iGen (Livingstone, 2018), and NetGen (Beard & Dale, 2008), have shown that they take information for granted, as information has always been easily accessible, free, and immediate to them (Salleh et al., 2017). The close upbringing with technology and the mindset it has created has led Gen Z to expect instant results and become both impatient and rebellious (Salleh et al., 2017, p.62). It is no exaggeration to state that technology facilitates their lives while also solving their problems, additionally providing them with access to different people and relevant information at all times (Caporarello, Manzoni, Cirulli, Magni, 2013, p.1). Mendez (2021) also points to the fact that in the future, both Gen Z and the following generations "are expected to expect motion or animation-based experiences that are more natural than traditional experiences".

While Millenials have witnessed the transformation from an analog to a digital world, Gen Z was born into a world "overwhelmingly filled with tech" (Hansen, 2022). This places them in a position of frontrunners of upcoming generations and thus makes understanding their needs, preferences, and how they access public services imperative. In turn, this implies the need to invest in technology and knowledge that furthers our understanding of Gen Z, as e-governance needs to "entice, engage, and retain Gen Z's attention" (Hansen, 2022)

3.0 Theoretical framework

In order to sufficiently answer the outlined research questions, theories from both the fields of cultural studies and media studies and interaction design are applied. While well-established theories of encoding and decoding from cultural studies allow for a greater understanding of why websites need to be designed with the user in mind, perspectives from *user experience* provide insight into human interaction with technology and, in turn, how usable websites should be designed. Finally, this has been supplemented by practical principles and guidelines from the field of *interaction design*. This intersection of distinctive theoretical backgrounds allows for this thesis to draw on strengths from both sides.

3.1 Cultural studies perspective: Encoding and decoding

The field of cultural studies attempts to deconstruct meaning, ideology, and power in communication forms (Allen, 2017). While the field can be traced back to the 1930s, its theoretical implications are perhaps even more relevant today, as the field particularly considers the role of our new, boundaryless technologies and their cultural implications.

Contradicting the traditional and somewhat outdated model of sender-message-receiver, scholar and pioneer Stuart Hall (1973) introduced the encoding/decoding model. He posits that in any communication, the message is encoded by the sender, while the receiver does decode or make sense of this information in order to understand and make sense of the message. In particular, he underlines the user's own experiences and cultural and social contexts are important for this interpretation and can change the message's meaning (Hagen, 1995). The audience's own interpretation hence becomes a prerequisite for the message to have an effect, but "before this message can in effect, …satisfy a *need*, or be put to *use*, it must be appropriated as a meaningful discourse and be meaningfully decoded" (Hall, 1980, p.130). Hence, Hall emphasizes that meaning-making is individual to the user, implying that a single message can be perceived differently from user to user.

Transferring this theoretical model of media communication to the field of interaction design, where different types of "interactivity are promoted or discouraged by new technologies and platforms" (Shaw, 2017), websites can be understood as messages encoded by the designer. The user must understand or decode this message correctly by "deducing the meaning" of the website elements (Zola, 2021). Different types of noise can get in the way and disrupt, distort or delay this message. Within interaction design, it becomes the designer's main job to design a website that is decodable and gives meaning to the end-user. Visual designer Evelyn Münster (2020) underlines that "adding meaning to the data is an invisible process that has to be accomplished by the decoder". Furthermore, she states that "it is of utter importance that we as data encoders and creators of data visualizations make every effort to find out the exact job to be done of the product" (Münster, 2020). For the decoded message to be useful, the designer must therefore design a website that fulfills the user's need (ibid). Halls (1973) encoding/decoding contrasts lead to the reflections around what the users need. Can it be understood as solely functional needs or the need for "meaning-making"?

3.1.1 Information science: Designers encode, users decode

The DIKW Pyramid, presented by Russel Ackoff (1989), is a commonly used model within the field of knowledge management, which explains the relationship between Data, Information, Knowledge, and Wisdom. Each of the building blocks represents a step towards a higher level (figure 1). When adding context to data, it becomes information, which transforms into knowledge when given meaning. Finally, when given insight into knowledge, it becomes wisdom.

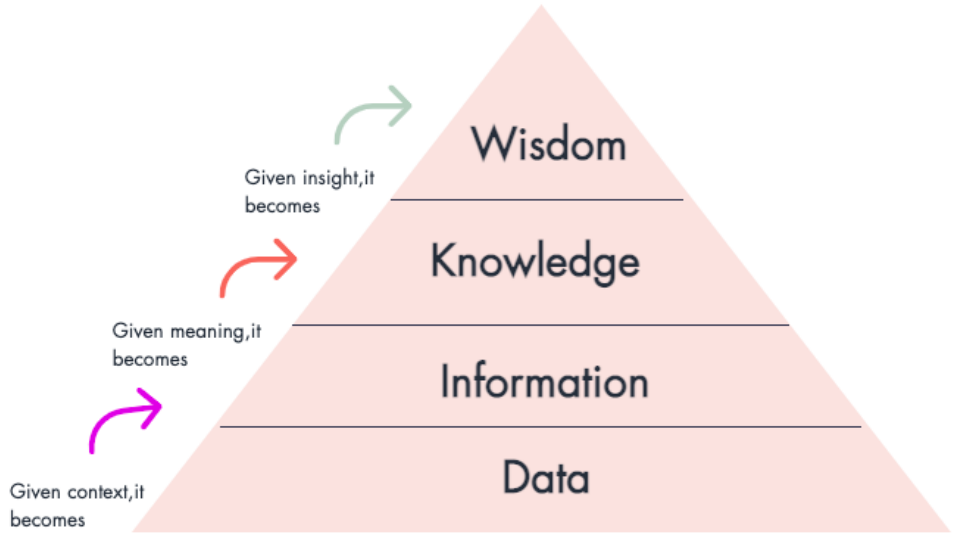

Figure 1 The DIKW Pyramid explained

However, UX designer Kai Wong (2020) underlines how structuring data efficiently only can get you so far. In order to jump from information to knowledge, it requires an understanding of how the users find patterns and understand the data (Wong, 2020).

When designers create visualizations, they often condense a great amount of data onto a single interface. Wong explains this through an analogy, using QR codes as an example. QR-codes are essentially data that is mechanically and automatically encoded into a matrix barcode. When these codes are scanned, it allows the data to be decoded, resulting in the "correct" or intended website (Wong, 2020). While Interaction designers often go through a similar process of encoding and decoding a message, they meet a stark diversity in decoding, as they have to rely on a diverse audience to decode the data in their own minds. If the audience successfully manages to decode the data, it can result in understanding, insight, and even knowledge (Wong,

2020). On the other hand, if the audience fails to decode the data, they are just left with data without context or information without meaning and are not capable of applying the level of wisdom. In order to achieve this, further insight into how decoding happens is necessary.

Dr. Ben Shneiderman, working within the field of Information Visualization and Human-Centered Design, presents the *visual information-seeking* principle (1996) of decoding to help create effective visualizations; 1: Overview, 2: Zoom, and Filter, and lastly, 3: Details-on-demand (Wong, 2020). This thesis applies this information-seeking principle to redesigning Skatteetatens's website, as it provides a deeper understanding of how the users look for and find relevant information. In particular, Schneiderman's principles become relevant when regarding first-time users, who are not necessarily avid users of the website or have an existing knowledge of the tax system, and hence would need more time to get acquainted with the different features.

Firstly, Users scan over the interface, trying to create a basic story out of it through an *overview*. Their attention is drawn to the visual aspects, such as charts or pictures, without paying much attention to the minor details. Given that this is how the user first encounters the information, the designer should spend more time polishing and fine-tuning the overview in whatever form it takes. If the information exists but is "buried in details" (Wong, 2020), the likelihood of understanding and finding the information will be difficult to achieve

Secondly, users start to focus on specific sections in greater detail. This is where interactive interfaces come into play, through zooming, scrolling, panning, and using filters. Making sure information is well-grouped for focusing on users' performances hence becomes vital. If specific sections fail to contain the relevant information users are looking for, they will have to scan the entire interface for other bits. At the third stage, users might still have not gotten to the detail they are looking for. By going through the two previous steps, the users will be presented with a reduced amount of information and therefore be able to grasp the "details on-demand".

Theoretically, when applying the detail-on-demands principle on skatteetaten.no, the principle should work as such: Figure 2 shows the entire first-page giving Overview of skatteetaten.no, where the user, for example, will land on the page: *Person*. Here the user will get an overview of the information presented and create a meaning of the different features and services provided. In figure 2, the user has zoomed in, and filtered down the information by clicking on "min side", and has been redirected to a new subpage. On figure 3 the user is presented with reduced information and thus able to look for the details, for instance, the large blue "log in" button in the center of the page.

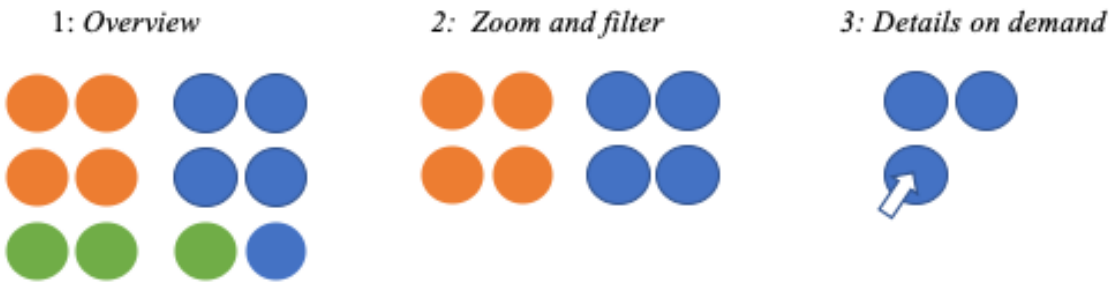

Figure 2 Visualization of Information-seeking principle

This thesis aims at seeking an understanding of how Schneiderman's details-on-demand principle can be practically applied on skatteetaten.no through the field of interaction design. Placing the DIKW-pyramid in direct correlation with Schneiderman's principles, it is possible to analyze the information and interaction on skatteetaten.no. According to this framework of the DIKW-pyramid, to reach the highest level in the pyramid (wisdom), designers must understand the user's information-seeking process. Otherwise, converting the information given from the data would not result in wisdom. When regarding websites, it, therefore, becomes necessary to gain a better understanding of the principles for visually presenting information on websites. This thesis seeks this understanding through the field of user experience, more specifically through interaction design.

3.2 Understanding user experience

User experience (UX) design can be understood as the process design teams use in order to create products that both provide relevant and meaningful experiences (interactiondesign.org, n.d). Helen Sharp, Jennifer Preece, and Yvonne Rogers (2019), explain how UX includes all aspects of the end-user's interaction with the company, its services, and its product. Sharp et al. (2019) underline that "one cannot design a user experience, only design for a user experience". This means that a designer cannot design a sensual experience but create design features that evoke it. UX design is often used interchangeably or in relation to terms such as "Usability", and "User interface Design". However, as these terms are both important aspects of UX, they are just subsets of it, as UX design over multiple other areas (interactiondesign.org, n.d). While Usability measures how well a user can use a product or a design in order to achieve a defined goal effectively and satisfactorily, User Interface design focuses on the graphical layout of the product. The graphical layout can be understood as buttons users click on, animations, screen layouts, text entry fields, and transitions (interactiondesign.org, n.d). Furthermore, there is no single definition of good user experience; instead, it can be further understood as "one that meets a particular user's needs in the specific context where he or she uses the product" (interactiondesign.org, n.d).

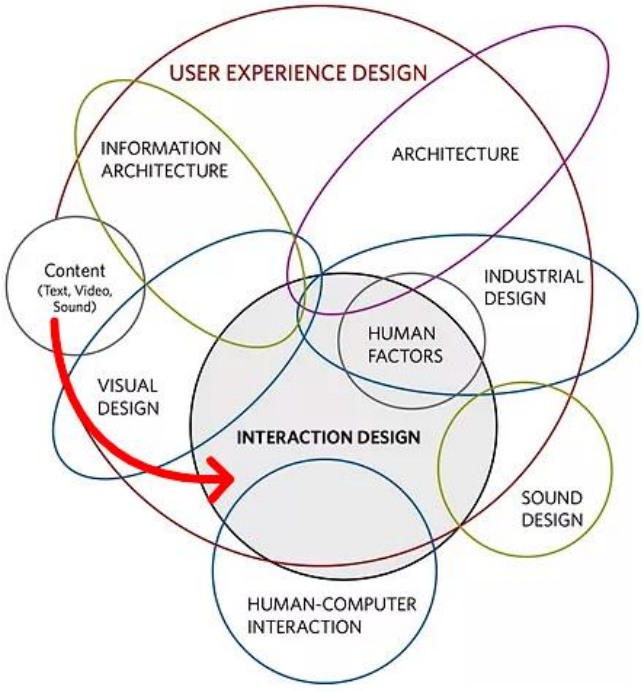

Figure 3 Relation between UX and Interaction design (Saffer, 2009)

As shown in figure 3, media studies involve analyzing and interpreting the effect different media content has and attempting to make sense of how they shape our understanding of the world. In particular, this thesis looks at the content on skatteetaten.no as an example of how Gen Z interacts with this e-governance content and how their digital literacy and competency might affect their use of public websites. In turn, this necessitates looking at their *user experience*.

3.2.1 Understanding interaction design

Interaction design can be understood as an important component within the larger umbrella of user experience design. Interaction design focuses on the interaction between the product and the user, where the goal is to create products that enable the users to achieve their objectives in the best possible way (Siang, 2020). Don Norman explains how interaction design involves the focus on human interaction with technology, where the goal is to improve the understanding of what has been done, what is happening, and how it can improve (Norman, 2013, p.5).

Moreover, in order to achieve a good user experience, it is important to assess the negative aspects, such as frustration and irritation, and how they can be reduced by designing an interface that enhances joy and efficiency (Sharp et al., 2019, p.2). There are many aspects within the field of interaction design, such as visual design, human-computer interaction, and industrial design, all relevant to understanding interactions with technological devices

3.2.2 Mental and conceptual models

Norman (2013, p.7) states that "If we did not have people, everything would work so much better". One of the most important factors in interaction design is to design for the user, meaning it is vital to understand the user's needs and how individuals work with technology. It is, however important to keep in mind that some design choices might work well for some users and not so well for others. Factors such as age, culture, socio-economic background, and professions should be taken into consideration while designing.

Mental models are used by users when they resonate around a specific technological device or product in order to understand what to do when something unexpected happens or when encountering an unknown product for the first time. The longer a user learns about a product and how it works, the longer the mental model develops (Sharp et al., 2019, p.116). When users

interact with products, they develop an understanding of how different types of features work and are used. After some time, the user's mental model shapes itself around the developed perception the user is left with, which means that they will use their previous knowledge from one product to another. However, in some cases, users struggle to apply their mental models, an example of this can be when rapidly clicking on a button several times in hopes of the process going faster, even though it doesn't.

A conceptual model can be understood as "a careful and detailed description of how a system is organized and operates" (Sharp et al., 2019, p.74). It is the designer's perception of how a system should look, feel and operate (Norman, 2013). It can be understood as an abstraction that outlines what users can do with a product, how they understand it, and how they can interact with it. This model is used by the designers and developers of a system in order for them to have a starting point on how the product should work and look. In order to design a system that is both intuitive and understandable to the users and provides a good user experience, it is important to have a conceptual model that takes the user's mental models into consideration (Weinschenk, 2011, p.75).

3.3 Designing for usability

Usability is fundamental to the quality of the user experience, similarly, aspects of the user experience, such as how a product looks and feels, are inextricably connected with how usable a product is (Sharp et al, 2019, p.50). Meanwhile, designing a system related to a set of requirements the system has to follow. These sets of requirements are often technical and are centered around the functionality and effectiveness of the system. An example of this can be the navigation system on a website. The navigation is meant to provide a roadmap, both of where you are at the moment and to what paths you can take ahead. It is not granted that everyone will see all the different subpages, which makes it important to "convey enough context so that people can proceed immediately toward their goals" (Farrell, 2015). The risk is, therefore to forget about the actual user and how they are going to use the technology. Unfortunately, this can lead to the user feeling stupid because they don't understand how to work around the system. This again leads to grave mistakes and too much effort to efficiently work with the system, which leaves the user without an overall enjoyable and engaging experience (Cooper et al., 2014, p.13). Sharp et al., (2019) present six usability goals:

- *Effectiveness*: How good is the product at performing the activity?
- *Efficiency*: How efficiently does the product perform the activity?
- *Safety:* How safe is it to use the product to perform the activity?
- *Utility:* Does the product offer good functionality to perform the activity?
- *Learnability:* Is the product easy to learn in order to perform activities?
- *Memorability*: Is it easy to remember how the product works?

These six goals are specific objectives that enable the usability of a product to be assessed in terms of how it can improve users' overall experience. The goals can be measured by asking users in the form of questions or by measuring user time. An example is measuring how long it takes to complete a task (efficiency) or how many mistakes are made in performing a specific task over time (memorability) (Sharp et al., 2019. p.54). It can be difficult to know exactly how to accomplish these goals; hence the field of interaction design has developed specific principles in order to achieve enhanced usability. This thesis uses these goals in order to evaluate empirical findings from both the interview phase, the practical wireframe workshop, and the usability test. Furthermore, the thesis aims to apply certain principles from interaction design in order to reach these goals.

3.3.1 Interaction design principles

Design principles can be seen as guidelines used by interaction designers to help them reach the goals of usability and create good user experiences. The principles are generalizable abstractions that are meant to help designers think about different aspects of their designs (Sharp et al., 2019, p.26). There are several different design principles today, both specific and vague, and which have been developed through a mixture of knowledge, experience, and common sense.

A challenge that might arise when mixing and applying several principles in this study can be that they can encourage contradictions that weaken the purpose of the principles. It is therefore important to use the principles as guidelines and inspiration rather than follow each one as fixed standard. Furthermore, this study presents the five most commonly used design principles; visibility, feedback, constraints, consistency, and affordance (Sharp et al., 2019,

p.26-30). In addition, overall information-seeking principles, visual communication, and theories of media interpretation are included where relevant to the project.

Visibility

The principle of visibility entails functionality and choices being visible and clear for the users. This statement is supplemented by Norman's (2013, p.72) definition of discoverability, where the importance lies in the current state of the system and users' ability to decide and understand the different types of choices they have. The more features of a system that are presented to the users, the more likely it is that the user will know or figure out what to do with them (Sharp et al., 2019, p.26). In contrast, when functions and features are hidden, it makes them more difficult to find and use. The highly visible and intuitive, controlling devices such as buttons, switches, and knobs, have been replaced with invisible and unclear activating zones where users have to guess where to go and what do to in order to make them work (Sharp et al., 2019, p.26)

Feedback

The feedback principle is strongly related to the concept of *visibility*, as it involves sending information back to the user regarding what action has been done and accomplished. There are various kinds of feedback within interaction design, such as verbal, visual, audio, and combinations of these. In order to make the user experience of a product efficient and understandable for the user, deciding on the right combinations for the different types of activities on a product becomes central. In cases where the feedback principle is used the right way, it helps provide the necessary visibility for user interactions (Sharp et al., 2019, p.27).

Constraints

The concept of constraining can be referred to as determining ways of restricting different kinds of user interactions that take place at a given moment. A known design practice used in graphical user interfaces is deactivating certain options by, for example, shading them with a different color (Sharp et al., 2019, p.28). By doing this, the designer restricts the user only to actions that are permissible at the stage of the activity. The main advantage of this type of constraining is that it prevents the users from making any mistakes, as it reduces the risk of selecting the incorrect options. Sharp et al. (2019) exemplify the principle of constraining through flow chart diagrams, which only show which objects are related to which, helping the user constrain the way the information can be perceived.

Consistency

A consistent interface is one that follows the rules, meaning it has similar operations and elements for achieving similar tasks (Sharp et al., 2019, p.28). Designing a consistent interface makes it easier to both learn and use for the users, as they only have to learn a single mode of operation that is applicable to all objects. However, this principle is more beneficial for interfaces with limited operations, such as a portable radio with a limited number of operations mapped onto separate buttons. All the user needs to do in this case is to learn what each button represents and select accordingly (Sharp et al., 2019, p.29). However, it can become problematic to apply the principle of consistency to a more complex interface, where there are different operations that need to be designed. For instance, is common to look for the log-in button in the top right corner of a website, and placing this on the lower left side would confuse many users.

Affordance

Sharp et al. (2019) refer to the term affordance as an object that allows people to know how to use it. When the affordance of a physical object is obvious, the user will easily figure out how to interact with it. Norman, 1999 (referred to in Sharp et al., 2019, p.30) suggests that there are two kinds of affordance; real and perceived. Physical objects are known to have real affordances, such as grasping, which is obvious to do and does not have to be learned. However, user interfaces such as websites are virtual and therefore do not have real affordances. Norman (1999) further argues that it does not make sense to design for real affordances on interfaces, as screen-based interfaces are better conceptualized as perceived affordances that can be learned. Examples of such affordances are graphic elements such as icons, links, scrollbars, and buttons.

3.4 Theoretical summary

The theoretical framework for this thesis can be understood through this inverted pyramid. On top, the broadest level demands a comprehension of communication theories, more specifically, the user's interpretation of messages sent by designers. Narrowing this down, the perspective of the user and designer with the user in mind becomes vital by borrowing from the field of UX design. Hence, this is a representation of the different perspectives from different theoretical fields, which need to be integrated in order to answer the research questions. While UX design can provide the background for design choices, interaction design can guide exactly what effect different elements have.

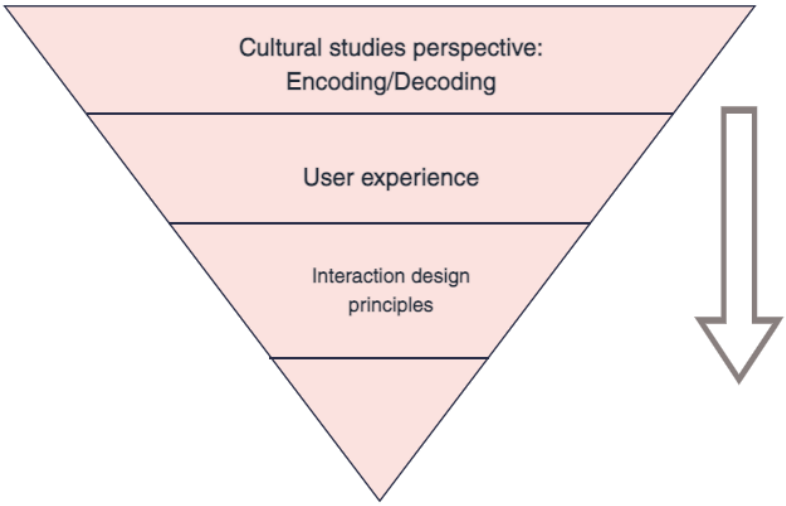

Figure 4 Conceptual framework - self-made

4.0 Research design and Methodology

In this chapter, I will present my methodological approach, what methods I have used to collect and analyze data, and finally, the ethical aspect of this study. For this study, I will be using an exploratory approach and applying a deductive research design by conducting qualitative methods.

4.1 Research design

A research design can be seen as the framework of methods and techniques used by the researcher. The research design is determined by the purpose of the study (Easterby-Smith, Thorpe, & Jackson, 2012). My research design choices build on the ontology framed by a stance within the wider field of media science, where the importance of understanding the user as an individual actor is regarded as vital for understanding media practice. This study can be categorized as *analytic*, as it involves examining and evaluating data about first-time users and their experiences with e-government websites. Aiming to develop a redesigned website in order to enhance the user experience of real-world scenarios related to tax filing for Gen Z, this thesis can also be understood as *applied* research. As this requires a deeper understanding of the user's feelings and experiences, a combination of user-centric *qualitative methods* has been used to gather data. Hence, the research falls under the label of *empirical* research, as importance has been given to knowledge and actual experience rather than theory and beliefs or non-personal quantitative data (Kothari, 2004). The empirical research is placed under the wider umbrella

of *participatory design* as a method, including five participants representing Gen Z in processes involving interviews, one wireframe workshop, and usability testing of the redesigned developed prototype. All of these elements have been integral to presenting a redesign, which is not only based on theoretical knowledge perspectives of media science and cultural studies but also grounded in real-life experiences and perceptions of the actual users.

4.1.1 Participatory design

Originating in Scandinavia, Participatory design (PD) focuses on the social, human, and political contexts in which information systems are used and developed (Löwgren & Stolterman 2007, p.151) and involves users as active participants in the research and development process of a design. Participatory design is mainly built on social interactions between users and designers who are willing to learn from each other in order to create and express ideas and visions (Devisch, Huybrechts & Ridder, 2018). Shared reflections and experiences are an essential part of the design process (Robertson & Simonsen, 2013, p.8). The core value of Participatory design is to find the right combination of different methods to help create a common vision for the task to be resolved, giving the users a sense of ownership (Brandt et al., 2013, p. 145). Using participatory design has been important in order to gain the right insight and understanding of how first-time users perceive skatteetaten.no, as they have played an active role throughout the process.

4.1.2 Research process

The overall research design of this study has been divided into three phases, one being the initial "User research phase." This phase entailed the process of gathering information through research of the skatteetaten.no, recruiting participants, and conducting interviews. The second phase, "Wireframing and prototyping," entailed using the data gathered by the first phase to create wireframes in workshops, as well as making a digital prototype and then redesigning the website. The third phase entailed conducting a "Usability test" in order to see if the data suggested overall improvement on the redesigned website.

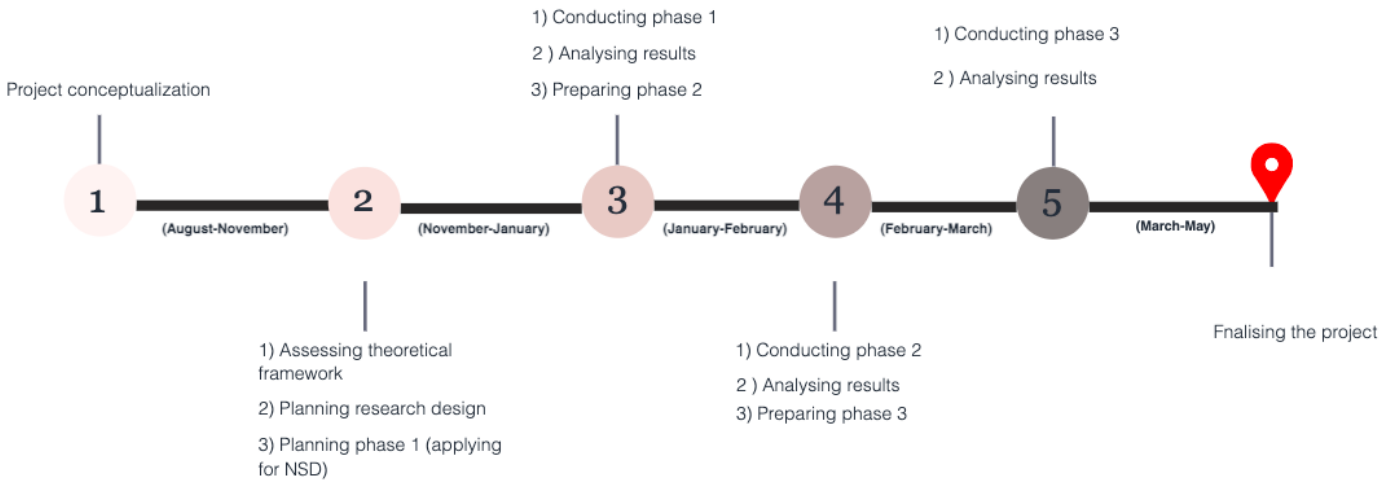

Figure 5 Timeline of the research process

4.2 Data collection

This subchapter provides an overview of the research methods used for gathering the relevant data in order to answer the defined research questions.

Qualitative methods help the researcher understand people and the social and cultural context in which they live by collecting non-numerical data (Blakie, 2010). This thesis uses three different methods in order to answer the two research questions posed in section 1.2. These are five individual interviews and one wireframe workshop with all the participants, leading to a redesign, which in turn provided the basis for a usability test.

Table 1 Research phases in correlation with reseach question and methods

Research question	Phase	Method	Research objective
1: How is the current website of Skatteetaten.no experienced by first-time tax filers?	1	Qualitative interviews	Do first-time users have difficulties in interacting with the webpage, and understanding the overall tax-payment system
2: How can a redesign of skatteetaten.no apply concepts from media studies in combination with interaction design to improve the User experience of first-time-tax filers?	2a	Workshop (Wireframes)	What can be done to ease their experience
	2b	Redesign of website	alternative to skatteetaten.no
	3	Usability test	To test if the redesign can solve first-time users initial difficulties

4.2.1 Recruitment of participants

Coming up with realistic tasks will depend on the participants that you recruit and on the features that you test (Moran, 2017). In order to gain answers that represent the primary target group, Gen Z, had to be further narrowed down to first-time tax filers.

As this study's primary target group is first-time users who haven't used skatteetaten.no to file taxes before, I contacted Elvebakken VGS in order to get a random sample size as high school students who are in their final years start looking for jobs and will have to pay taxes. I contacted the vice-principal, who sent out an email to teachers who have social studies as their main subjects. I received an email from one teacher who showed interest, as she had five participants in her class that wanted to participate in the study. In this simple random sampling method, each member of the population in the class has an exactly equal chance of being selected.

Table 2 Pseudonyms of participants

Pseudonym	Age	Occupation	Prior experience with skatteetaten.no
Anna	17	Student	Yes
Tina	18	Student	No
Jack	18	Student	Yes
Bruce	20	Student	No
Taylor	19	Student	No

User privacy

NSD (Norwegian Center for Research Data) is the Norwegian national center and archive for research data, where the goal is to ensure data about the society and people are collected, shared, and stored both safely and legally (NSD, 2021a). In the guidelines for Oslo Metropolitan University (Oslomet), it states that all students and research projects that obtain personal data must apply to NSD in order to get a privacy assessment (Oslomet, 2021). According to NSD, all identifiable information about an individual is considered personal information (NSD, 2021b). This study was assessed by NSD as the personal information that has been gathered is names, age, audio, and video recording. As far as personal data is concerned, no personal data besides the participant's first name and age have been used in this thesis. However, as the participants wanted to remain anonymous, they have been referred to

by pseudonyms. The video and screen recordings have been saved on a private encrypted hard drive and will be deleted by the end of this project, more precisely, when the final grade has been obtained. Each participant was given a consent form at the beginning of the interview, where the form was explained in detail in order to reduce the possibility of misunderstandings. The consent form can be seen in appendix B.

4.2.2 Phase 1: Interviews

Interviews are considered one of the primary ways in which ethnographic (qualitative) research gains insight into different users' cultural, social, political, or economic everyday life (Crang & Cook, 2007, p.35). In phase 1, 5 semi-structured interviews were conducted at Elvebakken High School, where each lasted between 30 - 40 minutes. As Löwgren & Stolterman (2007, p.67) suggest, interviews should be conducted in a natural or known setting for the interviewee, as the researcher is then able to both conduct data through the conversations and also through observing. The interviews were held at Elvebakken, in a classroom known for the students through weekly classes.

Choosing semi-structured interviews was a natural choice as it was important to make the participants feel calm and also be able to explore the participant's feelings, beliefs, and thoughts without a set of predefined or constricted parameters for the conversation. In order to collect data that can be further analyzed in light of the theoretical framework, the questions were structured in the following categories: *first impression*, *usability*, *navigation*, and *alteration*. In total, seven questions were asked. The complete interview guide can be found in appendix A.

4.2.3 Phase 2: Wireframes

Within the participatory design method, conducting a "workshop" is a commonly applied method, where one gathers designers and users to work out a solution to a particular problem. Participatory workshops are carried out with the potential users to identify a problem, discuss visions and solutions and finally implement them (Löwgren & Stolterman, 2007, p.70).

In order to better understand the first-time user's preferences for the redesigned website, card sorting was used during the workshop. Card sorting is used to study participants to group individual labels written on notecards/post-it cards according to the criteria that make sense to

them. This method serves to create the best possible information architecture on a website that matches the user's expectations and mental models (Sherwin, 2018). Each participant was provided with necessary equipment such as paper, markers, and sticky notes with their ideas on an interface of skatteetaten.no. The workshop was also conducted at the Elvebakken, in the same classroom as the interviews, creating a sense of comfort and familiarity. The workshop lasted one hour and 15 minutes in total.

Prototyping: creating the redesign

A prototype can be understood as a draft version of a product that allows the designer to explore ideas and show the intention behind a specific feature or the overall design before investing money and time into the development. A prototype can be both a paper drawing (low fidelity) or something that allows click-through features to a fully functioning site (high fidelity) (Johansson & Arvola, 2007). This study undertakes both low-fidelity prototyping with the participants in phase 2, through the wireframes, and a high-fidelity prototype using the website builder WIX.com in phase 3. The aim is to get the closest resemblance to the final design in terms of both details and functionality and test whether or not an alternative is better.

4.2.4 Phase 3: Usability test

In order to understand what works and what doesn't with a specific interface, it is vital to study how people use it in the real world. This process can be seen as the essence of usability testing, as the researcher gains qualitative insight into what directly causes the problems on a particular interface. In phase 3, a usability test with six tasks and three reflection questions was conducted by all five participants.

The participants were presented with the redesigned, high-fidelity prototype of skatteetaten.no, and the tasks were aimed at being realistic activities the participant could need to conduct in real life, for instance, to file taxes or find the button to log in to their designated account. While the participants complete the given tasks, the researcher observes their behavior and writes down feedback. The usability test script can be viewed in appendix C.

4.3 Data reduction:

In order to make the data collected suitable for further analysis, it was necessary to use data reduction techniques. The importance of data reduction is explained by Berg and Lunde (2012,

p. 55), where they state, “qualitative data need to be reduced and transformed (coded) in order to make them more readily accessible, understandable, and to draw out various themes and patterns”. To simplify the process, coding frames were created before the overall data was collected, however, some of the coding categories needed re-organization. This was conducted by adding additional categories and narrowing down the existing ones. (Blaikie, 2010).

The table below summarizes the different techniques for data reduction, corresponding to each phase and method applied.

Table 3 Data reduction in different phases

Period	Method	Type of data collected	Reduction
Phase 1	Interview	Audio recording	Transcription, coding after theoretical categories
Phase 2	Workshop	Observation/oral answers	Card sorting, comparison of final 5 wireframes
Phase 3	Usability test	Task results/responses to reflective questions	Coding frame (TCA), severity ranking, transcription of verbal answers.

Interviews

The verbal answers given by each participant were recorded to audio files and later transcribed to make sure no details or nuances in the responses were missed. The audio recording was then transcribed, color-coded, and grouped into different categories. This grouping led to distinguishing the answers in light of the theoretical framework, primarily from interaction design: *first impression, usability, navigation, and alterations.* These were developed after the coding phase.

Workshop

The workshop session was video recorded and used as secondary data/supporting material for the discussion. Each of the wireframes was analyzed and categorized in order to detect similarities through *card sorting.* Based on the interviews, a sample of cards containing elements the participants wanted were created. By analyzing which cards were used in the wireframes, which were left out, and where on the wireframe they were placed, an analysis of the workshop was made possible.

Usability test

In order to analyze the usability test, the answers were categorized based on the severity of the issues and were sorted into five levels; critical, serious, medium, low, and no issues. See appendix D for ranking explanation. In addition, a coding frame was developed based on three parameters: Time (T) in seconds, number of Clicks (C), and whether or not a task was Accomplished (A). The responses to the reflection questions were recorded and transcribed in the same manner as the responses from phase 1.

4.4 Methodological reflections

Reliability:

The reliability of the research is considered with regard to the consistency of the findings from the three phases and the theoretical framework. As data collection in qualitative research is an interactive process that makes it necessary to use a range of different methods that are not likely to be repeated, it is not likely that the results of the research could be replicated the same way it would be expected to be in quantitative research (Neuman, 2006).

However, the reliability of this specific thesis can be assessed by the consistency of the data collected. The research process started with reviewing the theoretical framework regarding media sciences and the interaction design field. On the basis of this knowledge, a research problem was formulated, focusing on the problems in the real world in contrast to what other researchers may have assumed it to be or what the theory suggests. Consequently, the research focused on seeking a deeper understanding and finding a case in order to suggest possible solutions. In order to do this, Skatteetaten was chosen, and young participants were contacted to help provide insightful data. In order to fully answer the research problem and get to understand the problem from a user perspective, methods such as interviews, workshops focusing on wireframes, and usability tests were applied.

Data reduction is essential in order to make the collected data suitable for analysis (Berg and Lunde (2012, p. 55). Hence, the raw qualitative data in terms of interview answers and results from the workshops and usability test were transformed (coded) in order to make it understandable and to see patterns. Based on the usability test script, one coding frame was established before the test (Blaikie, 2010). The coding frame was used to keep track of the movements on the website during the tasks and was divided into how much time was used, the number of clicks, and whether or not the tasks were accomplished. The accuracy and

consistency of the data increase the reliability of this research. Additionally, the findings were further substantiated by the usability test on the redesigned website.

Validity:
Internal validity refers to the degree to which a research design produces a conclusion that is presented in a manner free of error and that the presented findings are recognizable to all participants (Neuman, 2006). In order to ensure the validity of the data collection, ambiguous statements were clarified by asking additional questions during the different phases. This ensured that the participants' statements were not misunderstood and therefore decreased the overall potential of their statements being distorted.

In the cases where there was ambiguity about an interpretation of a statement, the participants were consulted directly, or the primary data was consulted, meaning the audio recordings of the interview or video recording of the wireframe workshop. In those cases when it was difficult to draw open and clear connections between the participant's statement and the analysis, that particular data was disregarded. This has been done strategically to avoid having biased opinions influence the project. Verifications could have lent further clarifications about content choices and design choices if Skatteetaten were given access to the research material before publishing. However, as this thesis centers around the user's individual experiences and preferences, it has been decided that the main focus should stay on their responses. In line with the core focus of the participatory design, this thesis aims at gathering real-world data from actual users in several phases of the project. Simply redesigning the website and choosing to discuss it in light of previous research would have omitted vital participatory data.

External validity refers to the ability to generalize the findings from a study across other similar settings (Neuman, 2006). Nielsen Norman group strongly states that "*testing with five people lets you find almost as many usability problems as you'd find using many more test participants*" (Nielsen, 2021). Although the five participants are not representative of all first-time users, they represent the specific group of users, Gen Z, which is in the focus of this study.

5.0 Empirical findings:

The purpose of this chapter is to explain how first-time tax filers experience the existing Norwegian Tax Administration (NTA) website (skatteetaten.no) and to explore how a redesign

of the website can improve its usability. Subsequently, this will make it easier to answer the overarching research problem of how overall usability can be enhanced on skatteetaten.no. The empirical findings have hence been structured into three sections. The first section, 5.1 explains how first-time users experience the usability of the existing NTA website through interviews (RQ1). The second section, 5.2, explores how the first-time tax filers drafted and outlined physical wireframes (RQ2). The final section presents the results of the usability test conducted in a physical meeting.

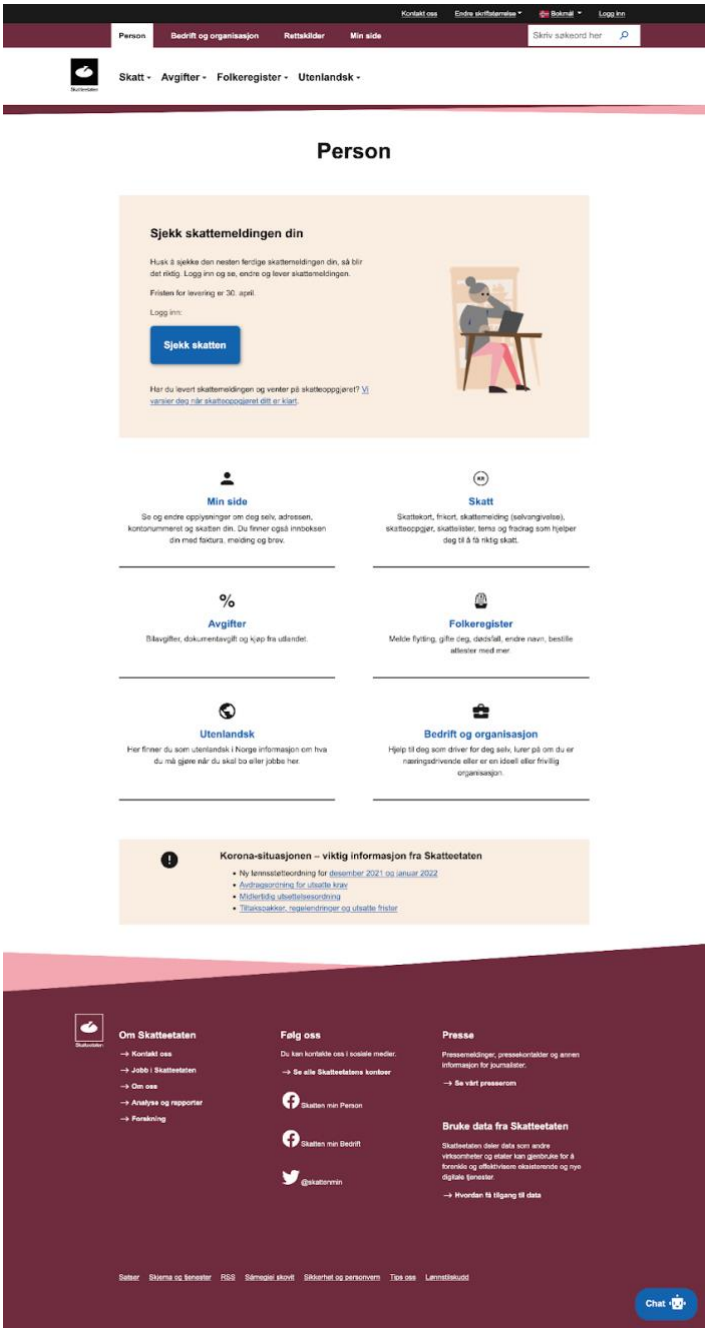

Figure 6 Front page on Skatteetaten.no

5.1 Website experience:

Below follows the empirical findings, describing the user's first experience with NTA's existing website. The main findings derived from phase one, are categorized, and presented in the following four subsections; *first impression*, *usability*, *navigation*, and *alteration.*

First impression

The initial reaction to a website is vital for the overall relation users develop with the interface. The interviews showed that all participants found the website to be disorganized and chaotic at first glance. When asked about her first impression, Anna explained how a large amount of information on the website resulted in her feeling overwhelmed and thus made it difficult to know exactly what to look for. Interestingly, she states that the cluster of information on the front page leads to her using the "search engine" function more. She says," *When I see so much information on one page, which I assume is important as it's on the front page, I directly go to the search engine to reduce the stress" (Anna, 17).* Jack, who has even visited the site once before, explains how the first impression is overwhelming and further elaborates, *"once I look at the website properly, and scrolls through it, it starts to make more sense" (Jack, 18).* Moreover, he points out that the *extra* time needed to understand the website ruins the first impression and leaves him with negative feelings.

Figure 7 Lady at the desk (Skatteetaten.no)

When asked about the first thing that caught their eyes, most participants mentioned the homepage picture presented right under the global navigation as presented above. The picture states “Sjekk skattemeldingen din”. Tina explains how her eyes are drawn toward the vector illustration used in the picture. She elaborates:

"The more I look at the picture, the less I, as a first-time user, understand, and it makes me wonder if it is important information for me or not. I don't want to miss out on any important messages, so my first instinct will be to click on it regardless" (Tina, 18).

She further describes that the big blue button used in the picture, which says "see taxes," is confusing for a first-time user, as they have never filed taxes before. Instead of being a button that improves the efficiency of the website, it, therefore, creates more confusion and tension for a first-time user. Agreeing with Tina, Taylor states that he feels left out and not looked after, as everything on the front page is targeted toward experienced tax-filers.

Bruce and Jack highlight the "my page" button in the top left corner of the front page when asked what they are drawn towards. Bruce states, "it is definitely "my page", it reminds me of similar websites where you have to log in and stuff like that. It should, however, be more visible, maybe with a bigger button". Jack supplements by saying that the button should be in the front picture instead of under *my taxes*, as it is more important and should be the first thing you should be able to find on the website.

Five out of five participants mentioned that their first impression is affected by all the intricate terminology used on the website. Tina states that foreign terms such as "Avgifter" and "Folkeregister" are not necessarily something she is affiliated with on an everyday basis and therefore make the website appear more difficult to understand. Similarly, Anna states that taxes and money are often associated with something scary because you don't want to make any wrong moves.

Usability

A good website utilizes the user-centric design process in order to ensure that the website is both efficient and easy for the users, rather than for the people designing it. In order to better understand the participant's thought process, and eventual difficulties on the site, each

participant was asked to imagine themselves paying taxes for the first time. The results of their progress are summarized below

Table 4 Time needed to complete tax-filing task

Participants paying tax for the first-time	Total time needed	Amounts of clicks needed
Anna	2 min and 14 sec	5
Tina	1 min and 56 sec	8
Jack	1 min and 46 sec	6
Bruce	2 min and 58 sec	8
Taylor	1 min 58 sec	6
Average time/clicks needed:	**2 min 17 sec**	**6,6**

As presented in the table, each participant used a great amount of time and clicks to accomplish the task. When asked for reasoning, the participants stated that they relied on assumptions and guesses in order to reach the end goal rather than following a logical structure to get to the section for paying taxes.

Navigation

Thirdly, the participants were asked about their perception of the overall navigation. Their feedback is overshadowed by the initial first impression, which was chaotic and overwhelming. Interestingly, Taylor pointed out that since the website includes a large amount of information, one should expect a lot of clicks. It is an important way of categorizing and differentiating information. However, when he was asked to find "Opplysninger om skattekortet mitt", he further elaborates, " I can see that there are plenty of clicks needed, I would say maybe 2-3 clicks too many" (Taylor,19). As presented in figure 8 below, when clicking on the tax button on the front page, you get redirected five times before reaching the page. Each box below represents a different click, corresponding to a different site within the site. Taylor explains that he finds it unnecessary and especially difficult for first-time users, as it creates confusion and uncertainty about what to do next.

Figure 8 Representation of clicks needed to reach "Skattekort" from the homepage of Skatteetaten.no

Likewise, Anna states that "I find it difficult to know where I am, and if I'm at the right place. I just feel like I'm constantly clicking without getting anywhere" (Anna, 17).
On the other hand, Bruce explains that he found the search engine to be rather useful, as he can narrow down the information without having to scroll through the different pages. Jack adds to this by saying:

> *"Even though I find it difficult to understand what I'm doing, I feel like I can still manage my way around because I have better digital knowledge. I can find shortcuts. My parents, however, would probably use many hours figuring out the same shortcuts" (Jack, 18).*

Alteration

In order to better understand what information and alteration the participants would prefer in order to make the website more usable; they were asked the following question: If you had the chance to create a new design layout to make the website more usable for first-time users, what would you change? Interestingly, all participants suggested a new page dedicated to first-time users. Jack explains this intention behind a new page by stating:

"A new page would reduce the cluster of unnecessary information and make it easier to understand what to do when paying taxes. I also think it is important to have a section or page

where difficult words are explained because right now, I can feel the anxiety building up. I don't understand most of the words, and I am afraid I will make the wrong moves" (Jack, 18).

All participants made it clear that they associate paying taxes with something scary and stressful and, therefore, would want adult support. Additionally, Tina argued that having functions such as *step-by-step guides* would help first-time users better understand the overall tax-paying process. Bruce further supported this idea, stating, *"animations would make any process feel easier, as it would help create a better feeling on the page" (Bruce, 20).* Surprisingly, Taylor pointed out that he would design the page in a similar way to as it is now, as he appreciates the different sections. Moreover, he states, *"I would add more color contrast to the page, as the white space makes the website look boring (Taylor, 19).*

Other suggestions were; a tax calculator, changing the color scheme, a chat function, a frequently asked question (FAQ) feature, and finally, a list with difficult and foreign terms explained. Taylor enhanced the importance of a tax calculator by explaining how many people struggle with the problem of tax returns and in many cases, have to pay more money back to the government than they had expected. He further states, "Having a function like this calculator visible on the front page would make the entire process feel less scary, and it would also help people pay the right amount of tax" (Taylor, 19). Although Skatteetaten's website already has a similar function, Taylor argues that the design and layout of the existing functionality do not help the user experience, instead it makes it more confusing.

Four out of five participants were unhappy with the existing color scheme, as they explained that it makes them nervous, anxious, and uncomfortable. Anna points out, "I don't like the purple color, it is too dark, and I associate it with Halloween, or something similarly spooky. I prefer a lighter shade, I think it would change a lot" (Anna, 17). Both Bruce and Tina suggested a FAQ feature, they believed it would help the users find answers easier, as well as know that others are facing the same difficulties. Lastly, Jack suggested a section or a list with foreign terms explained, he pointed out that words and terms that are unknown can in certain cases, demotivate a user and ruin the overall experience.

5.1.2 Empirical findings summary

The most striking finding was the number of times and clicks they needed in order to actually find the section for filing taxes. Other key findings from this phase indicate that all participant's first impressions of skatteetaten.no were chaotic and disorganized. Additionally, they found the *home page picture* and *my page* sections to be the most relevant information, as it was the first thing that caught their attention. Moreover, the participants were affected by the intricate and complex terminology used on the website. Surprisingly, all the participants were unhappy with the exciting color scheme, as it made them nervous, uncomfortable, and anxious. In sum, all of them were either confused or annoyed by the navigation on the website and suggested a new page dedicated to first-time users.

5.2 Participants wireframes and redesign

In order to gain insight into the participants' own preferences and needs, they were provided with the possibility to design their own "perfect version of skatteetaten.no". Keeping in mind that the participants were not designers themselves, their inputs were meant to aid the decision-making process for the redesign.

As the empirical findings in section 5.1 show, the participants underline a need for several alterations in order to enhance the overall usability of skatteetaten.no. Phase 1 clearly demonstrates that the users have strong preferences of what type of information should be included and where on the site it should be placed but did not uncover how the participants would prefer the "flow" of the website to be. Wireframes serve as tools to design websites, as one can test out the navigation before starting the actual digital designing. Using posters and post-it notes representing different graphic elements and buttons, they were asked to visualize their ideal website. Observations and analysis of both the process and final wireframes resulted in a deeper understanding of the user's needs and their preferred way of actually using the website. Moreover, this was substantiated by their argumentation for why some elements and buttons should be removed or altered. Presented below are the five paper wireframes made by each participant. This section will present the key similarities of the five different wireframes.

Figure 9 Wireframes by all five participants

5.2.1 Key similarities of participants wireframes

The table below summarizes the elements that participants wanted on the redesigned website. Overall, five out of five participants confirm the need for reduced irrelevant information and clicks on the redesigned website.

Table 5 Summary of wanted elements

Elements wanted	Participants
Reduced number of clicks	5/5
Explanations for both terms used, and the tax process	4/5
Designated section for FAQ	5/5
Vector illustrations	5/5

Interactive elements	3/5
Explainer video about the tax-payment process	4/5
Chat function	5/5
Calendar	4/5

Overall, five out of five participants confirm the need for reduced irrelevant information and clicks on the redesigned website. In addition, there was strong support for enhancing the use of explanations as the terminology was found intricate and confusing, as Anna (17) clearly stated, *"this is an important website, and I need to understand the terminology, but as for now, I do not feel comfortable distinguishing between similar phrases and the technical language"*. Interestingly, all participants pointed out the need for a FAQ section, stating that they felt *"alone and stupid"* (Jack 18) in not knowing how to find the needed information.

As the table shows, all participants wanted vector illustrations on the redesigned website in order to *"help soften the look"* (Taylor, 19). Moreover, three participants elaborated on the need for interactive elements such as videos, buttons, social media links, or a tax calculator. Interestingly, most of them also wanted an explainer video, in either animation format, or live-action, to help them understand the overall process. Notably, five out of five participants wanted a chat function in order to pose direct questions to get instant feedback. The majority of participants wanted a calendar feature so that they could stay up to date; Bruce (20) further pointed out, *"I think it is important to know when different due dates during the year are so that I can avoid any mishaps' '.*

In addition to revealing vital information about what elements the participants wanted, this phase also led to significant findings as to *where* on the website they wanted different information.

5.2.2 Redesigned website

Below is a screenshot of the redesigned webpage. The primary change applied to the current version of skattetetan.no is the specific subpage dedicated to first-time users: "førstegangsbrukere." This is presented as a button in the global navigation and does hence not disrupt the existing website (Figure 10). Clicking on this button takes the user directly to the dedicated webpage for "førstegangsbruker" (Figure 10).

Figure 10 "Førstegangsbruker" button added in the global navigation menu on the redesigned website.

On this page, you are firstly met with a section that includes three different buttons: 1) Se og endre min skatt, 2) Betale skatt, 3) Forstå skatt. In addition, you are introduced to Skatte-line, who is supposed to act as your personal companion on the website. Below the fold follows an introduction video explaining the overall tax process. This video is taken directly from the current skatteettaten.no website. The next section provides an explanation using text and vector illustration in order to clarify in a different format.

Figure 11 Animated character: Skatte-Line

The information is presented in a Criss-Cross movement. This is followed by a FAQ section, which aims to clarify the most common questions asked by users. After, follows three buttons; “Skattekort”, “Skattemelding” and “Skatteoppgjør”, which are all inspired by the homepage design on the current website. Finally, the redesign includes a calendar feature, aiming to provide an overview of due dates and reminders.

In concluding phase 2 of the research, this redesign provided a basis for a usability test with the same 5 participants. This was conducted in order to assess their overall impression and to evaluate whether applying concepts from media studies and interaction design to improve the user experience of first-time tax filers.

5.3 Usability test

Below follows the results of the usability test, including both the tasks conducted and the accompagning answered reflection questions.

Table 6 Usability coding frame with results

	Anna			Tina			Jack			Bruce			Taylor			Severity ranking
	T	C	A	T	C	A	T	C	A	T	C	A	T	C	A	
1	5 sec	1	Yes	4 sec	1	Yes	4 sec	1	Yes	3 sec	1	Yes	11 sec	3	Yes	**No issues**
2	4 sec	0	Yes	6 sec	0	Yes	20 sec	3	No	8 sec	1	Yes	5 sec	0	Yes	**Medium**
3	7 sec	1	Yes	23 sec	3	Yes	11 sec	2	Yes	5 sec	1	Yes	3 sec	1	Yes	**Medium**
4	4 sec	1	Yes	2 sec	1	Yes	6 sec	1	Yes	3 sec	4	Yes	3 sec	1	Yes	**No issue**
5	15 sec	2	Yes	9 sec	1	Yes	5 sec	1	Yes	11 sec	2	Yes	8 sec	1	Yes	**Medium**
6	12 sec	2	Yes	10 sec	1	Yes	8 sec	1	Yes	5 sec	1	Yes	10 sec	1	Yes	No issues

The table below provides an overview of the usability-tasks asked to perfmed by the participants. Corresponding design elements that are applied on the redesign websites are included, as well as the overall severity ranking for each task, as presented in section 4.4 (Usability test).

Table 7 Usability test questions, with corresponding design elements and severity ranking

Question	Task questions	Design elements applied	Severity ranking
1	Where would you click to file your taxes as a first-time user of skatteetaten.no?	Button: “førstegangsbruker”	No issues
2	Where would you go to find information about what Skattemelding is?	Option 1: Step-by-step video Option 2: Interactive explanation Option 3: Button, “Skattemelding”	Medium
3	How would you try to find information that you are not seeing on the page, or still don't understand?	Chat box	Medium
4	Where would you go to login to your “my page”-section	Log in-button	No issue

5	Can you find the the page where you file taxes?	Buttons: Option 1: “Se og endre min skatt” Option: 2: “Betale min skatt”	Medium
6	Can show me information about the last “skatteoppgjør” before the summer?	Calendar	Low

Three of the tasks have been deemed *medium*, as they do not necessarily interfere with the user experience often but do, however, cause frustration for the users. One task has been ranked *low*, as it does not directly hinder the users but could, however, impact Skatteetaten's image. Two of the tasks have been ranked as *no issues*, meaning there are no changes that need to be conducted right away.

After the usability test, the participants were given three reflection questions in order to further evaluate the user experience and provide insight into eventual changes that still needed to be made.

1. What did you like the most about the website?
2. Did anything surprise you with the website?
3. Did anything with the experience cause you any frustration?

Firstly, all of the participants stated that the page dedicated to first-time users made them feel relaxed and that their needs were taken into account. Anna (17) points out that she likes the vector illustration (*Skatte-Line)*, adding: “I think it is cool to see this as the first thing, it makes the website less scary and more friendly”. She further states that her favorite part about the redesigned website is the three *option button*s. Additionally, Jack (18) states that these “make the website so easy to use” as they are presented with the most important actions early on.
Interestingly, when asked if any of the features surprised them, Bruce (20) stated that he was impressed by how efficiently the page worked, elaborating, “I found all of the relevant information on one page, so I did not have to click through several sections to find what I am looking for”. Two out of five participants answered that they were surprised by how easy the tax process is explained through the video. Thirdly, when asked if anything was frustrating with the new design, all participants answered “No”. However, when reflecting further, Taylor (19) did point out that this page is very different from the rest of skatteetaten.no, and while

their own page is easy to use, the other pages, such as “skattemelding” or “skatteoppgjør” still follow the original design.

6.0 Discussion

This chapter aims to answer the two research questions of this study;

1: How is the current website of skatteetaten.no experienced by first-time tax filers?
2: How can a redesign of skatteetaten.no apply concepts from media studies in combination with interaction design to improve the user experience of first-time tax filers?

This is attempted through a continuous discussion of empirical findings in light of the theoretical framework presented in chapter 3.

6.1 Research question one

First impression

The empirical findings underline that there are three main issues in relation to the participant's first impressions. Firstly, there is an overload of information; secondly, the information is structured in a messy or cluttered manner; and thirdly it is difficult to filter out what information is relevant for first-time users in particular.

The findings indicate that the users are not able to get a sufficient *overview* (Wong, 2020) of the website in light of Shneiderman's (1996) *visual information seeking* principle, as they find it difficult to filter out relevant information. The participants were directly drawn to the home page picture (Figure 6: Lady at the desk), as it was both the first visual aspect on the page and included a vector illustration. As *overview* implies, the participants were focused on the illustration rather than the minor details on the page. However, as they have not paid taxes before, the text "Sjekk skattemeldingen din", did not make sense to them or help them understand what to do next, any better, or what information to *filter*. Instead, they focused on the illustration of the lady at the desk, which could, in turn, imply that their *mental model* (Sharp et al., 2019) has trained them to associate illustrations with relevant information and hence *filter* for these when seeking details. Additionally, this appears to be the case as to why they were drawn to my page - section as well.

It can be argued that the process stops after the first two stages of the mental model, and therefore reaching the wanted *details* is hard. Furthermore, it can be argued that the failure in this process has led to an overall negative first impression the participants were left with. Since the designers have to rely on the audience to *decode* (Hall, 1973) the data in their own minds (Wong, 2020), it is even more important that the data/information presented is easy to understand. In extension, it can therefore be argued that they are not able to transform the data on the page into actual *information*, *knowledge*, or *wisdom* (Russel Ackoff, 1989), and thus travel upwards in the DIKW-pyramid.

With this being said, it is of importance to state that the design of the website was not created with only first-time users in mind, as Skatteetaten has to cater to all citizens in Norway. However, findings show that greater importance to the *visual information-seeking* principle could result in better usability to all users in general and first-time users in particular, as they are not familiar with the tax-paying system in order for it to be more successful.

Usability

The *visibility principle*

A good website utilizes the user-centric design process in order to ensure that the website is both efficient and easy for the users rather than for the people designing it. Based on the empirical evidence, it can be argued that an excessive amount of information on the current website, in turn, leads to poor *visibility* (Sharp et al., 2019). While there is substantial information about the different tax-related subjects such as *Avgifter*, *folkeregister*, *utenlandsk*, and *bedrift og organisasjon*, the information is not targeted to different user groups. Hence, the participants were confused as to what information was relevant for them and how to locate key actions. As stated in the findings, the participants went blind due to the overload of information, suggesting that while information was visible, the visibility of relevant information was low. This is underlined by the lack of "functionality and choices being visible and clear for the users" (Norman, 2013).

Arguably, this has led to lower discoverability, as the participants struggle with decoding and understanding "the different types of choices they have" (Norman, 2013, p. 72). The findings are in line with Sharp et al. (2019), as skatteetaten.no does have all the necessary features, but participants underline that *"functions and features are hidden"*, making them both hard to find

and use. Sharp et al. (2019) exemplify this through devices and environments that have become automated through sensor technology. Elevators, lights, and faucets can sometimes become difficult for people to know how to control, activate or deactivate. Unfortunately, this leads to users getting frustrated and caught out. The highly visible and intuitive, controlling devices such as buttons, switches, and knobs, have been replaced with invisible and unclear activating zones where users have to guess where to go and what do to in order to make them work (Sharp et al., 2019, p.26).

The *feedback* principle:

The table below represents the differences between the time and total clicks needed on the current website, and the redesigned website when asked to "file taxes".

Table 8 Comparison of time spent on the current and redesigned website.

	Current website		**Redesigned website**	
Participants paying tax for the first-time	**Total time needed**	**Amounts of clicks needed**	**Total time needed**	**Amounts of clicks needed**
Anna	2 min and 14 sec	5	15 sec	2
Tina	1 min and 56 sec	8	9 sec	1
Jack	1 min and 46 sec	6	5 sec	1
Bruce	2 min and 58 sec	8	8 sec	2
Taylor	1 min 58 sec	6	11 sec	1
Average time/clicks needed:	**2 min 17 sec**	**6,6**	**9,6 sec**	**1,4**

The empirical findings clearly show that the participants used a substantial amount of time (an average of 2 min and 17 sec) to complete a single and the most important task; filing taxes. It can be argued that this is a result of poor usability. Poor usability can in many cases, be a result of not being able to *decode* (Hall, 1973) the intended message. On skatteetaten.no, there are multiple choices and roadmaps that lead to sections with different categories. This cluster of information made it difficult for first-time users to both understand where and what they were looking for. When clicking on one category, the participants were redirected to a new page with even more categories, which made them confused and stressed. This result strongly implies that the *feedback* principle, which involves sending information back to the user regarding what action has been done and accomplished, has not been applied. However, as

suggested by Sharp et al. (2019), both verbal and visual feedback mechanisms could have been applied by the designers, as it would have made the users aware of what was happening.

However, as shown in the table above, there is a marked difference between the current website's average time and clicks and the redesigned website. It can be argued that time spent on a task, or the amount of clicks used to reach the desired page, does not provide solid metrics for how easy or good the design is in itself. It is not necessary that a few clicks is always better, or directly entail better usability, or that the shortest amount of time indicates that a solution is most effective. Rather, it can be argued that aggregated, these different metrics provide a quantifiable baseline for reasoning and insight into user performance.

The *affordance principle*

In light of the empirical evidence, it can be argued that the website's overall *affordance* (Sharp et al., 2019) was weak, as the participants did not manage to functionally use the webpage. Even though the website has loads of graphic elements such as buttons, scrollbars, and links, the overflow of information made it hard for the participants to decode the messages of these functions, leading to weak affordance.

Navigation

As the findings clearly state, the participant's overall impression of the navigation system was chaotic and unclear, and hence can be understood as not succeeding in "providing a roadmap" (Farrell, 2015). Rather, it can be argued that instead of directing the first-time users toward the right path, it made them more confused and frustrated .One reason for this might be the lack of applied principles such as *consistency* and *constraints* (Sharp et al., 2019).

In light of the findings, the participants made it clear that the design layout on the current website was unorganized. However, when looking at the design of the current website, it has applied the principle of *consistency,* as the website follows the rules and has similar operations for achieving similar tasks (Sharp et al., 2019). The website has consistent elements such as "boxes" with information categorized in a grid system on almost every subpage. One can, however, argue that the complex interface offers too many operation choices, which in turn takes away from the importance of the consistency principle.

By looking at the theoretical framework, skatteetaten.no could perhaps have applied the concept of constraints progressively in order to restrict the first-time users from unwanted and unrelated information. By applying the principle through solutions such as deactivating and shading certain options, it would have made it easier to *filter out* content and make more room for *feedback* mechanisms. Moreover, it would have prevented first-time users from making mistakes and feeling overwhelmed and instead helped them constrain the way information is perceived.

As supported by the findings, the participants found the vocabulary on the current website difficult, as they did not understand the different terms and felt like they "missed out" on important information. Arguably, this problem is connected with the negative impression of the navigation system. Because the participants did not understand the overall navigation system, the foreign and intricate terms made it even more confusing to interact with the website. Moreover, it could be the relation between a poorly navigational structure and difficult terms that gave the participants an overall negative impression. Additionally, the empirical findings state that the existing color scheme made the participants uncomfortable, nervous, and anxious. It can be argued that this problem or *noise* (Münster, 2020) disrupted or delayed the intended message for first-time users.

Alterations

As the results from the interviews underline, the participants were dissatisfied with the existing website. In order to create the most suitable, usable, and user-friendly website, it is therefore important to figure out what specific changes they prefer and need. As the participants represent Generation Z and hence the next generation of our digitalized society, it becomes even more important to highlight their preferences. As underlined by Mendez (2021), this particular generation values customized designs and experiences that are less traditional. By designing with this generation in mind, and their digital competence, in particular, we can keep up the continued digitalization process and thereby bridge the *Generation gap.* The interviews clearly state the need for a redesigned website, particularly for first-time users in mind, as they find simple and essential tasks difficult.

6.2 Research question two

6.2.1 Wireframes (workshop)

The empirical findings show that the most substantial findings were gathered through the interview phase, in addition to the result from the usability tests. However, getting to the usability test would not have been successful without first conducting the wireframe workshop, where the participants themselves could create wireframes representing their individual preferences and needs as the wireframes show important evidence of what information is regarded as relevant and where they would like to have it placed, has been obtained. More precisely, it was the observations and clarification during the workshop that provided a basis for the specific design choices. In addition to the particular inputs of where they wanted different elements placed or what elements could be eliminated, it was their arguments that helped *encode* the message in a way that it could be better *decoded* by the participants.

Based on the findings, each participant suggested solutions to improve the redesigned website, which can be argued are connected to their mental models (Sharp et al., 2019). The participant's preconceived notions and previous experience from similar official websites resulted in different alterations they would like to apply to the redesigned website. A reason for this could be that they had a difficult time decoding the intended message (Wong, 2020), and therefore relied on their references from other websites, in combination with their digital competency.

6.2.2 Redesigned website

As presented below, table 6 (from section 5.2.1) has been extended to include reasoning for the elements wanted from the participants and corresponding design goals as outlined by Sharp et al., 2019. In order to design the best possible solution, the elements chosen on the redesigned website have been analyzed in light of the usability goals, as they all help create a good user-centered design

Table 9 Extended table from section 5.2.1

Elements wanted	Analysis	Correlating usability goals (Sharp et al., 2019)	Participants
Easy access to information about tax filing.	Finding information quickly and easily helps alleviate anxiety at the starting of the process	Effectiveness	5/5
	Tax terminology is alien to most first time users and an FAQ or explainer helps point them in the right direction.	Efficiency/Effectiveness	4/5

	To feel reassured that they are not alone in finding skatteetaten.no difficult to understand or scary.	Efficiency	5/5
UI Tweaks that make the website more friendly	The colors are very sterile and very inviting	Memorability	5/5
	Illustrations help alleviate stress and make it look less like a government website.	Memorability	3/5
Chat function	Easy access to information that may not be present on the website	Utility	5/5
Calendar	To keep up with important due-dates	Utility	4/5

The most common element wanted among the participants was reduced clicks, which can be argued to enhance the overall effectiveness of the redesigned website. The biggest problem with the current website was that the participants never knew what page they were on, meaning they were struggling to find information quickly and easily. In line with the participant's request, the redesigned website proposes a button in the global navigation menu of Skatteeaten.no in order to solve this problem. This element was put in order to alleviate anxiety at the beginning of the process and enhance both *effectiveness* and *efficiency*.

As presented in the findings, all participants suggested user interface (UI) tweaks that would make the redesigned website more friendly. In order to reach their expectations, two main changes have been made, firstly, to the color scheme, as it is now in a lighter pink color, and secondly, the addition of interactive elements and an animated character (Skatte-Line). The aim has been to make the page look less static and repetitive. However, it can be argued that skatteetaten.no is, in fact, a government website, meaning they have a reputation to look after. On the other hand, by adding the elements presented in the redesigned website, based on the testing results, it can be stated that UI-tweaks enhance user-friendliness and enhance *learnability* without compromising on professionality and brand image, or visual strategies. In addition, UI-tweaks in general can be argued to *strengthen* utility and *memorability*, as they help to understand the functionality of the product, as well as remember how the product works.

Another UI - tweak, the interactive chat function, was proposed as an important element by all participants, as they would be able to instantaneously ask questions to Skatteetaten in case they needed it. Interestingly, the current website does have this element, but the participants were

not able to detect it and make use of it. The redesigned website does offer this element as well, in the bottom right corner, just like the current website. Moreover, it can be argued that because it was the participants who suggested the element, they were more prepared to look for it when presented with the new design, which can be the reason why they found it so quickly. Just like the chat function, the current website has a calendar element, but it is difficult to find, as on chat function on ""skatt"" and scroll down to the bottom of the page to find it. The redesigned page for first-time users presents a calendar function as well in the same right corner, but it can be argued that the participants found it more functional as it was on the page they knew all of the important and relevant information was presented on for them. Both the chat and the calendar function were used in the redesign as it would help increase the *utility* of the overall design, meaning they are believed to offer better functionality.

6.2.3 Usability test

Scoring: Time, Clicks, Accomplished

Based on the result presented in table 6, it can be understood that individually, neither time spent, clicks used, nor whether or not a task has been accomplished or not, are solid metrics for judging a website. For instance, if a task is formulated in a difficult way, it could give the participants more time to solve it, which might lead to not being able to accomplish it at all. Another example can be that a participant uses several seconds but only one click to accomplish the task. If the findings are based on the task being accomplished, that represents good results, however, if it is based on time, the results would imply otherwise.

By analyzing table 8, presented in section 6.1, in light of the TCA, one can argue that the redesigned website is marginally better in terms of both time and clicks. However, this could also stem from the fact that the redesigned website was developed in close cooperation with the participants.

Considering Time spent, Clicks needed, and whether or not a task was Accomplished, all together can still provide valuable information when presented through the severity ranking. The empirical findings from the usability test clearly state that there are no **critical issues** assessed with the redesigned website. This means that there are no immediate errors or problems that directly restrict the users from completing the tasks. A **critical issue** could have been if the participants were not able to find the page dedicated to first-time users in the global

navigation system. However, in the case of the redesigned website, the majority of participants were able to quickly find the first-time user page, except for one participant who used 11 seconds and thus used a very long time. The reasoning behind this was that the participant scrolled down the page in the hope of finding the dedicated page with the other sub-categories. In order to avoid scenarios like this, a solution on the redesigned website could have been by applying more of the essence of the *visibility* principle and shading over the dedicated page button in the navigation. Regardless, it is of no surprise that there are no critical issues, as the redesigned website was created closely with the participants through participatory engagement. Moreover, this can be seen as underlining the importance of participatory design in general, but it does not imply that the usability of the website would be representative to all first-time users, as one aspect of the research design implies that feedback is very subjective to the participants.

Based on the findings, three out of six questions were ranked as **medium.** These questions include; question number 2: “Can you find the information about Skattemelding and explain what it is?”, question number 3: “Can you find the chatbox?”, and finally, question number 5: “Can you take me to the page where you file taxes". On question number 2, one participant struggled to accomplish the task, using several clicks and in a total of 20 seconds. This can be due to the fact that the question was formulated in a difficult manner, which could have caused confusion. The participant went directly to the homepage instead of finding the information on the page designed for first-time users. It is difficult to determine why this was the case, as the redesigned page provides information about *Skattemelding* in three different sections. One explanation could be that drawing on this *mental model,* he is used to finding such key information on the front page.

Although all participants were able to accomplish questions number 3 and 5, they used several seconds. This can be argued is because of the positioning of the elements, for example, the chat button, which is placed in the right corner. On the other hand, placing the button anywhere else on the website would have been odd, considering the fact that the element has a “specific” place on all websites. When asked to find the button to file taxes, all participants were able to do so, however, some went to the homepage instead of scrolling to the top of the page where

Just because the five participants that took part in this particular study were satisfied with the redesign does not mean that other first-time users will have the same impression. It is important

to underline that the redesign was made closely with the participants, meaning their subjective needs and preferences were prioritized. However, the fact that there were three questions ranked as **a medium** can suggest that messages can never be fully decoded by the users as the users always will rely on their mental models and the designers on their conceptual models (Sharp et al., 2019).

7.0 Conclusion

To answer the research problem, a qualitative study has been conducted using a participatory approach. The empirical findings are seen in connection to the theoretical stance, which includes both media studies, communication studies, and user experience. This chapter presents the main findings drawn from the discussion of each research question and cumulatively provides a conclusion of our research problem.

How is the current Norwegian Tax Administration website (skatteetaten.no) experienced by first-time tax filers?

First-time tax filers, here represented by five high school students aged between 17 and 20 years, find the current website of the Norwegian Tax Administration difficult to navigate, hard to comprehend, and filled with terms they do not understand. Empirical findings underline that though many key usability principles are already applied on the current website, they do not successfully manage to engage first-time users. Rather, substantial frustration and stress are experienced related to the tax-filing process. While this could be seen in relation to tax filing being stressful in general, as one is scared of giving the wrong information or getting tax returns, the empirical findings clearly show that design choices exaggerate such negative feelings.

Keeping in mind the key characteristics of Gen Z and their online behavior, it can be reasoned that Skatteetaten has not successfully designed with this age group in mind. On the other hand, it can not be reasonably expected that all subgroups, minorities, the elderly, or immigrants should have their own website within the main website. What can be regarded as a takeaway is that first-time users do need some level of facilitating. This thesis shows that a shift in the mindset of the designer is needed in order to provide a usable website for the target audience.

How can a redesign of the Norwegian Tax Administration website (skatteetaten.no) apply concepts from media studies in combination with interaction design to improve the User experience of first-time-tax filers?

The redesigned website and subsequent usability test demonstrate that participant satisfaction was enhanced through the specific design choices. By assessing the participant's individual inquiries, and their preferences on skatteetaten.no, this thesis was able to study the internet messages that they were not able to decode.

In order to sustain e-governance, the fact that a "one size fits all" solution to web design does not adequately take into account the growing gap in digital competence between generations/groups needs to be embedded stronger in the design process. Based on the evidence provided in this thesis, Skatteetaten would benefit from investing in user-centered approaches and adjust their expectations in order to design for the future generations to come. This further implies that public authorities need to invest in empirical knowledge in close association with different user groups. Moreover, the transferability of this study lies in the fact that the same research design can be applied to other user groups in order to bridge the growing gap in digital competence. In order for e-governance to be more efficient, they need to shift away from the homogeneous design for all digital competence in society.

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Appendices:

A: Interview guide

«How do first-time users experience Skatteetatens website?»

Phase one: explorative general questions:

Første inntrykk:

1: Hva er det generelle første inntrykket ditt av nettsiden?

2: Hva var det første som fanget øye ditt?

3: Hva var det første du ville klikke på?

4: Hvilke andre nettsider minner denne siden deg om, og hvorfor?

- Er denne nettsiden bedre eller dårlige?

Brukervennlighet:

7: Se for deg at du skal betale skatt, hvordan ville du gått frem?

Navigasjon:

8: Hva slags informasjon på første side er mest relevant for deg som førstegangsbruker?

9: Hvordan syntes du det er å finne informasjonen du trenger?

10: Hvordan er oppleves navigasjonen?

Eventuelle endringer:

11: Hvordan kunne nettsiden ha vært mer brukervennlig for deg som bruker?

B: Consent form

«How do first-time users experience Skatteetatens website?»

Background and purpose of this study:

In regards to my master thesis, I would like to conduct a research that focuses on the experiences of first-time users, and how they interact on Skatteetatens website. The overall goal of the study is to figure out if the current layout on Skatteetatens website is understandable and use friendly for first time tax filers, specifically. In order to accomplish this goal, I will redesign the current website, based on textual inquiries gathered by these interviews. After the redesigned version is finished, I will conduct a usability test, in order to gain insight on further improvements.

Participation in the project:

It is voluntary to participate. If you however decide to withdraw from the interview, you can do this at any given point without any reasons. It will not lead to any negative consequences for you if you choose to not participate or withdraw from the research. The information about you will only be used for this study, and will be treated confidentially and in accordance with the privacy regulations given by Oslo Metropolitan University and the Norwegian Centre for Research Data (NSD).

What will happen to your information once the assignment is handed in?

All persona for the information for this research will be anonymized. The data will only be available for the student and advisor in charge of this study, no one else will have access to see or read it. Any audio recordings will be deleted immediately after transcription, and no identifying information will be saved. All data will be deleted after the assignment is handed in.

Your rights:

If you want access the data registered about you, you can contact the researcher of this project at any given time. You also have the right access information about you which are both either corrected or deleted, and you have the right to receive a copy of your personal information.

Where can I find more information?

If you have questions about the study, or want to exercise your rights, please contact Himani Rohatgi on: +47 XX XX XX XX or **********@gmail.com

Declaration of consent:
I have received and understood the information about the project and have had the opportunity to ask questions i agree to:

☐ To intend the interview
I agree that my information will be processed by 13.05.2022.

(Signed by the participant, date)

I hereby consent to the following method for data collection being utilized: (Mark the field for yes, if the method is ok or no, if you do not want this method being used)

Type	Yes	No
Interview		
Observation		
Audio recording		

C: Usability test script:

Introduksjon:
Takk for at du vil ta del i testingen av den nye skissen. Testen vil omtrent ta 10 minutter å fullføre, og du vil forbli helt anonym.
Slik fungerer det:

1. Du vil bli presentert med et redesign av Skatteetatens nettside
2. Klikk der du ville klikket hvis du skulle ha løst oppgaven i virkeligheten.

Dette er ikke en test av deg, det er ingen riktige eller gale svar.

Spørsmål for selve testen:

1) Hvor ville du ha klikket for å finne siden til «førstegangsbrukere» på Skatteetaten.no?
2) Hvor ville du ha funnet informasjon om «Skattemelding»?
3) Hvor ville du ha prøvd å finne informasjon du ikke finner på siden, eller forstår?
4) Hvor ville du ha gått for å logge inn på «min side»?
5) Kan du finne siden hvor man «betaler skatt»?
6) Kan du vise med hvor du finner informasjon om «skatteoppgjøret for sommeren»?

Spørsmål etter testen:
1) Hva likte du mest med testen?
2) Var det noe som overasket deg med siden?
3) Var det noe i løpet av denne prosessen som frustrerte deg?

D: Usability severity ranking:

Critical: all problems that interfere with the user experience, and restricts users from completing their tasks. An example could be that the user did not recieve a confirmation feedback after making a payment or can not sign in to their account. This issue needs to be s immediatly before releasing the product.

Serious: includes issues that have to be fixed as soon as possible as they slow down the user's experience. A good example can be that the users are not able to navigate to pages or that they are not able to reset their password.

Medium: include issues that have a medium severity, which might not interfere with the user experience often, but can still be frustrating for the users. For example, the users has to scroll a lot to find information, or that the text is too small to read.

Low: include issues that are neccesary to fix, but does not hinder the user experience as they are not critical. An example can be spelling errors or not updated information, that might affect the overall brand image, but does not affect the user experience.

No issues: this situation arise when the user reports a problem that turns out to not be an issue, meaning so further actions needs to be taken.