

# **Looking for Troubles and How to Improve User Interfaces (UIs).**

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## Summary

This assignment is about UIs and troubles that may occur in them. It's also about different peoples use and interaction with these UIs and what type of challenges that can arise during these interactions.

The assignment is done as a qualitative study where I have used principles from Participatory Design (PD) to Explore and learn, and Principles from Universal Design (UD) and User Centered Design (UCD) have been used as guidelines for how to properly design UIs.

Through the assignment I found that some principles are broken quite often in different UIs, and I have suggestions as to how the design could have been done better in accordance with the principles.

# Preface

This assignment is the final assignment in the master studies in informatics: Design, Use and Interaction at the University of Oslo. I have enjoyed the process of writing this assignment and have gotten the chance to work with people who has shared their experience with UIs with me.

Thank you all that have participated in this study, and I would like to especially thank Guri Verne for being my supervisor through this assignment. You have given much great advice that have been useful in the writing process.

I would also like to thank my fiancée and family for supporting me in my work.

Oslo, March 2023

Bjørn Langseth

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# 1. Introduction

I wish to research different user groups and their use of digital technology. The different user groups are blind, elderly, and young people and students, and I have studied how they are using different digital devices and their user interfaces(UIs). When creating a UI there are several principles to keep in mind to make it better. This thesis is about Universal Design (UD), Participatory Design (PD) and User Centred Design (UCD) and is researching how one may use principles from these to improve and facilitate the user experience (UX) of UI. How to help people to get a better understanding of how to interact with the UI?

What is the result when these principles are ignored and what troubles can we find in UIs today?

And what challenges do different user groups have with them? My motivation is to show how already existing webpages can be improved and the reasons I want to do this study is because I think it would be an interesting job to help improve the UIs of for example web sites and applications by making them more available and easier to use for everyone. Developers may find it interesting to see how UIs may be improved. There are many suggestions for what can be improved and that could be something that also others find useful. I will use literature about UD, PD and User Centred Design to support my research. I also want to help people with their use of computers and teach them useful things. I want to help people to get a better understanding of how to use computers and hope to learn something from them so that it becomes what is called mutual learning. I have made 11 interviews and five observations for this thesis.

## 1.1 Improving UIs

A factor that complicates the process of evaluating technology is the problem of partial perspectives. People see different sides of technology and social practice, depending on their positions. Sometimes the work of some people is quite invisible to others. (Vicky O'Day, 2013, p. 33) This is true when it's about coding of web pages. A regular user of a web page or an app does not know all the complex code that is behind it. We just see the result of the code and don't really have to get into coding to use a web page or an app. I was using computers for a long time

before I ever understood a single code. What we see in the UI is a representation of the code behind it.

When changing the design of web pages, it is necessary to edit the code of the web page. And one needs a coding expert to do that, especially if it is a complicated change. For a beginner, though, even the smallest changes can be complicated to employ. You don't really have to be a programmer at all to know what changes should be made on a web page or an app. But you must know how to communicate the changes that should be made to a programmer.

If we want to become more involved in good conversations about technology, we need to use language that promotes this kind of involvement. A way to think about technology is as an assistant. The idea here is to visualize technology not as a material object, but as an agent that acts on your behalf while you are busy doing more important things. (Vicky O'Day, 2013, p. 35)

“On the social level, what was first considered “broken” and then determined to be “worth” repairing was something that depended on context, including access to disposable income, perceived value of the object, and perceived ease of repairs. Moreover, those who diagnosed most problems and carried out most repairs were the repair staff or volunteers rather than the owners of the device” (Rosner et al. 2014, p. 329) “If it's not broken, don't fix it.” This is a common slogan, but sometimes it is good to improve something even though it's not broken to get a better UX.

## **2 Background**

### **2.1 What Is a UI?**

A UI is the design of what a human is interacting with in Human Computer Interaction (HCI). It is the design of the operating system (OS) and the design of how the applications look outwardly. Whenever you are looking at an application, website or an OS that is the UI you are looking at and it is possible to interact with.

## 2.2 What is use?

To use is in my own words “to do something with something.” According to Hovde S. it is formulated that a user is a person or a group of people that are dealing with things, technology, services and architecture in a culture or natural environment over time. “Use” is the activity users get involved with. To get involved with refers to the use being about some form of exchange or interaction. Use requires a physical and mental separation between the user and what is used.

The collection of what we use includes conditions that can be concrete and limited, as for example an electric drill or an app on a smartphone. (Hovde S., 2021, p. 1)

## 2.3 Universal Design (UD)

“Design is work done today to enact a desired future.” (Ribes et al, 2009, p. 4) UD is a term which was first mentioned by Ronald L. Mace, who was an influential architect, product designer and educator. UD was according to him a concept to design products according to the needs of people regardless of their age, ability, or status in life. The term now has the meaning of design for all. (Persson et al, 2014, p. 4)

It has become increasingly important over the last decade with accessibility and equal opportunities for all in the digital age. In most projects that develop interactive systems the concept of accessibility is being considered to a greater or smaller extent (Persson et al, 2014 p. 1).

There are certain handicaps, disabilities, and sicknesses we are stuck with and are not able to heal: visual, auditory, physical, speech, cognitive, language, learning, and neurological disabilities. In the future we will hopefully be able to heal these handicaps and sicknesses either by the development of science and medicine, or the power of God when the Messiah comes or Jesus returns, but while we are waiting for that time to come, we must help people to live with their handicaps as best as possible. For this purpose, we have UD.

The quality of life may be increased for people who before didn't have access to services, but now have. “In many countries, non-discrimination laws that require a certain level of

accessibility are in place. Therefore, the question is not so much about whether it is necessary to achieve accessibility, but more about how to achieve it.” (Persson et al, 2014 p. 2)

It is also an increasing demand for accessible services as the population grows older and gets more disabilities. According to Persson politicians are working for the agenda that people with disabilities get integrated within society. (Persson et al, 2014 p. 3) And developers are working to make applications more inclusive.

“Universal design has its roots in the Barrier-free design and accessible design approaches, and according to more recent research, the term Universal design can be used interchangeable with the term design for all” (Persson et al, 2014 p. 4)

### **2.3.1 Economic Considerations**

Making services more available for everyone is not only morally good but also good for business making the product available for a broader market. The disabled are a group that has equal purchasing power with other groups in society. By creating online services that are available to disabled people, you can increase the turnover.

### **2.3.2 Legal Considerations**

There are legal requirements that services are universally designed. In Norway the law says that public and private businesses have a duty to universally design solutions for information and communication technology (ICT) aimed at or made available to users, so that the general functions of the business can be used by as many people as possible, regardless of functional impairment. ICT means technology and systems of technology that are used to express, create, transform, exchange, store, multiply and publish information, or that otherwise make information usable.

The obligation under the first paragraph does not apply if it entails a disproportionately large burden for the business. In the assessment, particular emphasis must be placed on

a. the effect of removing barriers for people with disabilities

- b. the nature of the business
- c. the costs of the arrangement
- d. the company's size and resources.

The duty according to the first paragraph is considered fulfilled if the business fulfils requirements for universal design in other laws or regulations.( Lovdata, § 18. Universell utforming av IKT, 2021)

### **2.3.3 Ethical Considerations**

Ethically speaking, it is wrong to exclude certain groups of people from society. Having webpages unavailable for certain types of people can be frustrating for them. It is not nice to not be able to use for example shops, or music streaming services or even not be able to confirm that you're not a robot because you can't see.

### **2.3.4 World Wide Web Consortium (W3C) and Web Accessibility Initiative (WAI)**

W3C is an organization that develops standards for the Internet. A big part of this work is to make the internet accessible for people with disabilities. W3C are committed to develop the internet tow its full potential and this includes promoting a high degree of usability for people with disabilities. W3C started the Web Accessibility Initiative(WAI) in 1999 to develop accessibility guidelines on the internet. They have developed WCAG. WCAG 1.0 became an official W3C Recommendation on May 5, 1999.(Crisholm et al. 1999).

WAI cultivates its work through W3C's consensus-based process. This involves different stakeholders in web accessibility and includes industry, disability organizations, government, accessibility research organizations, and more.

WAI, has partnerships with organizations around the world and pursues accessibility of the web through these primary activities:

“



- ensuring that W3C standards support accessibility
- developing accessibility guidelines for web content and applications, browsers, and authoring tools
- developing resources to improve web accessibility evaluation processes and tools
- supporting education and outreach on web accessibility
- coordinating with research and development that may impact future accessibility of the web
- promoting harmonized international uptake of web accessibility standards

“ (Henry and Brewer 2020)

### 2.3.5 Web Content Accessibility Guidelines (WCAG)

WCAG 2.1 (5.th of June 2018) defines how to make Web content more accessible to people with disabilities. Although these guidelines and success criteria cover a wide range of issues, they are not able to address the needs of people with all types, degrees, and combinations of disability.

The guidelines and Success Criteria are organized as four principles, which are important and necessary for anyone to access and use Web content. Designers must make content that it is:

1. **Perceivable** - Information and UIs must be presented to users so that they can perceive it. Users must be able to perceive the information being presented.
2. **Operable** - UI components and navigation must be operable. Users must be able to operate the interface (the interface cannot require interaction that a user cannot perform)
3. **Understandable** - Information and the operation of UI must be understandable. Users must be able to understand the information as well as the operation of the UI (the content or operation cannot be beyond their understanding)
4. **Robust** - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies. Users must be able to access the

content as technologies advance (as technologies and user agents evolve, the content should remain accessible)

If any of these are not true, users with disabilities will not be able to use the interface. There are many general usability guidelines that make content more usable by all people, including those with disabilities. However, in WCAG 2.1, its only included those guidelines that's address problems particular to people with disabilities. This includes issues that block access or interfere with access to the Web more severely for people with disabilities. (Kirkpatrick A., et al. 2018)

When UIs support accessibility features, users are more likely to want it and developers are more likely to implement it. When developers want to implement an accessibility feature in the UI, they are more likely to demand that their authoring tool make it easy to implement. When authoring tools make a feature easy to implement, developers are more likely to implement it in their UI. When an accessibility feature is implemented in most UIs, developers and users are more likely to demand that user agents support it. If one component has poor accessibility support, sometimes other components can compensate through “work-arounds” that require much more effort and are not good for accessibility overall. Developers can do more work to compensate for some lack of accessibility support in authoring tools; for example, coding markup directly instead of through a tool. However, in most cases the works-arounds are not implemented, and the result is still poor accessibility. Sometimes the problem of poor accessibility support in one component cannot be solved and the result is inaccessibility, making it impossible for some people with disabilities to use a particular UI. (Henry S.L., 2018)

### **2.3.6 Text to Speech**

Text to speech is an accessibility feature and is an accessibility fundamental. Many modern devices have built in text-to-speech software. Especially some people with visual impairments and people who are blind use this specialized software called screen readers. “It is hard to teach about web accessibility without talking about screen readers. Screen readers has become for web accessibility what wheelchairs is for accessibility.” (w3 schools, Accessibility Screen Readers)

With screen readers the user is provided with important functionality that make it possible to navigate through headings based on what the user hears. It also gives speaking image alternatives

and identifies internal and external links. It is also possible to highlight text that gets read aloud for people to see and hear the content at the same time. It is important though, that content is coded properly so that all the functionality of the text-to-speech software works with the content. People who are blind and cannot see what is on the screen and people with partial sight depends on this feature. Also “people with dyslexia and other cognitive and learning disabilities who need to hear and see the text to better understand it” (Zahra 2019) depends on this functionality. The feature gives additional benefits for people who can’t read the language but needs to hear it aloud, and it’s beneficial for people who prefers to listen to something while for example multitasking.

For this functionality to work it is necessary to Use semantic HTML markup for structures such as headings, paragraphs, lists, forms, and tables. It is also necessary to provide text alternatives for images, icons, and other non-text content and to ensure that all functionality is accessible with keyboard (keyboard compatibility) and to ensure that text information is understandable without the visual context. (Zahra 2019).

It is also an especially important guideline for blind people in WCAG. “Guideline 1.1 – Text Alternatives. Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols, or simpler language. “w3 schools, Accessibility Screen Readers)

This guideline is important so that blind people can get a description of a picture for example.

### **3. Methodology**

I have chosen to work with Qualitative Interviews and observation to generate qualitative data. Qualitative research is about understanding people, the social aspect and the cultural context people exist in. (Myers and Klein, 2011) Qualitative data is not based on numbers. Data based on numbers is called quantitative data. “Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena. Examples of qualitative methods are action research, case study research and ethnography. Qualitative data sources

include observation and participant observation(fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions" (Myers 2015). It is possible to collect quantitative data through interviews but that is not my goal this time.

Through interviews I have gathered data about different users use and complications. I have taken what is most important from the interviews and written summaries of the interviews.

Doing Ethnography is a book on the curriculum, and I will be doing ethnography in this thesis. Ethnography is about getting to know "the portrait of the people" (Mayo, L, M) And you get to know people by interviewing and observation and recordings.

## **3.1 Paradigm and Research**

### **3.1.1 The Interpretive Paradigm**

I am going to work with the interpretive paradigm, which is concerned with describing the world through a subjective lens by emphasising the individual experience. Epistemology is an interpretive approach, although it's not necessarily exclusively interpretive. It's a branch of philosophy concerned with the nature of knowledge itself, and is addressing questions as: How do we go about knowing things? How do we separate true ideas from false ideas? How do we know what is true? How can we be confident we have found the truth? How can we find out if something is good or bad? (Lusini S. 2021)

### **3.1.2 Interpretive research**

Interpretive research does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges (Kaplan and Maxwell, 1994) Access to reality is only through social constructions such as language, consciousness, and shared meanings. (Myers M., D.) Interpretive researchers see themselves as part of what they are looking at. Reality is subjectively defined through the human senses.

### **3.1.3 Positivist research**

This is a typical scientific approach where it is believed that there is an objective reality that can be described by measurable properties which are independent of the observer. Research is positivist if there are for example quantifiable measures of variables or hypothesis testing. In positivist studies they usually test theories trying to increase the predicting understanding of phenomena. (Myers M., D.)

Positivist researchers see themselves as someone outside looking into what they are researching. Ontology is a positivist approach. Ontology is a branch of metaphysics that is concerned with identifying in general terms what kind of things that exist. And addressing questions as What is existence and the nature of existence? Is there a God? What Happens to us when we die? (Lusini, 2021)

### **3.1.4 Critical research**

Critical research is about fighting against injustices in society. Reality is produced and reproduced by people. The ability to change social and economic circumstances are made difficult by various forms of social, cultural, and political domination. Critical research is fighting to eliminate the causes of alienation and domination. (Myers M.D.) In critical research it is thought that social reality is historically formed and is produced and reproduced by people.

The positivist approach fits me, but it is limited to some extent to what can be measured and perceived as objective reality. The interpretive paradigm fits me more because it is realizing that everything is more subjective. And sense making and thinking through language is important.

## **3.2 Interviews**

Participant observation and interviewing has been one of the most important methods which ethnographic researchers have attempted to understand the different contexts of different people's everyday economic, political, and cultural lives (Crang and Cook, 2007, p. 35). An in dept interview is a qualitative research method or technique. From interviews it is possible to

learn whatever the person interviewed knows about the questions asked. As human beings we have limited knowledge, but if you interview someone who knows a lot about the subject in the interview it is possible to learn a lot. When doing interviews if you want to pick up the details it is vitally important that a tape recorder is used to pick these up. There are several reasons for this. Taking notes can be very distracting both for the interviewer and interviewee and may be distracting the conversation. The second reason you should use a tape recorder is because of the researcher's memory. It is hard to remember even straight after such a conversation. It's hard to remember the intricacies of what was said, and comparing notes taken afterwards with actual transcripts often reveal significant differences between what the researcher remembers being said and what was said. The last reason is that many researchers find it mentally exhausting to listen very closely to everything that their interviewees say. It can often be a relief to know that if your attention wavers you can still listen to the tapes later." (Crang and Cook, 2007, p. 53) I feel that it's true that a tape recorder is helpful when it comes to making an interview. If I was supposed to write notes on all the answers, it would be difficult for me to write down everything that was being said. Sometimes it is also difficult to hear what the person said, and then it is helpful to be able to listen to it over again until you get it right. Personally, I didn't write any notes before transcribing the interview listening to the recording.

In terms of gaining access to communities, it is not only who the researcher contacts that is important, but also how he explains the project to them. The ways in which he presents aspects of himself in the process of negotiating access to a community is particularly important. (Crang and Cook, 2007 p.24)

When making an interview it is important to choose the right place to have the interview. For me it doesn't matter much if it's through zoom, at school, at my home or at the interviewed person's home; that's the reason I let the people I interview decide.

There are several ethical considerations to have in mind. It's for example important to not ask offensive questions and to keep the participants participation confidential and not reveal who they are. This is to protect the privacy of the participants. When I asked a person, I interviewed if I could do some observation on his workplace he answered "That depends on what costumers we are working with. Some costumers think it is okay while others value their privacy. So, it

depends on where we are in the process, but I can talk with my colleagues about it.” Hopefully, I can go through with the observation if I keep it confidential.

### **3.3 Observation**

An observation may give insight into the participants' situation and context. (Råen, p. 31) During an observation it is possible to learn about a certain environment and what is going on in that place. The knowledge retrieved is limited to the place observed, but the knowledge may be like other places that are similar. Observation gives the opportunity to get data around a user in his/her natural surroundings and data about what the user does and not just what the user says.

Observation in its basic form it can be described in three stages where the researcher, first, gains access to a particular community, “second, lives and/or works among the people under study to take on their world views and ways of life, and third, travels back to the academy to makes sense of this through writing up an account of that community's 'culture'.” (Crang and Cook, 2007 p.21)

I have done four observations in this project. I started writing sentences when I observed, but soon realized I had to write keywords first, and then form sentences later. In that way the person I observed didn't have to wait for me to finish writing sentences. A typical observation was done by telling the person to do a task on his/her device and then I observed as they did it.

## **3.4 User Experience (UX) and User Centred Design (UCD)**

### **3.4.1 UX**

The term UX was not created to only focus on digital products, but the entire experience that an individual has, through any, and all mediums, around a product or a service. This user-centred mindset is often neglected as an aspect of digital product design and needs to receive more attention. It's important to provide developers with what they need to gain understanding of the user's needs, and what a good user experience means to the users. In that way we can create

more successful digital products with a solid foundation of knowing the users' needs and goals (Knight W. 2019, p. 1). It may be a user experience with digital interfaces or simply how for example a map of the Subway routes is designed. It is important to know that UX and usability is not the same. Usability is about how easy the service or product is to use, while UX is about the whole experience. “While usability is most definitely an important factor that contributes to the user experience, only concentrating on usability neglects other aspects of the experience.” (Knight W. 2019, p. 20)

### 3.4.2 UCD

The goal of UCD is to provide a good UX. The term UCD was first introduced by D. Norman and S. Draper in 1986. They thought the “purpose of technology is to serve the user,” and the needs of the users must be considered when making the technology. (Norman & Draper, 1986).

“The use of UCD processes has been shown to have several financial and business-related benefits. For example, reduced total time and cost of the development process, and increased end-user acceptance of the developed product.” (Heggebø R., Å. 2020) Involving users in the development process is key to getting a product with high usability. Usability is according to ISO 9241 defined as “The extent to which a system, product or service can be used by specific users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”. According to Wikipedia: “ISO 9241 is a multi-part standard from the International Organization for Standardization (ISO) covering ergonomics of human-computer interaction. It is managed by the ISO Technical Committee 159. It was originally titled Ergonomic requirements for office work with visual display terminals (VDTs).[1] From 2006 on, the standards were retitled to the more generic Ergonomics of Human System Interaction.” (Wikipedia).

Prototyping is an important part of the UCD process and it’s recommended to start prototyping early in the design process, then continue throughout the process to support the creative process (Gulliksen et al. 2005).

The process may consist of these three steps:



1. It should contain a proper analysis of the users' needs and the context of use,
2. a design phase,
3. a documented evaluation with concrete suggestions for modifications and a redesign in accordance with the results of the evaluation. (Gulliksen et al., 2003)

Adjustments are made in the prototype according to the feedback from the evaluation.

In 1996 Noyes et al. stated that the involvement of users early in the process reduces the cost of development because you can detect issues early on (Noyes et al., 1996)

UCD and PD are different because "Participatory design gives the user agency and control over the design process rather than simply consulting them for more data to help make decisions about the writing process." (Pope A., R. 2020)

### **3.4.3 Principles of UCD**

The following principles are based on one article by Viebrock and one article by Obear.

#### **1. Create designs unique to user needs**

Consider the specific characteristics of a certain user group, or targeted population. The product should fit the environment where it will be used the most.

#### **2. Maintain consistency.**

For good user experience it is necessary to keep the product consistent. Consistency determines how long time it takes to learn how to use it. More consistent products are easier to learn. Keeping in mind that the product must be consistent is important from the beginning to the end. It is also important to remain consistent if the product needs updates so that it remains valuable to the user. This principle also applies to restaurant chains. If a restaurant chain does not follow the same recipes in the different restaurant the quality may vary. That's why so many restaurant chains that are successful follow the exact same recipes in the different restaurants.

### **3. Use simple and natural dialogue.**

Don't present users with irrelevant information. Irrelevant information may make the user feel that he's wasting time. Avoid chit chat and jargon and only display relevant information. To use plain and simple language with vocabulary that is relevant to the targeted audience is key and allows the user to complete the task without becoming overwhelmed and confused.

### **4. Reduce unnecessary mental effort for the user.**

“Effective product design allows users to focus on the task at hand rather than the tool itself.” (Viebrock S.) The easier it is to use the product, the better. Make it easy to learn. Don't expect the user to invest a lot of effort to learn how to use the product. This makes the process less efficient and it's more likely for errors to occur. Instructions should be easily available for the user to refer to. The goal is that the users can complete tasks without confusion and to reduce the need for unnecessary effort.

### **5. Provide adequate feedback.**

Give the user a response to all their actions. For example: change the screens appearance after the completion of an action. Keeping the user up to date during the entire process reassures them and helps them stay on track with their work.

### **6. Provide adequate navigation mechanisms.**

Navigation with high usability makes satisfied users. Give the users clear routes to take in the product.

### **7. Let the user take charge.**

Users already know what their needs are. They should be able to utilize a product with minor effort and rely on the support of the product to do the rest.

### **8. Present information clearly.**

Information to the user should be necessary for the intended task. Elements that are relevant for the product can fill up the user's screen and give confusion; avoid that.

It's good to for example organize relevant information into spaces or boxes and to segregate information into sections so that the user can easily determine the different elements involved in the task.

### **9. Help**

Let the users get the help needed to use the system with minimal use of the document provided. Let the system be self-explanatory. Information provided should be in line with the user's tasks.

### **10. Be free of errors**

Minimize the occurrence of errors. If an error does occur, the product should always offer a solution to the problem so that it serves the user as best as possible. (Viebrock S.) and (Obear, 2017)

I choose to work with UCD in this project because the principles are important to have in mind when designing and improving

## **3.5 Participatory Design (PD)**

PD begun among the various social, political, and civil rights movements in the 1960s and 1970s (Robertson and Simonsen, 2013, p.1)

Also, according to Simonsen and Robertson PD can be defined as: “

A process of investigating, understanding, reflecting upon, establishing developing, and supporting mutual learning between multiple participants in collective “reflection-in-action”. The participants typically undertake the two principal roles of users and designers where the

designers strive to learn the realities of the users' situation while the users strive to articulate their desired aims and learn appropriate technological means to obtain them.” (Robertson and Simonsen, 2013, p.2)

According to Finn Kensing and Joan Greenbaum there are six guiding principles of PD.

1. Equalizing power relations – Give a voice to those who are oppressed in different power relations; especially within organizational power structures. In certain workplaces management and technical experts have more power than the workers on the floor; that makes it important to give those workers a say. Help people with less power and money to assert their needs to those in power.
2. Democratic practices – Engage and educate people so that they act for their own good, and for the common good. Teach participants necessary information so that they get an understanding for the decisions being made.
3. Situation-based actions – Work directly with people in their environment, for example at home or in their workplace, where the actions are taking place and where the technology is; to understand both actions and technologies, instead of through formal abstractions.
4. Mutual Learning – When technical experts and workers learn from each other, it's called mutual learning. It's about improving the understanding of different actors so that they may find a common ground.
5. Tools and techniques – Help different actors to express their unique needs and visions. The tools and techniques can be for example prototypes, workshops, and sketches.
6. Alternative visions about technology – Ideas that gives rise to equality and democratic practices.

A part of my research is about how to use the methods of PD to improve the UI of web pages or apps. In PD there are few methods but many techniques and tools. (Simonsen et al 2013, p. 120) In the Iron and metal project 20-30 workers in smaller groups met for a few hours every other week to discuss problems with computer systems and management and how to deal with such problems. There's a political argument in favour of this: people should have the right to influence their working conditions. The goal is that learning will happen for the “experts” and participants which can result in better designs. This process of learning between different power

groups is now known as “mutual learning.” (Simonsen et al., 2013, p. 27) I would like to do something similar. The participants should produce ideas of how to fix problems with the computer systems they are using. PD enables those who will use the technology to have a voice in its design, without needing to speak technical language of technology design. This is achieved through creation of prototypes and discussion about prototypes, mock-ups and other tools that can represent future systems and practices. People who are not professional technology designers may not be able to define what they want from a design process, without knowing the possibilities. The goal is a process of mutual learning for both designers and participants. (Simonsen & Robertson, 2013, s.1) PD is based on social interaction as users and designers together create, develop, express, and evaluate their ideas and visions. Shared experimentation and reflections are essential parts of the design process. (Simonsen, 2013, p. 8). Bjercknes mentions: “However, the most difficult part for designers is to give some of the decision-making power to the users – and for the users to take that power” (Bjercknes). Why this is so difficult is partly because some of the designers feel the need to “make it themselves”, and sometimes we are not able to find the best solution by ourselves, and need help from other people, in the PD process. Simonsen and Robertson mentions an expression called “user empowerment. “(Simonsen, 2013, p. 27). What this means is that we through the PD process empower the user to give suggestions and participate in developing the product. So, the user is no longer only a user but also a participant. An example of this is when the participant draws mock-ups and answers questions in an interview. The result of that is that the product ends up being different and hopefully even better than if the users did not participate. “Participatory designers share the rights to make these decisions among the whole team. A fundamental principle in Participatory Design is the sharing of decision-making power between all participants in the design process. Having a say therefore addresses power and participation in the decision-making in design.” (Simonsen, 2013, p. 129).

“Participatory Design (PD) is an approach to the design of IT where the designers invite future users to participate in all phases of the design process.” (Bratteteig, T. et al. p.1, 2014) To involve users in the design process will bring up a lot of ideas of what can be done with the design of many solutions.

I got inspired with the simple way An arranged his PD project in South Korea and I decided to be doing it in a similar fashion.

### **3.5.1 Step 1 - Public Information**

The Public Information step is arranged to inform potential participants of the project in efficient and enjoyable ways. (An et al 2007, p. 5). I am studying at the Institute for Informatics in Oslo, and I can recruit some participants from there. It would be necessary to inform the participants that the project is about improving digital technology. Appropriate questions to ask would be: May I record the interview? What changes can be made to make the technology you are using easier for you? Is it something in the UI in the units you are using that is difficult or annoying that you wish could be designed differently?

Doing this research can hopefully lead to a lot of suggestions for how to make different technologies better. There may be that some people don't want to share the improvements that they have in mind and want to keep it for themselves maybe because they want to work with these improvements on their own. That can be the case if the participants are working or studying within informatics. Someone could feel that I am stealing their ideas. It is important to emphasise that it is voluntarily whether they want to share their ideas. It would be better to realise that it's a cooperation between the participants and me. And if they want credit for their ideas I could mention their names in the paper, if that is what they desire. But this is problematic when it comes to maintaining confidentiality. If people don't want to share their ideas, then they will not participate in the workshop. So, I don't think it will be a problem.

### **3.5.2 Step 2 - Design Workshop**

The participants will tell me or draw the improvements they think would make the technology or technologies they are using better. Hopefully, they will have some good suggestions that I can write about in my thesis. What design tools should I use in the workshop to make it easier for the participants to come with suggestions? I will provide them with a pen and a paper so that they may draw their ideas.

### 3.5.3 Step 3 – Feedback

“Feedback is for participants and experts to develop the design together.” (An et al 2007) This is when it is appropriate to see what the participants have produced as suggestions to improvements and then together develop the improved design with the participants.

Because I feel it’s a bit more challenging to have participants that I don’t know, I will start off with people I know. In that way I can also practice PD and get a little more experience before I start interacting with strangers.

## 3.6 Action Research

I have not followed action research in great detail, but I have let myself inspire by the methodology in my work. According to Kaasbøll Action Research aims at:

1. Generating new scientific knowledge published as academic papers or master thesis.
2. Improving life for the clients also after the research has finished.

It’s also about developing and evaluating novel IT solutions for clients, training clients on novel topics and make the clients continue using the solution. (Kaasbøll J. J., 2022, p. 28)

He also mentions that design never stops, and that new demands and conditions require rethinking of systems. (Kaasbøll J. J., 2022, p. 32)

With improving digital interfaces and making them have a better User experience (UX) we are trying to improve life for the users. This is true whether it be for people with handicaps as for example blindness or visual impairments, or deafness, or regular users.

According to Spencer Action Research has four phases:

Phase 1 – Planning for research and defining a specific research question.

- The research question is something that needs to be tested. This is what I started my thesis with. I created some research questions that I can work with answering. The thesis is about finding answers to those questions.
- Literature review – I do literature review by citing relevant literature and using it as a part of my thesis.
- Design Process where you determine your data methods, consider ethical issues, get the required permissions, and create deadlines.

#### Phase 2 – Action Phase

- Multiple cycles of experimentation and data collection. Might include qualitative data collection (interviews, observations, and artifacts.) or quantitative data collection (rubric scores, surveys, or achievement data).

#### Phase 3 – Analysis

- Organizing data with charts and graphs and looking for specific trends. I have made tables with collected data and have discussed the assignment with my peers.

#### Phase 4 – Conclusion

- This is where you share your research with the world and reflect on your own practice. This will lead to newer questions and the cycle will continue as you refine your craft.

(Spencer J., 2017)

## 3.7 Case Study

“Case Study is not a methodological choice but a choice of what is to be studied” (Stake R.E., p. 443). Whatever the case, that is what is in focus, and everything else comes after that. In case studies it is normal to optimize understanding by following up with scientific questions. (Stake R. E., p. 443). It may be a difficult or simple case and the time we spend may be long or short, but while we concentrate, we are engaged in a case study (Stake R. E., p. 444). I have case study material. A lot of people are being left out of for example logging into the bank because they can't see. And people who have bad eyesight also can't read certain web pages because the



contrast ratio is too low. Some people are old and didn't grow up with computers. They are not as advanced as the younger generations and are struggling interacting with UIs. This case leads to the research question I have already mentioned "What about these principles and how are these principles making UIs better?" "Ultimately, we may be interested in a general phenomenon or a population of cases more than in the individual case" (Stake R. E., p. 444). "A case study is both a process of inquiry about the case and the product of that inquiry."

### 3.8 Tense

It's recommended to either use the present or past tense. The present tense gives the reader a greater sense of immediacy and it's logical to use the present tense because concepts are always here and now. The present tense is also faster for the reader to process. An exception is when citing or attributing an idea to a person; use the past tense because an author's opinion may change over time. (Webster, J., Watson, RT., 2002, p. 18) I only use past and present tense. The interviews are written in present tense because it fits better with the style, even though it may attribute ideas to the person interviewed. I sometimes mix past tense with present tense in a sentence. For example, "She said that it is very complicated because there are many problems..." This is not to confuse the reader but a pointer to show that what was said is in the past, without having to make the whole interview in past tense, because interviews are best in the present tense. That is why I didn't write for example "she said it was very complicated because there was a lot of problems." For me it's a matter of taste. Dr. Copriola, P. wrote "More often than not, changing tenses during a sentence can create a very confusing statement. However, there are methods, such as a verb tense shift, that you can use to change the tense during a sentence that makes sense and can help you establish a timeline for the character you are referring to." (Capriola P. 2021)

"With each revision the paper ripens. Expose your paper to the fresh air and sunshine of collegial feedback. With each discussion new ideas emerge. The ripening process is facilitated with demanding work and frequent revisions." (Webster, J., Watson, RT., 2002, p. 20)

### 3.9 Representations and Abstractions

A representation is something that is a deputy for something else. Another example of representations is models of atoms. Atoms was for a long time too small for us to know exactly how they looked. It was made simplified models of atoms so that we could know how they are built. A representation modulates physical phenomena and enhance important properties in for example the operating system. Another example of a representation is a thought map. A thought map will vary from person to person. In the same way it varies what is considered important properties in an operating system from different user groups. The operating system is a representation where what is not represented may end in a black box where many functions are not available. Representations are showing up in the computer world as diverse levels of abstraction. In abstraction unimportant details are excluded and chosen qualities are enhanced. The computer is powered by divided current pulses (voltage differences) in the form of the representations 0 and 1 (binary format), where 1 constitutes a current pulse while 0 constitutes a pause. The binary level is controlled by code languages and these representations are further combined to form what we perceive as content at the computer. (Bratteteig T., 2010, p. 148-151)

## 4 Cultivation of the Socio Technical Method

The word “cultivate” is according to dictionary.com “to promote the growth or development of.” The term action research was first used by members of the London Tavistock Institute in the early 1950s when deciding to change current industrial practice, they wanted to cultivate both research and therapy. They wanted to improve work situations that was inhumane. To do that they developed an approach and methodology which they called “socio-technical.” The word is about a relationship and symbiosis between the social and technical. There is a dash between the word because within information systems it is one thing. Technology which they considered to be machines and the associated work organization should not be allowed to be the controlling factor when new work systems were implemented. They also emphasised to provide a high quality and satisfying work environment for employees. (Mumford E., 2006, p. 1) Human needs must not be forgotten when new technical systems are introduced. “Many researchers followed

the Tavistock example, and William Foote Whyte(1956) was one US pioneer.” (Mumford E., 2006, p. 2) Whyte, and people like him wanted to cultivate a new and more humane socio-technical system in many different workplaces. Many people had suffered harsh, stressful, and dangerous working conditions. And it was about time to protect the workers from this.

While cultivating socio-technical design “The results of socio-technical design were always closely monitored and recorded to establish if it had led to both the efficient use of the technology and an improvement in the quality of working life of affected employees.” (Mumford E., 2006, p. 2)

In the 1970s socio-technical principles were applied and cultivated in office systems. Companies were interested in socio technical design for a variety of reasons. They were cultivating new computer systems and wanted their staff to use them effectively. The positive reaction to the new systems of powerful groups was important. (Mumford E., 2006, p. 2-3) Sociotechnical projects were directed at increasing organizational effectiveness as well as the quality of working life. (Mumford E., 2006, p. 13)

By the end of the 1970s, socio-technical ideas became more accepted. Industry was expanding and many firms had labour difficulties. There were problems in obtaining staff and firms wanted to avoid losing those they had. Initiatives usually came from leaders of a company wanting to achieve stability and harmony and to reduce labour shortages. (Mumford E., 2006, p. 14)

In the early 1980s, Digital began cultivating the use of expert systems and were starting off by manufacturing plants and sales offices. It was important that important staff should welcome and cooperate with the change. Some firms had histories of using a socio-technical approach and wanted to use it in the introduction of modern technology. (Mumford E., 2006, p. 3)

In the 1980s, a group of American researchers, managers and consultants made a Socio-technical Round Table. Socio-technical researchers and practitioners from other countries were invited to join. It played a leading role in cultivating the socio-technical message to American industry. This group is still active today. (Mumford E., 2006, p. 14)

In the 1990s there was tough economic circumstances, and several companies in the USA, Europe and Australia continued with socio-technical projects, remodelling these to fit changing economic and social conditions. (Mumford E., 2006, p. 16) In the Netherlands there was

developed an approach called modern socio-technical theory, that focuses on production structures as the main factor of any socio-technical programme. The theory is that most production systems are overcomplex and cannot be easily handled, and need to be simplified (Eijnatten & Zwaan, 1998). But change involves risk, and this is something many large companies try to avoid. (Mumford E., 2006, p. 23)

It's worth arguing that having UIs with good usability and an overall good UX is a human need and is important in the socio technical method. Who wants to work with systems that are too difficult and annoying to use? That will make it more difficult to work for the employees and will the decrease their quality of life.

## 5 UD Interviews

My theme for this interview is UD. UD has a set of guidelines that designers designing UIs and webpages use to make them more available for everyone, including people with poor vision or blindness, deaf and hearing loss, limited movement, speech disabilities, photosensitivity, and combinations of these and some accommodation for learning disabilities and cognitive limitations (Kirkpatrick A., et al. 2018).

After doing all these interviews, I have gathered explanations of what UD is. I have asked questions that only scratch the surface in addition to more deep questions that require more explanation.

It is not only who the researcher contacts that is important when trying to gain access to communities, but also how s/he explains the project to them. The way the person presents aspects of himself in the process of negotiating access to a community is particularly important. (Crang and Cook, 2007 p.24)

It is important that the person you interview knows something about the subject you are researching. Unless you want to find out what random people know about a certain subject.

## 5.1 Person 1 - Interview 1- an Expert

For the first interview I chose a professor from University of Oslo IFI that I already know for certain knows the subject. I will call him person 1. My goal is to get insight into the knowledge of the person interviewed about UD. He will have the role as an informant. I think he will be able to answer my questions and have knowledge within this field. I expect to get valuable knowledge about UD. The questions I have made are relevant and I'm looking forward to seeing what he is going to answer. I am curious to see what knowledge he has and what his individual opinions are about the subject.

I am through this interview getting to know an expert's opinion and thoughts about the subject. I have asked a critical question "What is bad about UD" to get to know the shadow of UD. The ways in which researchers are critical has changed over time, and so too have the ways that they pursue their critical agenda and argue for their contributions. (McGrath, 2005) I regard asking that question as being critical because it is trying to figure out what is not so good about UD.

I don't know the path that the interview is going to take or how long it takes to answer all the questions, but there is a time limit of 30 minutes. I may have to drop some of the questions when the time limit is up.

Some people like to work in a setting that is homely - or a home - to put people at ease or to allow domestic topics to be broached. Others suggest that this relaxed set-up increases the pressure for consensus while still others suggest that people feel better able to speak their minds in a more formal environment because they can feel confident in their anonymity. (Krueger 1988; Templeton 1987). (Crang and Cook, 2007, p. 60)

I chose to have the interview through zoom, while I was at home and the person interviewed was in his office. I feel more comfortable at home when it comes to doing interviews. It is a lot scarier to go to someone's office to interview them. It was a possibility to have the interview outside the office somewhere at school but for some reason I felt that the expression in Norwegian "det enkle er ofte det beste" was true. Translated to English the expression is "The simple is often the best". I sent the person I interviewed a link to the zoom meetings several days in advance of the interview. It is different to meet up with someone in person and to be in the

physical presence of the person then it is to have the meeting on the screen, but I think the interview would have turned out the same way if I met him in person.

“Whatever the case, it is important to bear in mind that the ability to arrange meetings with appropriate people in appropriate places can have an important bearing on the outcome of your research. (Crang and Cook, 2007, p. 38) I knew that this guy was the appropriate person to interview about UD, and I also found it appropriate to do the interview through zoom. The outcome of the interview was satisfactory.

When I contacted person 1 asking whether I could have a confidential interview with him. He said yes to that, but later said he would have liked some more information about it when I contacted him. My email had not been descriptive enough, but I told him more in detail what it was about when I talked to him through Zoom.

Personally, I assumed that there may be many jobs within UD, but according to the person interviewed it hasn't been that many jobs, but there are getting more.

I learned quite a bit about UD through this interview. I learned that there is UD not only in the digital but also in other areas like rural surroundings. I also learned that you may not reveal too much about a person in a confidential interview. “One other point that I would add about interviewing is that it is crucial to try to reassure the interviewee at the start about your purpose and about confidentiality.”(Walsam, 2006, p. 323)

On the other hand, I didn't learn how to apply the UD guidelines. To learn that through an interview is complicated. He first discovered UD and 2007. He said it is good because it gives access to a larger group of people to services, and it also contributes to democracy. It is bad because it may be complicated and difficult to implement, and it costs a lot of money to manage. The laws may get in the way for what was originally planned, and it may be unnecessary. Certain UIs may get compromised because of UD. If there are too many buttons or choices for the user, it may get confusing. The guidelines are for those who evaluate systems to check, control and evaluate. Developers, developing teams, testers, and those who evaluate use these guidelines. And the digitalization directory also uses it to check if the requirements are fulfilled. There are main principles and distinct categories organized hierarchically. There is an increase in the interest and need for specially computer scientists that knows something about UD and

facilitation. There are strong connections between PD and UD. He said an interesting question to ask is what are the challenges and possibilities on the border between these? We are all unique. We have different bodies and different thoughts and different feelings and different interests. And we are also at one level completely similar. We have all the same value as humans and as beings so what are the challenges of pushing the universal down on all the differences? That is a question one may think about for years. But that is more philosophical.

## **5.2 Person 2 - Interview 2 - a Blind Woman**

I have a friend (Person 2) that's blind and it was interesting to interview her about her use of her phone. I sent her a message where I asked her if I may interview her about her use of a smartphone as a blind person. She said yes and told me about a friend of her that is working with UD that I may interview as well. He works in a company called Include that is working with UD. It would be interesting to give this company a visit and do some observations there as well. I would just have to be discrete and don't interfere too much with what they are doing, but simply passively observe the workers and take notes of interesting things I see. Unfortunately, they didn't have time for it. I contacted several different companies to ask if I may do observation and/or see how they are working with UD and that I would keep it confidential. Unfortunately, I was not able to make such an appointment.

After talking more with her on messenger she told me that she would like to have the interview through messenger.

Following is the data I gathered interviewing my blind friend. The goal of this interview was to figure out what can improve technology for blind people.

She first discovered UD when buying her first iPhone as a necessity by suddenly becoming blind. She said her experience with UD is very varied. Certain web pages are easy to navigate but she experiences a lot of problems in how to navigate because there are very many ways of using your fingers to signal the web page you are on. She knows many different techniques. For example, you can double click with one finger and sometimes you can do it with three or four

fingers, sometimes you must twist. So, understanding how a web page is designed must sometimes be learned from a third party.

She said her favourite web pages are YouTube and Spotify. They are very accessible and even a child could use them. Facebook is also exceptionally good. It has audio descriptions of photos so that blind people can see what the image is portraying. For example, it will describe a photo by saying “two people smiling, and a mountain.” Facebook is her favourite.

Shops are exceedingly difficult to use for blind people. She cannot use any online shop. When trying to scroll the different clothing shops or even a store like Claus Ohlson it is virtually impossible to understand how to search for the items wanted because they use pictures a lot and not text descriptions, so shops are not aware enough how it is for blind people to use them.

She said that what she is happy about with the way her phone helps her as a blind person, is number one; the ability to stay socially connected to friends and making new friends around the globe. Number two; access to information. She really loves the NLB which is the Norwegian Sound and Braille Library. They have a free audiobook library where one can search out any book or subject one wants for free. It's great to have access to any kind of information that is important like medical, scientific research results and medical information and for example the way YouTube has lectures.

She said the most satisfying thing about UD for her is all the possibilities, all the enormous amount of access to information on any subject that previously where hard to find in libraries. There is an almost limitless access to knowledge and information. What she likes the most is that you can learn about anything. She's also incredibly happy about the way she can access information about arrangements happening in the real world that she can attend concerts, lectures etc.

When it comes to improvements, it can be made easier to navigate with the phone online. She thought she should find a teacher who is fully qualified in how to use the iPhone that can teach her the various touch techniques and contact the company and try to ask them if they are willing to teach more about UD. As an individual, she has not been taught by anyone how to use the iPhone but feels that she has a lot of competence and possibilities at the level she's at right now.



We agreed that developers use UD to make web pages more available for everyone, but not only available, but also accessible. She said that she prefers the word available over accessible because accessible means user friendly, while available translates to the Norwegian word “tilgjengelig.”

She feels like Siri has a lot of undeveloped potential and would say that on a scale of one to ten she thinks seven is how well Siri works. There are a lot of things she must do manually that they could have developed Siri to be able to do; that would make it easier for her. Siri is for instance not able to make a smiley emoji, you must do it manually.

### **5.2.1 Is there something you wish you could do with Siri that you now can't?**

She said there are many things, but it's hard to remember because it happens many times daily. So, a lot of the functions she uses on her iPhone are a combination of what is called voice over, which is her finger tapping the screen and Siri. There are certain things she wishes she could do only using Siri. An example would be when she wants to change certain settings on her phone. She must do it manually and to go into the settings menu, choose the actual thing she would like to change, like turn on or off Bluetooth. This is something she must do manually. It should be possible to make Siri do that with a voice command.

### **5.2.2 Obstacles Online**

She felt that it would be fun if for example Instagram could have the same form of visual description of photos as Facebook. This has to do with achieving WCAG principle nr. 1 of being perceivable. She said the biggest obstacle for her is that she has not yet learned how to navigate certain pages that she needs to for example buy things like food or clothes etc. That would make her life so much easier as she also has not got the mobility skills as most people have. Her biggest obstacle is that she cannot go to online shops. The online shops need a lot of improvement with UD, and there is a lot of work to do there. It's as if they have not even thought about blind people. There is also this law that you must have UD on your website. It's a discrimination against blind people to avoid having websites accessible and it is a human rights

law against discrimination. It is quite serious and certain things are ridiculously hard, but she would have to learn them from a blind technology teacher, and she cannot navigate her bank alone because they have something called captcha. Certain pages ask you to confirm that you're not a robot. Please enter the word in this box. She has spoken to so many blind people who were irritated about that because it is an impossible task for a blind person. And They have tried to develop an audio description of the word, but it is impossible to hear what is said because it is said by a robot, and it is not professionally designed. She is also at an international blind site also where everybody agrees about that. It is a very cool YouTube channel which is called "The Blind Life" and this man is blind, and he has dedicated his entire life to tutor people about technology for blind people.

### **5.2.3 How can UD help blind people?**

She said that the answer is exceptionally long but the most important way it helps blind people is by keeping them connected to loved ones, finding new friends, and obtaining valuable information etc. For example, about health issues and when they travel, google is good at describing where to go. So, if you are good as using your cane you can almost find anywhere if you have Google Maps with you at the same time.

### **5.2.4 Is there anything you would like to add about being a blind user of technology?**

She said that in her personal circumstance there is a lot of technology that she has not tried yet, like for example a fancy cane for blind people that speaks and can warn you about obstacles and even tell you what buss is on its way.

She could never afford that cane and there is so much technology out there that she does not have access to because she doesn't have the economy to get it. For instance, a lot of blind people have Alexis. So that would be something interesting for people who are interested in technology for blind people. With this machine you can say "open the door" and then it can and "turn of the oven," and it does that as well. I told her that South Park made a funny episode about Alexis.

Some people got angry because they lost their job because of Alexis and then there were some people who took over the job to Alexis as people instead of machines. She thought that's crazy because everybody talks about the opposite problem. That robots are going to take over people's jobs, and it was funny that a guy got angry because a robot was taking over its job. It was also funny that those people started working as Alexis. It was a person who sat in the house, and then someone said Alexis do this and then the person started doing it like a slave.

She has a blind friend who said to her that he had asked Alexis if she was jealous of Siri and then Alexis had said that "No I think all AI should be friends." She said she thinks Alexis is cool. It's funny to talk with her and it is a bit more developed. Many people don't know that Siri can tell you jokes and stories. They haven't developed it that much yet. She would like to explore Alexis more and see what possibilities it has. The only thing that stops her from further developing what she has of technological facilities is the economy. Because all these things cost a lot of money. Even a screen reader for your computer costs a lot of money and various programs for a computer that are made to be accessible cost money, so a lot of UD is expensive, but it is an amazing thing.

### **5.3 Person 2 - Observation 1 - A Blind Woman (Soundcloud)**

I send person 2 a link with my song on Soundcloud. She starts looking for the link in messenger on her phone with the help of something called voice over. Voice over is a screen reader on her iPhone where the iPhone reads whatever she puts her finger on. She must go to availability and turn it on as an extra function. She tells me that it's some sort of subordinate function to Siri. The text reader tells her who the different messages are from. She finds the different messages from me and eventually find the message with the link to my song on Soundcloud. When she comes to the link, Siri is just saying "punkt operator" in Norwegian and it is impossible for her to open the link in any way because the website is breaking WCAG principle nr. 2. Operable - UI components and navigation must be operable. Users must be able to operate the interface (the interface cannot require interaction that a user cannot perform) Soundcloud is operable with voiceover, but she struggled to open it when I sent her the link. Soundcloud is also breaking

WCAG principle nr. 1 “Perceivable - Information and UIs must be presented to users so that they can perceive it. Users must be able to perceive the information being presented.”

She turns of voice over and shows me the screen because to save battery the screen is always black when she uses voice over. The screen is showing a warning about cookies. I push “accept cookies” for her and give her back the phone hoping that it now would be possible for her to turn on the song. She turns voice over back on, but it just continues to say “point operator,” so what Siri says doesn’t correlate with what is on the screen. Siri goes out of SoundCloud and into settings on the phone. We conclude that it’s only people who can see that can use SoundCloud. Soundcloud has a lot to learn from services like Spotify. They should hire someone that can make their services perceivable for everybody. Spotify works very well for blind people. She wants to demonstrate how well Spotify works for her and she activates Siri and says, “play Chris brown 2012”. It doesn’t work for her. She tells me that it usually works. She decides to navigate Spotify manually with the voice over function. Spotify has a lot of functions for blind. There are pages she can flip through and different tabs. Tab 1 has a home profile and settings. In tab 2 she can double tap the search option and then she gets a keyboard where she can press “dictate” She then says what she wants to search for and gets different results. She searches for Bjørn Eidsvogs’ song “Eg ser” as an example. She then double tapped on search and got results. She sometimes gets a lot of different versions of a song and then finds the one she wants with help from the voice over function. In tab 3 she has her own library with different playlists. The playlists are extremely easy for blind people to make. She just takes the song she wishes for and stroke horizontally first, then vertically, and then she can add the song to the playlist. Another alternative is to share songs. She likes to share through mail, SMS or messenger. She thinks Spotify is an incredibly suitable alternative for blind to socialize with people by sharing music in an amazingly simple and effective way.

Some time after the observation I tested SoundCloud with Voiceover and it worked fine for a little bit. It was possible to navigate around on the site and to play songs etc. I was surprised and told my blind friend about it, but when I tried it again at a later time, it was not functional again. It seems that SoundCloud are working on voiceover with their web site, but it’s not good enough that it only works sometimes and not always.

## 5.4 Person 3 - Interview 3 - a Blind Man

Person 3 is blind and has been helped by UD and screen readers since he was ten years old. He said he is interested in UD because he has known these problems because he is blind.

He thinks the most satisfying thing about UD is when it is used it includes everyone. When it's not used, it discriminates people. We can make solutions that are particularly good for the rest of the population so that people who doesn't have a disability have use of it. It is necessary for some, but it is good for everyone. A UD thing is that one should avoid that people do mistakes so that computers are safe to use. And for example, a coffee maker has a function that it turns of after forty minutes. The important thing is that it is possible to understand all the content and possible to use with both keyboard and pointer and that the solution is robust enough so that you don't do mistakes.

What happens with webpages that doesn't follow the guidelines of UD is that it gets extremely hard to use or impossible to use. For example, bankID had a case because they didn't follow UD it was impossible to pay in an online store. It was irritating because they know how to make a better solution than that and because he was not able to do what everyone else is able to do. It varies between being an irritation to making people pissed off.

### 5.4.1 It is mandatory by law to follow UD?

All web pages in Norway must follow WCAG 2.0 and public web sites must follow WCAG 2.1 that is the standard for UD from 1st of February 2023. It's an EU directive that says all internet sites must follow WCAG 2.1 in the future.

He sees UD as a part of future and existing websites and applications. It makes sure UIs gets easier to use.

The level of difficulty to implement Universal Desing depends on when in the process one implements UD. Does one do it in the beginning or in the end? The projects he has joined where it has been the most confusion is the projects where they have decided to add UD at the end of the project. One firm was like: we are going to hire you to see if our web site, or app, or

functionality is universally designed. They came to us and then we discovered a lot of mistakes. It's better to use UD from the beginning. For example, IBM have researched that it is 15-100 times more expensive to apply UD in the end of the project than what it is in the beginning of the project.

To what degree is UD used in modern interfaces depends on those who have made the solution and what competence they have. A lot of corporations have sellers that are pushing to the customer that we know everything about UD and then one has developers that think they know UD well and then one makes a solution with a lot of mistakes. He and his colleagues had a meeting last week with a potential customer for a club that they are working on and then it was a corporation that had made a new domain where the supplier had said "we follow UD," but it turned out that it barely fulfilled 20-25% of all the success criteria that is mandatory by law in Norway.

It is important to follow the international guidelines like WCAG. Because WCAG has 49 success criteria. Some of the criteria are framing more and are more serious than others. The contrast between letters and background must be a minimum 4,5:1 for small text and 3:1 for big text. The success criteria that will frame the most people are if you begin to put in things that trigger people with epilepsy. If you have content that is blinking more than three times per second with red blinking lights it may in worst case scenarios trigger epilepsy. So, in the worst-case scenario people can die if we don't follow UD.

He said there is nothing bad about UD. What is bad is that it is extraordinarily little concrete teaching materials for it in Norway. They suggest that you should do this and that, and then the solution will work.

### **5.4.2 How can design of interfaces be compromised by UD?**

He thinks it can happen that interfaces get compromised by UD if the people designing the solution don't have good enough competence within UD. If they have good competence that will not happen. If you work actively with the guidelines, it is possible to make a solution that both looks good and is universally designed. You can style it and make it fresh it just depends on the skill of those who work with it. There are a few jobs within UD. There are corporations that

specialise in it and then there are some corporations that have it as a role to work with that. One can make it into one's own speciality and the skill level in Norway is getting higher.

His firm is called Include. They work with UD and make investigations on for example the University of Oslo's web site, and then they see how it fulfils the guidelines. And they have courses. For example, a digital course for “The Brunnøysund Register Center” that everyone can see.



An example of how difficult it can be to read something when the contrast ratio between text and background is not high enough. The video is from Facebook.

## 5.5 Person 4 - Interview 4 – A Professional

Person 4 has worked in a firm that works with UD called Funka since April 2003. She was the CEO from 2003-2018 and now she is working as the research and innovation boss, which means she is the leader of the department that is doing research projects, but she thinks it is important not only to work with policy issues, but also practically.

The most of their customers are found within the public sector. Within the EU, EU legislation only covers public institutions. In Norway, they have a larger proportion of private actors as customers.

Within the EU, it is the European standard EN301549 Annex A that applies, which means additional requirements than what is found in WCAG. In Norway, WCAG still applies, until 1 February 2023, when Norway also introduces EU regulations.

<https://www.uutilsynet.no/webdirektiv-wad/eus-webdirektiv-wad/265>

For the most part, they test manually. Automatic tests run faster and are therefore cheaper, but there are no tools (not yet anyway) that can test all the success criteria in WCAG/EN301549 appendix A.

If necessary, they test with aids to ensure that it works not only in theory but in reality. In addition, they are happy to carry out user tests - it is the best way to find out if the site really works for everyone - but most customers settle for expert reviews to check that they comply with the team's requirements.

It happens often that a website does not follow WCAG. She doesn't think they have ever come across a website that does not have any UD problems at all

When WCAG is not followed it depends on what the customer pays for when it comes to what they will do with the problems. Some customers only want one test, then they get a checklist with Approved/Not approved/Warning. Most customers want the checklist plus comments, suggestions, and recommendations.

Some customers want Funka to train them so that they can fix the problems themselves. It is rarely Funka who implement changes, it is either the customer or the customer's supplier.

One example of it could be to change the visual focus on the page, so that the user understands where he or she is during keyboard navigation. The most important thing is not really what is changed on the website itself, but that the customer becomes aware of which problems exist, so that they can avoid repeating these mistakes in the future.



Funka started as a non-profit project within the disability movement and now are market leaders within the EU in this area.

## **6 Elderly People and Their Use of Interfaces**

Old people didn't grow up with computers like people do now a days so they are not as advanced when it comes to modern technology. I have interviewed two old people that I know well from before, and that I have helped before with their use of technology. I would like to know what it is that they master and don't master. In addition, I would like to figure out if there were improvements that would make technology easier for them to use. My goal is to help them improve their skills in using digital UIs.

According to an article on digi.no Norway is one of the countries that uses the most public internet services, and the minister of digitalization is pleased with it, but he would like to include more people, especially elders. (NTB, 2019) I agree with him. It's too bad that too many elders are falling off the wagon and are not able to keep up with modern technology. It should be tried to help them to learn how to use it. It could be that a lack of interest keeps elders from succeeding with use of digital technology.

### **6.1 Person 5 - Interview 5 – An Elderly Woman**

Person 5. is 71 years old and has a MacBook Air laptop, an iPhone, and a smart TV. She is using the TV for watching regular tv and rarely watches YouTube videos. She uses the laptop for finding information on the internet, email, downloading pictures, solution for cross words, newspapers, cinema program, theatre program, buying tickets, books, buying and selling things, watching tv and movies, health services, finding food recipes and printing. She uses tv when she's home and the laptop a lot more when she's at the cabin. It's better to watch tv and movies on the tv because the screen is bigger.

She had to get help to download pdf files for the corona certificate. That was new for her; she had never done it before. She's not good at transferring pictures and videos from the phone to the

computer. Her daughter has helped her with that. It's difficult before you have learned what to do. A lot of things in the learning process are not self-explanatory. If she has not done it before she usually needs help to do it the first times. She uses YouTube for instructions on how to use the sewing machine. She thinks the world in a lot of ways has become easier with all the different digital services.

## 6.2 Person 5 - Observation 2

I observe as she tries opens a screen shot of something that is sideways. She turns her head to see what it says. I show her how to turn the picture. She has no use of the screenshot and wants to delete it, but doesn't know how. There seems to be no way to delete the picture while it's open. I tell her to drag the file to the trash can, but she struggles a little bit to do it at first, but after a few tries she manages to do it. She has something more to delete and this time I tell her about the command + backspace shortcut. She doesn't know where the command button is, nor the backspace button so I show it for her. She searches to find more things to delete, but the machine freezes as she tries to open a picture file. I show her how to restart finder by clicking with two fingers on the finder icon and selecting "restart finder" and then the computer is released from the freeze. I show her that in the same way can empty the trash.

She also wants to know how to change the desktop background. She misses a user's manual for the computer. I tell her that she can use google to ask questions about what she wants to do. She explains that when she finds a google explanation of how to do things and she tries to do it, the explanation disappears while she tries to do it. It gets hidden behind other windows, and therefore she prefers to print the explanation out.

We decide to try transferring pictures from her phone to the computer. She googles "how to transfer pictures from iPhone to laptop." The first step is to connect the phone to the computer. She searches for a USB-wire, plugs it into the phone and plugs the charger into the electricity socket. She didn't understand without me telling her that the wire had to be connected between the phone and the computer. But the USB cable she found was a USB-c cable and her laptop doesn't have USB-c. I tell her that she must find an older cable and she searches for it, but doesn't find it. I found it for her and finally she connected the phone to the computer. She

proceeds to push the import button, and the computer tells her that there is not enough space in the drop box to import the files. To proceed to the next step, she is offered to upgrade the space in her drop box. She realizes that it's too expensive to upgrade the drop box and decides to drop it.

She also finds it difficult to send a picture by email, and to copy links and send it to someone by email. If she's going on a travel and she wants to send a link to the travel agency to someone she thinks, it is difficult. She tries to google how to do it but finds the explanation to be too difficult. I proceed to show her how to do it. She must select the hyperlink in the address bar and copy it by either clicking command + c or double finger tap on the mouse pad and select copy in that way. She then must enter her email and fill in the email address she wants to send it to, and then paste the link into the email message by either pushing command + v or double tapping on the mouse pad and select "paste." She sent me a couple of links and found it funny. I then proceed to tell her how to do it on the phone as well.

### **6.3 Person 6 - Interview 6 – an Elderly Man**

Person 6 is 73 years old and have one stationary computer at home and one at work, one laptop and an iPhone, an Apple Watch and a smart tv. He is using his tv for watching politics, news and sports. He uses both YouTube and regular tv. He is using his laptop for his job. He uses his iPhone for work and private but he doesn't use it for email. The stationary computers he uses 50% and the other 50% he uses the laptop for checking emails. He has a system that allows him to have access to the job systems from home. He prefers to use the stationary computer, but he thinks the stationary computers and the laptop has the about the same level of usability.

It's difficult with the computer at work when the firm introduces new software. It's hard to get used to new software for him. And it's difficult to handle all the different passwords one must remember and use. Altin is working fine for him, and his internet bank is usually working out fine, but it's difficult to get help when it's something he doesn't understand. He can't call them because they're not available and it's expected that all communication is supposed to be online in the chat. He thinks many old people have the same problem. He's not that good with using the internet bank because there are so many transactions there and he doesn't have a good system

with overview of when the transactions are due. It should be easier to get an overview for people who are not that advanced.

## **6.4 Person 6 - Observation 3**

The first thing person 6 does when he starts the computer is to log into his work account. He uses his cell phone to get a code to verify that it is him. He pushes a button that says LAV. It was not necessary to log into the work account to check his bank account, but he did it anyway. I tell him that it's not necessary. He proceeds to enter his personal number on the bank's webpage. He tries to enter the one-time code, but the computer froze while he was doing it. He got a message that tells him the connection is slow. He finally can enter the one-time code and password and gets access to the bank. He manages to close the tab with the internet bank and struggles a little to find back to the bank. When he finds the web page again, he must log in all over again. He goes to his account that he uses the most. There are so many accounts and different transactions that it is difficult to get a good overview. He must connect the different payments with the different emails to the different creditors. He thinks an improvement would be automatic payment of the invoices from the most important creditors. He thinks he must do that in the future. When I suggest that he may draw some suggestions for what he wants to improve, he says he is not able to do that. He thinks he should be able to differentiate between job related work and private related work better. And differentiate private contact with friends and family and dialogue having to do with properties he owns.

## **6.5 Person 6 – Observation 4 - myPhoneak**

Person 6's use of a hearing aid and the associated app called myPhoneak is difficult for him to use. He is struggling to use the full potential of the app. We take a closer look at the app. The home page or index page says the message "Take control over your hearing devices. Adjust the settings of your hearing device." Then there's a button that says, "Connect unit." He pushes it. It gives more instructions: "Connect the hearing device to use myPhoneak." "Let's get started." "Connect the hearing device to myPhonak." He proceeds and the phone is searching for the

hearing device. It takes several minutes and it's still searching with a search animation. This is bad design, because it just continues to search for ever without giving any feedback about what is going on. It's not providing adequate feedback and is breaking the UCD principle nr. 5 of giving adequate feedback. It should have given an error message because it's obvious that it's not going to find any devices. A message like "No hearing device could be found" would be appropriate. We think that it may not be able to find the device because of low battery, so we connect the hearing device to the charger. He proceeds to push an information symbol "i" and it suggests that you push the button on the hearing device to mark it in the list. He pushes the button several times and nothing happen. We think the device may not be charged enough. After charging the device for some time, we try again. We push the button and the device appear in the list. It then suddenly disappears and comes back after a little time. He proceeds to connect the device to the phone after it appears in the list. He wants to connect the device to the tv.

## 6.6 PD Workshop with Apple Watch

Person 6 has an Apple Watch that he received as a Christmas gift from his daughters. He has tried to use it but stopped using it because he was getting to many email notifications. He doesn't want it to vibrate or make a sound every time he receives mail or SMS because he gets too many. I decide to help him to turn of the notifications and to wait and see if he will be more satisfied with the watch now. The day after it turns out that the notifications has continued to bother him. I ask him if he is sure that he has received alerts on the Apple Watch after I turned it off, and he said that it's possible that he remembers wrongly. The clock has too many functions for him. It's too much for him to get into. I watch as he explores the interface of the watch. He goes into tips, but doesn't find it interesting. He goes into the world clock and wants to figure out how to search for a city to see what time it is there. For now, he only has the option between New York and Oslo. He tries to push the screen while the world clock is open, but nothing happens. We figure that it may be possible to add different cities on his Apple Watch application on his iPhone for it to be available on his Watch. It was not possible to do it in that way. I decide to Google how to do it and there it is described how to do it. For some reason it suddenly works to just scroll down at the world clock and to choose "add city." His daughter, Person 8, takes his watch and says

“Los Angeles” to the watch, and it adds the time in Los Angeles. When we try to do the same, the menu item that previously was not there seems to suddenly be there when we enter the world clock again. We choose “add city” and push the microphone symbol to activate dictation and Person 6 says the name of the city we wish to see what time it is in. The watch writes London when he says “London,” but it doesn’t search for London after he has said it and it continues to write down what he is saying after he said “London.” We try to do it again and make sure to push the search button after saying London without saying anything else in between, but the search button doesn’t work. This is breaking the UCD principle 6 about providing adequate feedback mechanisms. We figured out there must be something wrong with the watch. I restart the watch and try again. This time it says that the apple watch doesn’t have access to dictation, even though it was possible before I restarted the watch. His daughter tries to do the same and for some reason it works for her. I try to do it again and then the same problem happens again. It writes down the city I say, but it does not work to push the search button. His daughter shows me that it is necessary to push the screen one time in the middle after saying the name of the city, to stop the dictation, and then push search, and then finally it works. It should have been possible to just push the search button after saying the name of the city, but for some reason you must push the middle of the screen to deactivate the dictation. This seems like a completely unnecessary step that makes the entire process a lot more complicated than necessary. I think the product would have offered a better navigation mechanism if it was just possible to push the “search button” after dictating the name of the city. After finally figuring out how to do it myself, I decide to show it to Person 6. I push the dictation button and say “Hamburg” to the watch, but this time the watch doesn’t write down the city name at all. I try to do it by myself, and suddenly it works for me. I show it to him and once again we get the error message that says dictation is not available. I close the window and open it again and now dictation is available. Person 6 finally manages to add a city as well.

## **6.7 Interview 7 – Person 7 – Another Elderly Man**

Person 7 is 57 years old. He has a smart tv that he uses for YouTube, two android phones and an old laptop. He has not been using his laptop for a while because he didn't figure out how to get online with it.

## **6.8 Person 7 - Observation 5**

Despite not being able to get online he still tries to activate his email on the computer. I try to tell him that this is not possible without being online, but he continues to try. I decide to help him. To get online he must enter his phone number for the operator to send him a SMS with a code that he has to enter on the operator's web site to get online. The problem is that he can't read the SMS on his phone. I go to messages on his phone, and it comes an error message that said messages is not activated on his phone. The phone describes how to activate the messages, but I struggle to find the menu where we must activate it. I find something similar and try to turn messages on, but it still doesn't work to receive messages. This is the first time I have seen a phone that is not able to receive SMS. We decide to go to the shop where he bought the phone and ask them for help. When we get there the guy in the shop look at his phone and activate the SMS function for us. We go home and receive the message and get his laptop online. Person 7 then wants to connect and activate his email address on the computer. I watch as he tries to enter his email address and password several times and then he pushes the back button and everything he did goes to waste. He does this mistake repeatedly and I try to tell him to not cancel it several times but then he has already done it. When he enters his email address and password and finally push "next" instead of cancelling it he has entered the wrong password and he doesn't get access to his email. He tries for a long time with my guidance to get access to his email without success, but he is grateful towards me that he got his laptop online and he says that he has learned a lot trying to activate his email. He also wants to buy a new part for his electrical scooter that has become broken. We search in google for the name of the part but don't find the exact part he is looking for. He finds something similar but he doesn't want to order the wrong part. We enter the id number of the part and search google again, but don't find anything. I tell him he could

call the manufacturer of the part, but he says he would rather go to the store and ask them there in person.

## **7 Younger People and Students**

### **7.1 Person 8 - Interview 8 – a Nurse**

Person 8 is 32 years old and works as a nurse. She has an iPhone, MacBook Air an iPad, a Dell computer from her job and a smart TV. Her work computer she uses for work, and the tv she uses for streaming, she sometimes uses the MacBook Air for watching movies in bed, but she used it more when she was a student. The iPad she doesn't use. She has problems with helping her dad printing at his home; It's too difficult. She doesn't like when web pages ask her to confirm that she is not a robot, because it rarely works. She also thinks it would be good to have a common place where you can log into all the different apps at once instead of having to log into each one manually by itself.

### **7.2 Person 8 - Observation 5**

She helps Person 6 with his computer at home. She helps him to update his password. She helps him to log into Citrix Workspace where he gets access to his work account from home. She helps him to send a link to an ad for an apartment to his real estate agent. He has never sent a link to a webpage before.





She also helps her dad with his Apple Watch. Suddenly the Apple Watch is stuck and it doesn't work to push cancel or get access to the main menu. She restarts the watch to make it work again.

### **7.3 Person 9 - Interview 9 – An ICT Student and Her Problems with Her Induction Oven.**

Person 9 is studying for a master in Interaction design and is 24 years old. She uses her Smartphone and laptop a lot, and her tv with speakers and a reading board(kindle).

She uses her cellphone for communication, and she writes and works with it. She uses apps like Instagram for inspiration sharing and a little knowledge. The pc she uses mostly for downloading information in a school setting. Not so much for other things than that. She uses a smart tv with connected speakers for all kinds of sound and visual media. She has some games that she is not using as well. And she uses the oldest version of kindle on her tablet where the only thing you can do is to read the book.

She chose her cell phone because it has a good camera, and it is a new model, but the cell phone is too big to be comfortable to use. There are smaller versions, but she had to choose away some

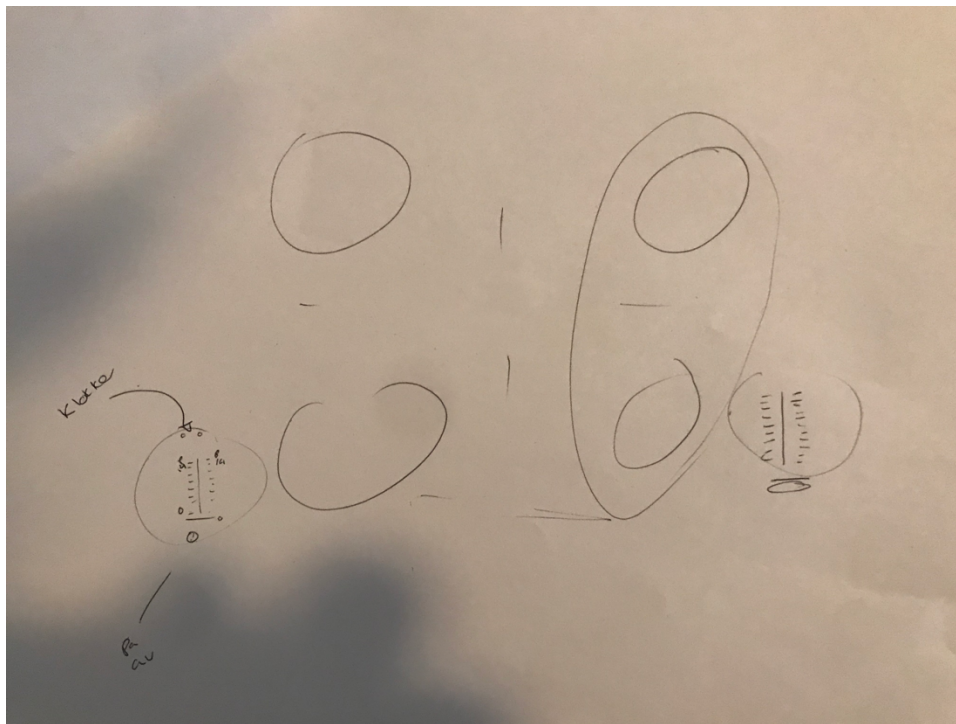
of what she thinks is comfortable to get the desired functionality. Within the apps it is ok because it is so easy to adjust within the settings. It's more comfortable to use the web on the laptop. A thing she thinks works very well is a mac laptop with a touch screen bar in front of the keyboard. She had a laptop with a touch screen that worked very badly because it was a bad attachment between the screen and the disk, and the attachment broke. The UI was not in accordance with what she was going to use it for. Another thing she is disappointed with is that there are too few ports on the mac now and you need too many adapters to do things. Apple tries to make it so that there is one that you use for everything. She shows her iPhone 11. Not all web pages and apps are designed with the top of the phone in mind. The black ring on top restricts what you can see up there. She thinks that doesn't work so well.



Other than that, she has an apple TV, and the remote control is too sensitive. If I push and hold the button the screen starts to shake as if she was going to rearrange or delete the apps. This happens much faster than what she wished for. On her reading tablet; the kindle. She has specifically decided to keep an old version because she thinks the new version is not ideal for reading because it has touch screen, and light and a web site, but she doesn't like the way it works. Therefore, she has picked an outdated version without all those new functions.

She also has an electronic cooking pot that is very frustrating and too sensitive. If she spills water on it, it can change from 2 to 12. They feel that they can't trust it enough because it is living a life on its own, so they always remove things away from it when it's not in use. The designers

have designed it to look simple. It has 1-12 written upwards and a few symbols. The symbols are two different clocks. One is for counting down and the other is for a general overview of how much time has gone. It is possible to understand how to turn on the correct timer for the correct plate, but they have tried to make it look as simple as possible that you must understand how, you must have done it a few times to make it work and that is a bit tiring if you have been away and come back and someone else have been using it. It's very stupid. It wants to change the power because something is close to it. You can only make the plates that are vertically opposed to each other work together. The buttons are too close to each other, and the sensitivity is not adjusted so it reacts to too many things. They haven't tested it enough. They have tried to make it look esthetical by hiding information until you show that you want it and that makes it difficult to navigate sometimes. This is breaking UCD principle no. 6 about providing adequate navigation mechanisms.



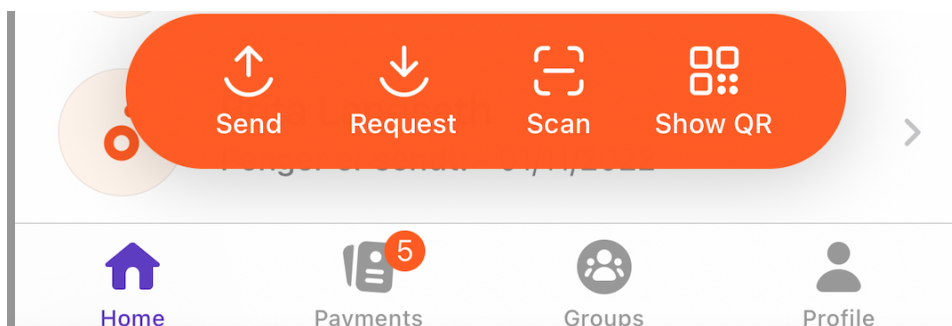
Person 9s drawing of her induction oven.

## 7.4 Person 10 - Interview 10 - Another ICT Student and Her Troubles with Vipps.

Person 10 studies for a master's degree in design, use and interaction at the University of Oslo. She uses a cell phone, and a mac, she does not have smart tv or a smart clock, or iPad. She uses her laptop for school, Netflix, YouTube, and music. She uses her phone for the same things but thinks it's better to use the mac when she's at home. She thinks it's difficult to know, but on a general basis she thinks it can become very unclear if there is a lot of functionality on a web site. If you just want to relate to one thing and there are too many options, it can be very unclear.

She uses DFØ, which has a lot of functionality, but she only uses one of the function. Because there is so much more that it is used for, it disappears a little and is not intuitive enough. She has experience from when she has gotten used to an app and then suddenly, they change the UI a lot. The change can lead to that you have to think differently than what you are used to. This happened with for example, the "Ruter app".

She has an example. On Vipps, to send money and to request money is too similar. She has found herself sending money instead of requesting money because they are so similar. You can see the difference but when you do it fast and don't read the text and only see the symbols it's possible to do a mistake. This is contradicting with the UCD principle 10 about being free of errors. They are too close to each other.



The symbol can be changed, or request could be moved all the way to the right.

## **7.5 Person 11 - Interview 11 – a Regular Woman in Her Thirties**

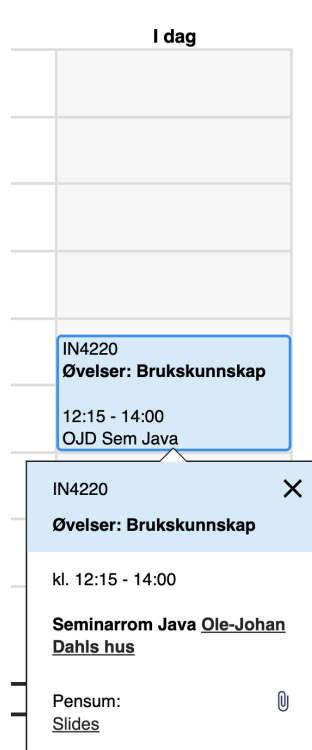
Person 5 only has one device and it's a Samsung Galaxy A32. There are a lot of things she would like to improve both in software and in hardware. The speakers got bad after the first three months. And the battery went bad after one year. Even though that she has 32gb memory card in addition to the hard drive, the phone became slower. Another thing is when she puts the phone to charge it charges slowly and other times it charges fast. It sometimes says, "slow charge" and other times "fast charge" even though she's using the same charger. Sometimes it gives her notifications about applications she's using. It says, "applications which are put for sleeping" and it shows her a list of applications which are put to sleep which sometimes are applications that she's currently using like the clock or the calendar. It doesn't happen anything when the applications are put to sleep so she doesn't know why she gets a notification that tells her the applications are asleep. A few days ago, she got the android update and since then she has a notification which says, "protected folder is locked." She never created a protected folder, and it asks her for a pin to open it and she never had a pin code since she never made the folder. It's very annoying for her. To find the pin, the phone tells her to go to her Samsung account, but she can't find the pin anywhere.

## **7.6 Photoshop through UIOs website**

When person 11 suggested a change in the design of Vipps I wanted to use photoshop to show how this change would look like. I talked with my supervisor who told me that it's possible to use photoshop through UIOs' website. I googled "photoshop UIO" and found a link called "UIO programkiosk". I tried to push a button that says, "log in to UIO programkiosk with VMWare" It opened a list of different programs, and I chose Photoshop and opened it. I tried to drag and drop the picture I want to change from the desktop to Photoshop but Photoshop doesn't import it. The picture only gets opened in a new tab and it's impossible to edit. In this case there is something wrong with the application which makes it not operable and it's breaking WCAG principle nr. 5 - UI components and navigation must be operable.

## 7.7 University of Oslo's calendar

On the webpage for students at the university of Oslo there is a calendar where you can see what classes you have and when you have it. The course code is included, but when you click on the course code nothing happens. It would be good if clicking on the course code brought you to the webpage of the course. Sometimes when I want to go to the course webpage, I google the course code and find it in that way. But it would be much easier if the course code in the calendar had a link. This is based on the user UCD principle nr. 5 of feedback. Give the user a response to all their actions. Feedback in this case means that something happens when you push a button. In this case nothing happens when you push the course code. It also has to do with the principle of reducing unnecessary mental effort by the user (UCD Principle no. 4) because the user must find another way to go to the course's website than clicking the course code. It also has to do with providing adequate navigation mechanisms (UCD Principle no. 7) because changing the course code to a link gives a more adequate navigation. It is also breaking WCAG principle nr. 2 of being operable. **Operable** - UI components and navigation must be operable. Users must be able to operate the interface (the interface cannot require interaction that a user cannot perform).



The calendar is showing the class I had that day.

Another thing that could be a problem is when a class is cancelled in the calendar, it would be good to get a message that the class is cancelled. The system could suggest sending a message to the whole class every time one makes a change in the calendar so that the people who didn't check the calendar also can know if the class is changed or cancelled.

However, there is an argument against implementing these changes. Students are expected to be able to handle some mental effort and do some extra work because we are studying IT, even though the website would have better usability with these changes. Personally I think it's important that websites like these has great usability because it representing UIO and should give a good example.

## 7.8 University of Oslo's Schedule

When looking at the schedule for a subject on the subject's web side the student gets information about when the classes are and what they are going to be about, and what curriculum he/she is supposed to read for the class. The curriculum overview(syllabus) is on another part of the web site. There should be links to the articles in the schedule but for some reason it's only the name of the author, year, title etc. To find the article the student must read he/she can copy the name of the author and search for it in the syllabus list but every time one wants to see everything that is planned for a certain day it is necessary to push a "show more" button. And when one marks the name of the author from the text after pushing "show more" the window that increased after pushing "show more" closes and decreases. It is then necessary to push "show more" again and then copy the author's name. This makes one extra unnecessary step and makes the UX worse. It should always take as few steps as possible to do an operation. This website is failing to provide an adequate navigation mechanism which is the UCD principle no. 7.

**About the lecture and reading material**

[Hide more...](#)

Digitalization has recently gained

When Marking a word,

**About the lecture and reading material**

Show more...

the “Show more” box closes.

**About the lecture and reading material**

Hide more...

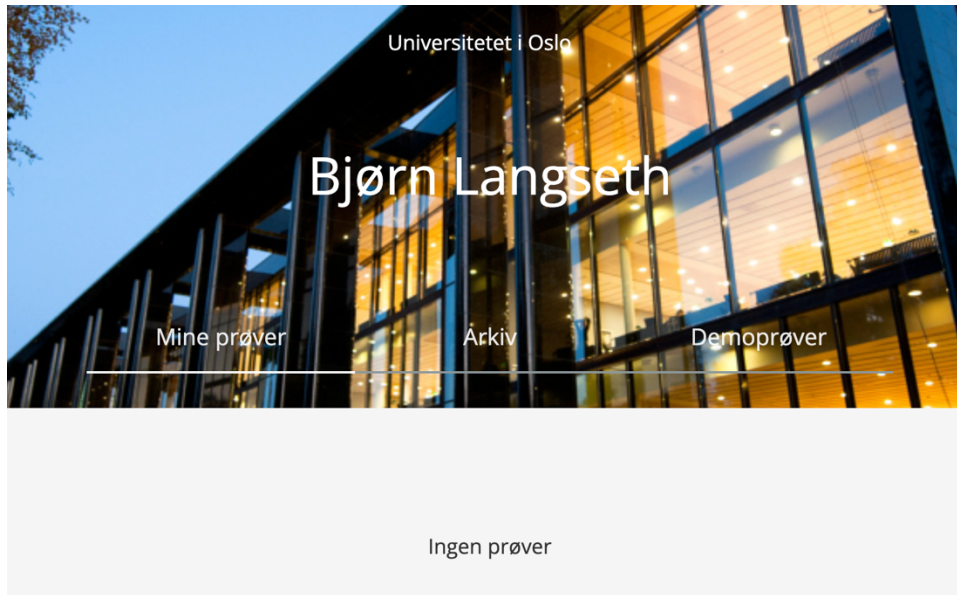
Digitalization has recently gained widespread interest

It is necessary to open box again to copy the word.

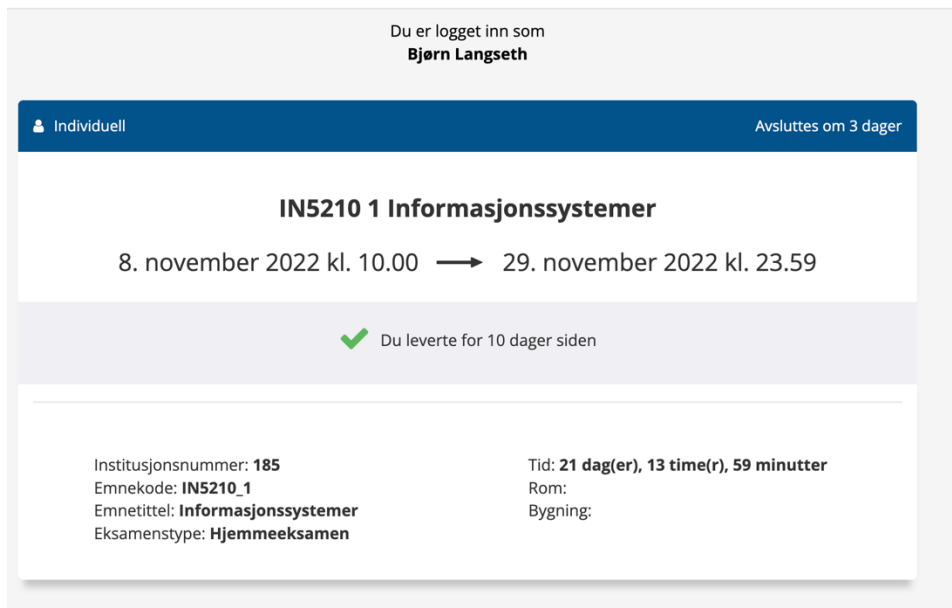
## 7.9 UIO.inspera.no

This is a website that is being used for delivering written home exams. I delivered the exam early, a long time before the deadline, and then I revisited the website a few days before the deadline to make sure I had delivered the right file and that nothing was wrong with my delivery. However, when I visited the site, it was not possible to see the file I delivered, and it was not possible to deliver it again. It was not possible to download the file either. What if I had made changes to my delivery and wanted to deliver it again? It was simply not possible and that is not normal. In other delivery sites like Devilry, it is possible to deliver a file again.





When I visited the webpage, I first had to push the archive button.



After pushing the “archive button” I got some information about the test, but I can’t view the files, or upload the exam again.

Du er logget inn som  
**Bjørn Langseth**

Individuell Prøven stengte for ett år siden

**IN5390 1 IKT for utvikling: Lager vi en bedre verden?**

29. november 2021 kl. 10.00 → 17. desember 2021 kl. 12.00

✓ Du leverte for ett år siden

Besvarelsen din vil bli lagret i to år.

[Vis besvarelse](#) [Last ned](#)

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Institusjonsnummer: **185** Tid: **18 dag(er), 02 time(r)**  
Emnekode: **IN5390\_1** Rom:  
Emnetittel: **IKT for utvikling: Lager vi en bedre verden?** Bygning:  
Eksamenstype: **Hjemmeeksamen**

When I went to see another exam I did a year ago, it was possible to see the file and to download it. So, I got confused as to whether my file was delivered. This is breaking WCAG principal no. 6 that is about the web site being understandable.

After sending an email to the school about the problem. They told me that they had tried to fix it, but if the problem was still there, I could send the exam manually. I went back to the Inspira web page and this time it was now possible to push two buttons.

Du er logget inn som  
**Bjørn Langseth**

Individuell
Avsluttes om 13 timer

## IN5210 1 Informasjonssystemer

8. november 2022 kl. 10.00 → 29. november 2022 kl. 23.59

✔ Du leverte for 12 dager siden

Besvarelsen din vil bli lagret i to år.

👁 Vis besvarelse
📄 Last ned

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Institusjonsnummer: <b>185</b> Emnekode: <b>IN5210_1</b> Emnetittel: <b>Informasjonssystemer</b> Eksamenstype: <b>Hjemmeeksamen</b>	Tid: <b>21 dag(er), 13 time(r), 59 minutter</b> Rom: Bygning:
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When I push the button that says, “Show answer,” I only get to see the front page of the exam. This is where I’m supposed to see the answer to the exam that I uploaded. For some reason, this system makes you see the front page and the first page of the exam before you can view and download the answers. This seems unnecessary to me.

**i Front page**

**Written home exam in IN5210**  
 2022 Autumn  
 Duration: Nov 8, 10:00 a.m. to Nov 29, 11:59 p.m.  
 It is important that you read this cover page carefully before you start.

**General information:**

- Important messages during the exam are given directly from the course teacher on the course's semester page or in Canvas (if used in your course). It is therefore important that you check the course's semester page / Canvas room regularly.
- Your answer should reflect your own independent work and should be a result of your own learning and work effort.
- All sources of information are allowed for written home exams. If you reproduce a text from books, online articles, etc., a reference to these sources must be provided to avoid suspicions of plagiarism. This also applies if a text is translated from other languages.
- You are responsible for ensuring that your exam answers are not available to others during the exam period, neither physically nor digitally.
- Remember that your exam answers must be anonymous; do not state either your name or that of fellow students.
- If you want to withdraw from the exam, press the hamburger menu at the top right of Inspira and select "Withdraw".

**Collaboration during the exam:**

It is not allowed to collaborate or communicate with others during the exam. Cooperation and communication will be considered as attempted cheating. A plagiarism control is performed on all submitted exams where text similarities between answers are checked. If you use notes that have been prepared in collaboration with others before the exam, this might be detected in a plagiarism control. Textual similarities such as these can be considered by graders as a show of low independence or even attempted cheating. Refrain from copying/pasting from notes made in collaboration with others.

**Use of sources:**

The answer must be written with an academic standard. Read UiO's website [Use of sources and citations](#)

**Cheats:**

[Read about what is considered cheating on UiO's website.](#)

**Contact information:** [User support exam](#)

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When I push the next button in the downright corner, I get to see the first page of the exam.

Kandidat ID 📶 ☰

🏠 🔍 ↕ 1 of 1
Automatic Zoom

**UNIVERSITETET I OSLO**  
The Faculty of Mathematics and Natural Sciences  
Home exam in IN5210 fall 2022

**Exam in: IN5210 Information Systems**  
Your answer should be between 2000 and 4000 words. Submit your answer using Inspera (<https://www.uio.no/english/studies/examinations/submissions/>). The deadline for submission is November 29<sup>th</sup> at 23:59 (midnight).  
The exam consists of three assignments. Each weighed equally in our assessment. Respond to the assignments individually and in the order we give them.  
The basis of the exam is two research articles:  
Article 1: Karwatski, S., Trenz, M., & Veit, D. (2022). The multidimensional nature of privacy risks: Conceptualisation, measurement and implications for digital services. *Information Systems Journal* (pdf)  
Article 2: Nielsen, P., & Sahay, S. (2022). A critical review of the role of technology and context in digital health research. *Digital health*, 8 (pdf)  
This exam document is on one page.

**Assignment 1**  
Explain the central concept(s) and then the central argument(s) in Article 1.

\*\*\*

**1 Exam task**  
Submit your answer.

✔  
 Din fil ble lastet opp og lagret i besvarelsen din.

⬇ Last ned
✖ Fjern
📄 Erstatt

Filnavn:	IN5210 Exam.pdf
Filetype:	application/pdf
Filstørrelse:	288.84 KB
Opplastingstidspunkt:	17.11.2022 18:08
Status:	Lagret

⏪
⏩

In addition, I get to push a button that says “download,” and when I push it, I get to see the answers that I uploaded, which was a relief, because I could see that my answers was online, but it was still impossible to replace the document or to upload it over again, but since I didn’t make any changes, it was still okay for me to not upload it again.

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1 / 6 100%
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1

2

3

4

**Assignment 1** Explain the central concept(s) and then the central argument(s) in Article 1.

**Central Concepts**

Privacy risks is when a third party takes advantage of having access to private information about the user regardless of the sacrifice of ethical principles. It can also be when there is reason to believe that there is going to be a loss because of the uncovering of personal information. Privacy risks are thought of as a one-dimensional construct that is about a possibility for loss when personal information is available to others.

Privacy concerns are the worries people have about the way their personal information is handled by others. (Karwatski et al. 2022, p. 2) Privacy concerns focus on people's view of how organisations handle their data. (Karwatski et al. 2022, p. 4)

Information privacy is a person's self-assessed state where others have restricted access to the persons private information.

The conceptualization of the multidimensional privacy risk are divided into two classes:

1. The fear that others take advantage of using a person's confidential information
2. The belief that there is an elevated risks for loss if a person's information is revealed to others

Privacy risks are also consisting of the following two components:

1. The severity of negative consequences of a situation
2. Their probability of occurrence (Karwatski et al. 2022, p. 5)

The Authors define privacy risks as “the extent to which an individual believes that negative outcomes may arise from others' access to his or her personal information.”

The different dimensions of privacy risks are described below.

**Physical privacy risk** are about negative physical consequences (such as stalking or physical violence) that may develop when information about persons' habits and location is misused. The fear that this may happen may arise out of knowing that others have access to their information.

**Social privacy risk** is creating fear that social status and relationships may be negatively impacted when others get access to a person's personal information. People may form a negative opinion of someone based on information about his/her opinions, lifestyle or behaviour, and conflicts may arise.

**Resource-related privacy risk** is the risk that someone may for example send spam mail, steal money

After a lot of trouble, I finally get to see my assignment uploaded to Inspera.

Du er logget inn som  
**Bjørn Langseth**

Individuell
Avsluttes om 13 timer

## IN5210 1 Informasjonssystemer

8. november 2022 kl. 10.00 → 29. november 2022 kl. 23.59

✔ Du leverte for 12 dager siden

Besvarelsen din vil bli lagret i to år.

👁 Vis besvarelse
📄 Last ned

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Institusjonsnummer: **185**  
 Emnekode: **IN5210\_1**  
 Emnetittel: **Informasjonssystemer**  
 Eksamenstype: **Hjemmeeksamen**

Tid: **21 dag(er), 13 time(r), 59 minutter**  
 Rom:  
 Bygning:

When I Push the button that says “Last ned” (Download) something similar happens.

Utskrift
✔ Avbryt
🖨 Skriv ut

**UiO : Universitetet i Oslo**

KANDIDAT  
**15503**

PRØVE  
**IN5210 1 Informasjonssystemer**

Emnekode	IN5210
Vurderingsform	Hjemmeeksamen
Starttid	08.11.2022 10:00
Sluttid	29.11.2022 23:59
Sensurfrist	--
PDF opprettet	06.12.2022 14:37

Tekstformat

Utskriftsformat for skriftlige svar sv

Standard

Optimalisert for lesing

Optimalisert for tilbakemeldinger

Innstillinger

Last ned



1 besvarelser valgt

Slå sammen PDF-filer og last ned

Last ned besvarelser som separate filer

Format

A4

Marger

Topp  mm

Bunn  mm

Venstre  mm

Høyre  mm

Valg

Vis topp- og bunntekst


Instead of just downloading the PDF file immediately it gives you two pages with information about the exam.

**Seksjon 1**

Oppgave	Tittel	Oppgavetype
i	Front page	Informasjon eller ressurser
1	Exam task	Filopplasting

**1 Exam task**

Submit your answer.



Din fil ble lastet opp og lagret i besvarelsen din.

Filnavn: IN5210 Exam.pdf

Filtype: application/pdf

Filstørrelse: 288.84 KB

Opplastingstidspunkt: 17.11.2022 18:08

Status: Lagret

**Tekstformat**

Utskriftsformat for skriftlige svar **NY**


Standard

Optimalisert for lesing

Optimalisert for tilbakemeldinger

Innstillinger >

Last ned



1 besvarelser valgt

[Slå sammen PDF-filer og last ned](#)

[Last ned besvarelser som separate filer](#)

**Format**

A4

**Marger**

Topp  mm

Bunn  mm

Venstre  mm

Høyre  mm

**Valg**

Vis topp- og bunntekst

There were three buttons, that said “Download,” “Remove,” and “Replace” but it was not possible to push any of these buttons. But it is possible to download a pdf of the exam on the right. This is failing to give adequate feedback to the user’s actions (UCD principal no. 5).

## 8 More Interfaces with Troubles

### 8.1 Finn Plane Tickets

When you want to travel out of Norway, finn.no is a good place to find flight tickets. You go to finn.no and see some ticket you like and then you buy it. Finn.no sends you to another webpage that offer flight tickets. The problem is that when you go there, they want you to find the ticket again. It didn’t remember to send you directly to the ticket you have chosen from Finn. So, you must go through the process of finding the ticket all over again. When you buy the ticket, you immediately start receiving emails. One that confirms that you have bought the ticket and several other emails with greetings and other offers and spam material that you may want to delete.

Another problem occurs when you get close to your travel and must check in online. You get an email with a link to the check in. You fill in all the check in information and when it ends, it says that your email is already in use by another user, but you don't have registered to get an account there. The person this happened to, went to travel to Sofia in Bulgaria and took the plane to London and started looking for her next flight to Sofia. It turned out the Plane to Sofia goes from another airport and she realised there was not enough time to catch her next flight. We called customer service and talk about the check in on the app that didn't work, and they tell us there is nothing they can do about it. We ended up having to buy a new plane ticket that was six times the price of the first tickets. We were two people ordering the tickets and neither of us noticed that the second ticket was from another airport. This must be more obvious. There is a lot of room for improvement on the behalf of the airplane company. What are the principles the airplane company didn't follow? They clearly don't follow the UCD principle nr. 10. Be free of errors. Minimize the occurrence of errors. If an error does occur, the product should always offer a solution to the problem so that it serves the user as best as possible. (Viebrock S.) and (Obear, 2017). First, it must be made clearer that the second ticket is from another airport. The airplane company should warn explicitly about this. And it is important that it comes across clearly for everyone who buys the ticket.

Another thing that could be improved on finn.no is when you are doing an advanced search for tickets, and you decide to change the day you search for tickets the website changes the specialised search back to default. It does not remember what settings you had put for the search. For example, if you decide to travel before ten o'clock and search for that and you change the date it does not remember that you are looking for before ten o'clock. This is against the principle of providing adequate navigation mechanisms which is UCD principle no. 7.

Something else that is a big problem on finn.no is that when you search for tickets it comes an error message that says "oops, the from field must be filled out" even though the field is filled out with "Oslo lufthavn Gardermoen (OSL), Oslo, Norge". This makes it impossible to search for tickets on a laptop. For some reason, the same problem doesn't occur when searching for tickets on a smartphone. This problem has to do with failing to provide adequate feedback which is UCD principle no. 7. Think about all the money they could potentially loose because it is

impossible to navigate their website. This is a serious error that for some reason has persisted for several months.

**Finn billige flybilletter til Burkina Faso**

Tur-retur
En vei
Flere byer

<b>Fly fra</b>		<b>Fly til</b>		<b>Utreise</b>	<b>Hjemreise</b>	<b>Reisende</b>
Oslo lufthavn Gardern ×	↔	Ouagadougou (OUA), ×		29.05.2023	15.06.2023	2 voksne, Økonomi ▾
Oops, fra-feltet må fylles ut						
<input type="checkbox"/> Søk på hotell						
<span style="background-color: #0070c0; color: white; padding: 5px 15px; border-radius: 3px; font-weight: bold;">Søk</span>						

## 8.2 Teoritentamen.no

This website is for anyone who wants to practice before the theory test on the Norwegian driver's license. They have tests with 45 questions where you are allowed to have seven mistakes. It would be good if the test informed you with how many mistakes you made so you don't have to count it. This has to do with UCD principle nr. 8. Present information clearly. After all it is relevant information for the user.

## 8.3 Vegvesen.no

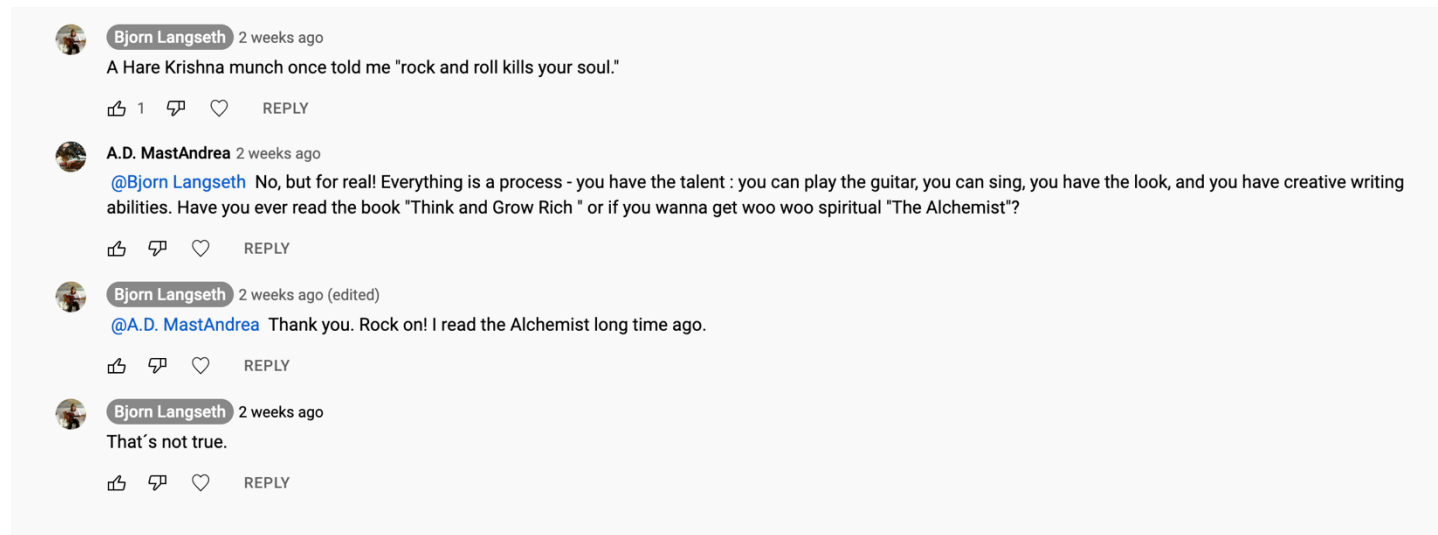
Something else that has to do with getting a driver's license in Norway is when ordering a theory test for driving at vegvesen.no it is impossible to pay online even though it says on the webpage that it is cheaper to pay for it online. This is a bit misleading, and they should not offer a cheaper price online when there is no option to pay online. One should never mislead the user to an offer that doesn't exist. This has to do with WCAG principle nr. 2 of being operable. **Operable** - UI components and navigation must be operable. Users must be able to operate the interface (the interface cannot require interaction that a user cannot perform).



## 8.4 YouTube

Occasionally, YouTube suggests that I see content I have already seen before together with the latest videos. It would be better if YouTube kept videos seen before in their own category sorted out from videos not seen before. It is as if the algorithm forgot that I had already seen it and suggests that I see it again. It is okay for the category “See Again,” but not when I am browsing for latest content. This has to do with the principle about creating designs unique to user needs.

Another thing on YouTube when I add an answer to a comment it does not appear underneath the comment replied to, but at the bottom. In this case I replied “That’s not true” to my own comment that says, “A Hare Krishna munch once told me “Rock and roll kills your soul,” but the comment appears underneath another comment than what I replied to it looks like I replied to another comment; which is not good. This error have to do with the principle of being free of error. (UCD principle no. 10)



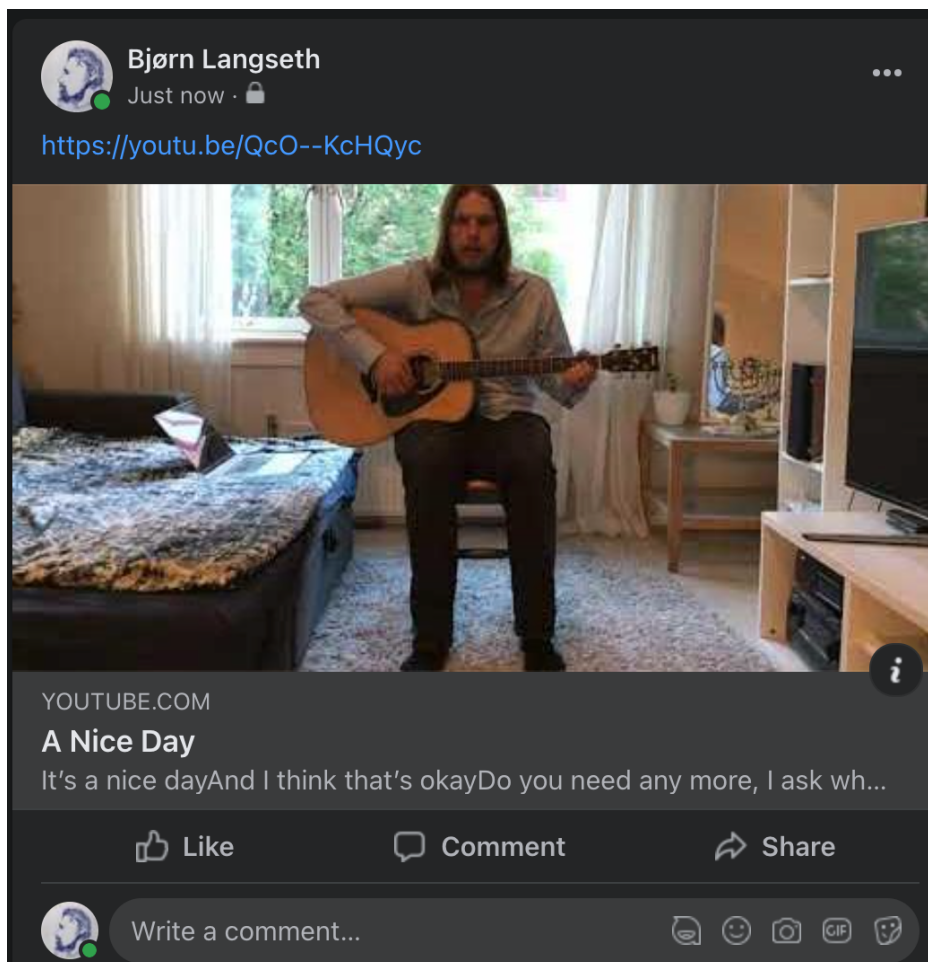
YouTube should improve this function so that my comment appears underneath the comment I replied to.

If you post a video on Facebook from YouTube and there’s a song lyric in the text for describing the video. When the video is posted on Facebook it takes away all the line breaks in the preview of the video. Soundcloud.com has the same problem. This is very annoying, and it looks like I’m not able to write correctly. They should just show the two first lines of the lyrics, and don’t

remove the line breaks. Because they remove the line breaks it neglects the users need to be presented correctly. This is breaking UCD principle no. 1, and that is to create designs unique to user needs.

It's a nice day  
And I think that's okay  
Do you need any more, I ask what for?  
And do you know what you are?  
The center of the mandala

How the poem is



How the lyrics are displayed when posted on Facebook from YouTube.

YouTube also has something called “live update” on the number of subscribers a user has. But when it comes to views, they have no live update, and one must update the screen to see if there are any new views. In the future I think we will see a live update of all the views the different videos are getting on the list with all the different videos a user has. When it’s possible to have a live update for subscribers, then why shouldn’t it be possible for the number of views a video has? It would also be good if they had an emoji where you bow to someone as a thank you. What more appropriate response when someone is clapping than bowing? Especially after a performance. YouTube should have a video chat option where people can watch videos together, just like it is possible with messenger. The examples above have to do with creating designs unique to user's needs.

YouTube also have a problem when ordering a free trial of their premium membership. When I enter all my credit card information, enter my one-time code, and try to proceed, they just send the user to the beginning again and request that he/she enters the one-time code again. It’s a never-ending loop. This is breaking WCAG principle no. 2. of being operable. Think about all the money YouTube loses because it’s not possible for some people to become a member.

When wishing to watch a video from YouTube that also is on Facebook it is sometimes necessary to search for the title of the video you are looking for. I usually do this by copying the title of the video on YouTube. However, this is only possible with a laptop. For some reason it is not possible to copy the name of the video with a smartphone, which is bad if you want to watch a video together with someone else on messenger with your phone. Writing the title can be a tedious process especially when the title is long. This has to do with providing adequate navigation mechanisms.

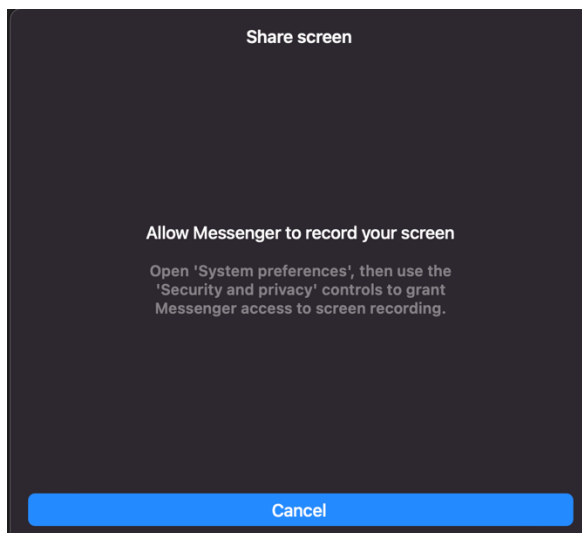
Short video stories have recently become popular. Every time one watches a short story it is necessary to scroll down to view the next video or the video is going to be played over again until you switch it. I figured that a good function would be for the short videos to change automatically once they are finished, but YouTube doesn’t offer this function. There are extensions you can get for your browser that changes the videos automatically but why is this extension not a part of the functionality of YouTube? This has to do with reducing the mental effort of the user and providing adequate navigation mechanisms. It Also has to do with providing design unique to user's needs.

## 8.5 The Video Chat Services

On Facebook messenger, What's app, Viber, and Instagram when you are making a call it does not say how many minutes you have talked on the screen. And there is no option to text chat in the video chat. Sometimes if you want to send a link it would be good to have the possibility to send it in a message attached to the video chat. As it is now you must open a new window with the text chat every time you want to send a text while in a video call. It could simply just be a possibility to write text and send it at the bottom of the screen. This has to do with providing users with design unique to their needs (UCD Principle no. 1)

Also, when watching a video together in the app it mutes my microphone automatically. But when the video is over it continues to be muted. It's also impossible to unmute my microphone while playing a video without stopping the sound on the video. It's not like that when you do a video chat in messenger in the Google Chrome Browser, neither on a smartphone. Therefore, I prefer to use messenger in the browser rather than in the app.

When wanting to use the "record screen function" on messenger it gives you this message:



But when I do what the message suggests it still doesn't work to share the screen. This is an error.

Another thing that is wired about messenger app on a desktop computer is that once the window is minimized and you're in a video call, and you try to take a screenshot of the with the video call it doesn't show the video in the screenshot.

Sometimes when using the video chat function on messenger it closes abruptly. It has happened several times and the program doesn't give any feedback as to what went wrong, or any type of error message is not displayed. Even once the app disappeared from the app menu at the bottom of the MacBook screen. I had to find the app in the applications folder and open it from there and make the call again. This has happened several times. Another time I tried to make a video call it just said "call ended" when I tried to call. I tried again and this time it simply asked me "how was the quality of your call?" I restarted messenger and the problem disappeared.

## 8.6 Google

When I was in a hospital eight years ago, I forgot to log out of my google account for YouTube. Another patient used the computer and updated the primary email address for my google account with her email address and ever since then I have not been able to change the email address back to my own email address. I have tried everything but google simply doesn't allow me to change my primary email address. What does this say about googles usability? If it is possible to change the email address once it should be possible to change it again; but it isn't. If your account's email address ends in @gmail.com, you usually cannot change it. It was possible to change it before because my previous email address was not from google, but because the person who changed the email address had an email address that ends in @gmail.com it is not possible to change it again. It doesn't seem to make any sense and is causing a lot of problems for their users. My YouTube account associated with this email address had a lot of videos and I didn't want to make a new google account because of that. And because it is not possible to change the primary email address because it ends with @gmail.com I'm still stuck with a total stranger's email address on my Google account nine years later. This kind of design has bad usability. I'm still hoping for google to change so that I can update the email address to my own, but it still hasn't happened, and for all I know it may never happen. How many people has this happened to? And why has google decided to have their system work in this way? I can't find any good reason for them to have it organized in that way other than they just want people to stick with a mail from Google? How can google improve their usability? Simply by letting their users change

their primary email address even if it ends with @gmail.com. This has to do with the UCD principle about avoiding errors (no.10).

## 8.7 Apple TV

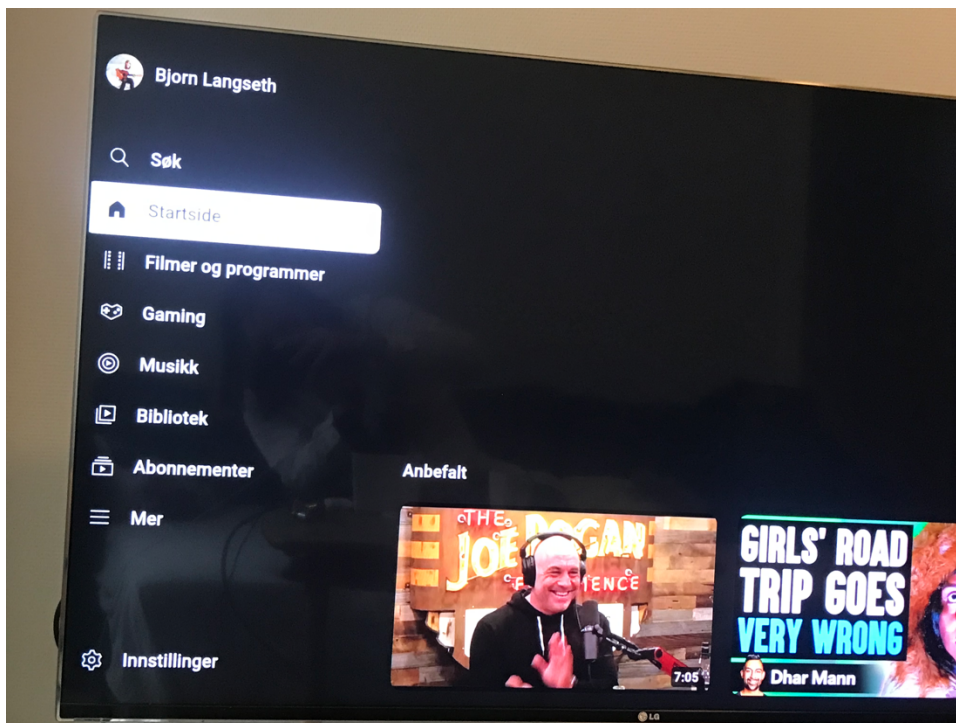
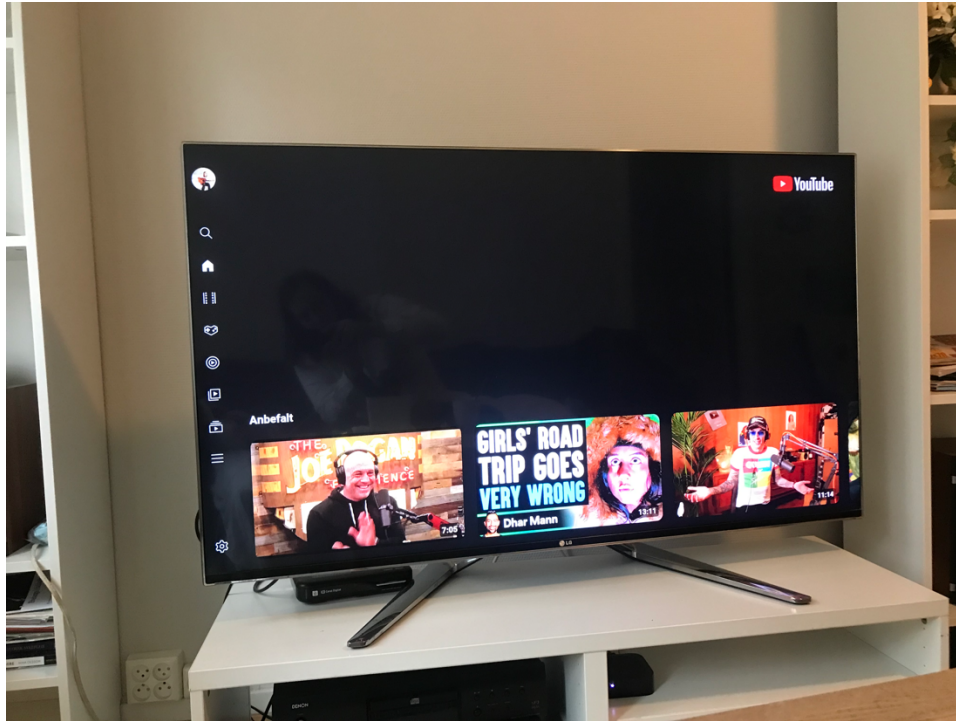
When using an iPhone for controlling an Apple TV and you go to search for something it used to be possible to write what you're searching for with the keyboard on the iPhone, but for some reason that is not always possible, and you must navigate and choose every single letter from a list on the TV Screen. This takes a lot more time and it's frustrating. Why isn't it always possible to write the search with the keyboard on the phone? It would also be good if it were possible to control the volume on the tv with the apple tv remote, but to this day that is not possible. These are both examples of failing to provide adequate navigation mechanisms (UCD principal no.6)

Also, the iPhone started requesting to turn on the Wi-Fi to connect with the Apple TV when the Wi-Fi already is on. When I close the Apple remote and open it again it doesn't request to connect with Wi-Fi as it is already connected.

Sometimes when the app is just opened and it's loading the screen it shows a temporary message that says something like "Apple tv cannot be loaded," but then it a few seconds later loads it. I don't understand why it is like this, but it is a misleading and misplaced message that overall lowers quality of the product. The same is true when the remote for some reason only works every other time, I open it. When I open it, it doesn't connect and nothing happens when I push the button, but when I close the remote and reopen it, it works. Next time I close it and reopen it, it doesn't work again, and this continues.

YouTube got stuck in a search on my apple tv. This means that the only option I had was to search for something and it was not possible to push the button in the middle, I call it "the back button" to get to the YouTube front page. After a few hours it resolved by itself.

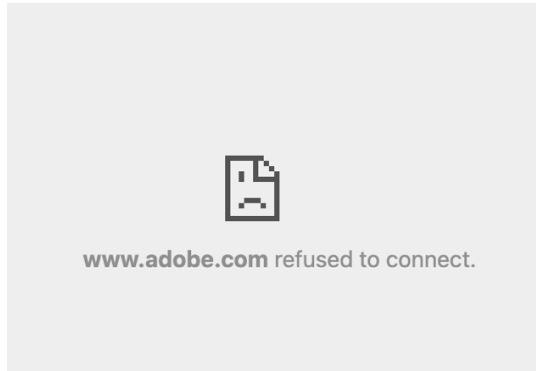
The home menu with different suggestions of what to watch stopped working on the YouTube app on the apple tv. When I try to push a button on one of the videos it simply closes the menu and it's no longer possible to navigate on the home page of YouTube.



I deleted the YouTube app and installed it again and then it worked to navigate on my YouTube homepage, but after a while it stopped working again. The app was simply not operable and was breaking WCAG principal no. 2 about being operable.

## 8.8 Adobe

When wanting to get a free trial of Photoshop and I click the link all I get is this window:



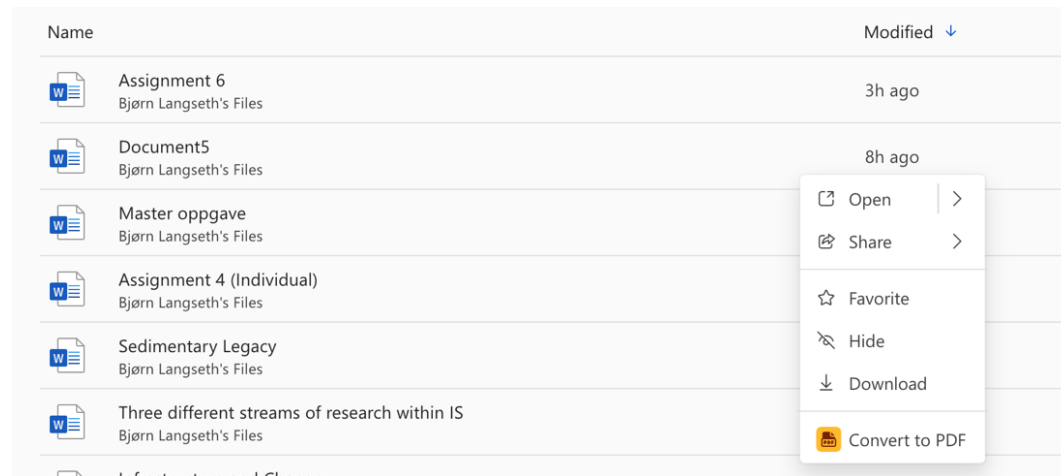
It doesn't say anything about whether there is a plugin missing or how to fix the problem. This is another example of a website not being operable.

## 8.9 One Drive

When using one drive with my school account and renaming a document. The documents name in the list doesn't get updated immediately. This can lead to some confusion as to whether the name was changed. I was staring at the screen for many seconds before the name change was updated and the document was moved to its appropriate place sorted by name. As already discussed, it is important with adequate feedback and when the feedback is delayed like that it can be confusing.

They updated One Drive and in the new update it is no longer possible to delete documents.





There is no alternative to delete a document.

## 8.10 Ruter App

Ruter has a new app. It would be good if it remembered not only your home and favourite stations, but also favourite routes. As it is now there is no way you can save a favourite route, so every time you want to search for a certain route you may first pick one of your favourite stations, but you must search for the destination each time. A lot of time could be saved if it only were possible to save favourite routes. This has to do with the UCD principle of providing adequate navigation mechanisms (no. 6) and to satisfy the user's needs. Why have a two-step approach when you can have a one-step approach? Ruter.no remembers the previous route you searched for. It should be only a question of time before the app can do that as well.

## 8.11 Rain Alarm Crome Extension

This is a good weather extension, but it doesn't have the option to save locations. So, every time you want to find out what the weather is in a different location it's overly complicated to find out what to do. I tried to go to the settings, but didn't find anything. The options in the settings are to change the animation rate, animation interval, transparency, turn on and off whether the radius is visible, reset to defaults, and more extension settings. In the more extension settings menu, there are even more options to read, but the location choice between automatic or manual is in the top

left. If you tap the manual option, you may write the location you wish to see. This is the only way to change location. It's too hidden and to many steps to find this option. With the ability to save location, which is possible in other apps like UV weather it is much easier to see the weather in your favourite cities and it's more beneficial to the user's needs.

## 8.12 Hello Fresh

This is a food delivery company. They sent me an offer in my mail where I can get a discount of NOK 1259 if I enter a code. When I went to their website to enter the code and see the discount, they first ask me to fill in my email address, and to create a password. Then they ask me to fill in my address and credit card number, but there is nowhere to fill in the code without giving all this information first. After filling in all this information there is a button that says, "Buy now and choose meals," and it says that I'm going to save 719. This is much less than the NOK 1259 that they had promised. I don't know if they are going to let me fill in the code after pushing the "Buy now" button, or if they are just going to charge me, so it feels a bit risky. I don't know if they do this to confuse or if it's just bad design. They should offer you to enter the code in the beginning so that the discount they are offering is visible on the page and the customer can know that the discount they have promised is real and not some trick they are doing to cheat customers. It is likely that they offer you to enter the code at a later stage, but because the button says "buy now" it looks like they are going to charge me with the more expensive offer. This is a bit tricky design that can be used to get more customers and leaving the customers interested figuring out what the offer is. It could be its not a mistake in the design, but it is someone who has designed the webpage in this way intentionally. I think this commercial may spike some interest in the market, but it may cause a lot of confusion as well. I think that Hello Fresh has broken principle number 6 of the user centred design principles by failing to provide adequate navigation mechanisms. Navigation with high usability makes satisfied users, but Hello Fresh has lowered the usability and made the website difficult to understand by failing to give a clear route as to how the discount is going to be activated. They have also failed to follow principle number 8 that is about presenting information clearly, and principle 9 that is about offering help. There is not offered any help for how to activate the discount code.

## 8.13 Spotify

When watching YouTube videos with a YouTube account it is possible to see the videos you have watched in a list in the history in the library. In this way you can look back and watch the videos you have watched in the past over again. The music streaming service Spotify doesn't have this option, but they really should. This has to do with the UCD principle nr. 6 about providing adequate navigation mechanisms. It would sometimes be useful to be able to go back and listen to songs one recently has listened to.

## 8.14 Instagram

When seeing a video on Instagram there is no way to rewind it. The videos automatically starts playing when you scroll down and for some reason, if you have Instagram videos on mute and if you scroll down and start watching a video without unmuting it, and you decide to watch it, you may not be able to watch the beginning of the video. They should really have a way to rewind the video and it's also missing the possibility to adjust the volume on the videos. This also has to do with UCD principal no. 6.

## 8.15 Student Card at The University of Oslo

When you have lost your student card and want to order a new one you must order an appointment for ordering a new card. It is also possible to have the student card on the Student Card app. When I got the app, I wondered if it is possible to use the app as a key card like it is possible with the student card. Their website didn't say anything about it. If that was possible I wouldn't have to pay NOK 150 for another card and wouldn't have to worry about losing it. I went to the appointment and the man in the counter told me that they haven't come that far yet. In the future it will be possible, I think. It would be satisfying for a lot of students to be able to use the student card on the phone as a key card. Although this is a feature that would be good to have it is arguably not breaking any design principles, or one could say that it is breaking WCAG principle nr. 2 about being operable because the app doesn't work as key. Because of that one

may also argue that since the app doesn't work as a key, it is not fulfilling an important user need and is therefore breaking UCD principle nr. 1.

## 8.16 Norsk radio

This is an app I found in the app store. It's a good app but there is one problem. There's a list of radio stations horizontally. The radio station that is marked is enhanced (larger). But when you go into it and out of it again it is not enhanced anymore. It's sometimes a station four, five or six places behind the one you are listening to that is enhanced on the list on the screen when you are listening to another station. This is not an adequate navigation mechanism and is causing confusion. Therefore, it is breaking UCD principle nr. 6. It should be the one you are listening to that is enhanced. I'm looking forward to seeing this improvement in the future. The developer didn't figure out how to code it so it works properly?

## 8.17 Samsung Smart TV

We have a Samsung Smart TV in our cabin. When it's not connected to the internet it gives feedback that the tv is not connected to the internet and encourages to check the network settings. The problem is however that the message continues to reappear repeatedly every five seconds even when we don't want to connect it to the internet. This is a problem because the message is interfering with the watching of regular tv. It's not good to have too much feedback with the same message repeating. It is disturbing and distracting for the user when he is watching tv. I tried to turn off the Wi-Fi, but it didn't help. I will argue here that it is breaking the UCD principle nr. 4 about reducing unnecessary mental effort for the user. The user gets annoyed by the message and uses mental effort to turn it off, but it's not possible.

## 8.18 DFØ

The University of Oslo is using this app for employees wanting to register work time and over time, a sick child, vacation and many more things. UIO and Oslo met was the first schools to use the system and schools like NTNU have decided to not use it because of bad experiences with it at Oslo Met and UIO. People are having trouble filling out the forms correctly, and there are bad explanations of what to do which is breaking UCD principle nr. 8 about presenting information clearly. There is also a lack of feedback as to what the user has done wrong. This is failing to provide adequate feedback and is therefore breaking UCD principle nr. 5. One user I talked to didn't know what she had done wrong and every time she tried to send it the form was just saved in the outbox and there were no errors in the form. As I was watching her explain how difficult the system was, she suddenly saw a green button that was for sending the form. She had overlooked it because it didn't stand out enough. She finally succeeded in sending the form after a lot of difficulties.

## 8.19 Word Online

For some reason, the format of this header continues to be wired no matter how many times I change the format of it. I changed it about ten times into this:

**University of Oslo's Calendar**

but every time I go back to the document it has changed back to this wired format pictured below:

**University of Oslo's calendar**

On the webpage for students at the

This is failing to create a design unique to the users' needs and is therefore breaking UCD principle nr. 1 because the user expects a change to take place permanently whenever he edits his document.

After a while though, the document stopped changing back to the error by itself, and the change finally became permanent.

## 8.20 Foodora

Foodora is a company that transports food for people who order it. When applying for a job at foodora (a food delivery company) in Norway you must first watch many videos and answer quizzes about the videos. You even must take a picture of your bike and upload it. After doing all of this they ask you if you are a member of an EU or EEC State. If you answer no, you must upload a work permission document even if you are from Norway. This does not make any sense because you do not usually need a work permission for working in Norway when you are from Norway. Is Foodora only hiring foreigners? They should not waste peoples time with quizzes and videos and then deny people to work when they do not have a work permission while they are from Norway. And they especially should not be sending messages on your phone all the time reminding you that there are still a few actions you need before you can start working. This is failing to reduce unnecessary mental effort for the user and is therefore breaking UCD principal no. 4. They should have asked about the work permission document should be requested at the beginning of the application.

## 9 Tables

I have created a table with the UCD principles that have been broken in all my examples as well as a table for the broken WCAG principles.

- 1. Create designs unique to user needs**
- 2. Maintain consistency**
- 3. Use simple and natural dialogue.**
- 4. Reduce unnecessary mental effort for the user.**
- 5. Provide adequate feedback.**
- 6. Provide adequate navigation mechanisms**
- 7. Let the user take charge.**
- 8. Present information clearly.**
- 9. Help**
- 10. Be free of errors**

	<b>Soundcloud</b>	<b>MyPhoneAk</b>	<b>Apple Watch</b>	<b>Induction oven</b>
<b>1.</b>	The website is not always operable with voiceover.			
<b>2.</b>				
<b>3.</b>				
<b>4.</b>				
<b>5.</b>		Continues to search for ever without giving any feedback about what is going on.	Not possible to push search button without ending dictation by pushing the middle of the screen first.	.
<b>6.</b>	The website is not always operable with voiceover.			The buttons are too close to each other. The sensitivity is not adjusted so it reacts to too many things.
<b>7.</b>				
<b>8.</b>				
<b>9.</b>				
<b>10.</b>	84			



	Vipps	UIO's Calendar	University of Oslo's Schedule	Inspira
1.				
2.				
3.				
4.		It would be much easier if the course code in the calendar had a link.		
5.		It would be much easier if the course code in the calendar had a link.		Buttons are there but nothing happens when you push them.
6.		It would be much easier if the course code in the calendar had a link.		
7.			Unnecessary step when marking a word after pushing " show more."	
8.				
9.				
10.	The " request" and " send" buttons are too close to each other.			

	<b>Finn.no</b>	<b>Teoritentamen.no</b>	<b>Youtube</b>	<b>The Video Chat Services</b>
<b>1.</b>			The user wants to see new videos, but YouTube suggests videos seen before together with the new. The users need of being presented correctly is also neglected by removing line-breaks in description.	No possibility to write text and send it at the bottom of the screen. No information about how much time spent.
<b>2.</b>				
<b>3.</b>				
<b>4.</b>			YouTube shorts don't change to the next video by itself.	
<b>5.</b>				
<b>6.</b>	The website does not remember the users' specified searches and the user must reenter the search specifications for each search.			
<b>7.</b>	The website does not allow filling in the airport the user is travelling from due to an error.			
<b>8.</b>		Doesn't inform the user about number of mistakes.		
<b>9.</b>				
<b>10.</b>	<sup>89</sup> It wasn't clear enough in the ticket that the traveler had to change airport.			

	Google	Apple TV	One Drive	Ruter App
1.				
2.				
3.				
4.				
5.			Feedback is delayed when renaming a document.	
6.		Not always possible to write the search with the keyboard on the phone. Not possible to control the volume on the tv with the apple tv remote.		Not Possible to save favorite routes.
7.				
8.				
9.				
10.	Changing of email address is permanent even if the user changed it by mistake.			

	<b>Rain Alarm Chrome Extension</b>	<b>Hello Fresh</b>	<b>Spotify</b>	<b>Instagram</b>
1.	There is no possibility to save cities in a list.			
2.				
3.				
4.				
5.				
6.		It's not possible to fill in the discount count before pushing the buy now button.	There is no history over songs listened to.	Not possible to rewind and no volume adjustment on videos.
7.				
8.				
9.		The website is not offering any help for how to use the discount code.		
10.	88			

	<b>Student Card at The University of Oslo (UIO)</b>	<b>Norsk radio</b>	<b>Samsung Smart TV</b>	<b>DFØ</b>	<b>Foodora</b>
1.	The student card app doesn't work as a key.				
2.					
3.					
4.			Impossible to turn off message that reappears about Wi-Fi not being connected.		Requires users to answer a bunch of quizzes and to fill out a bunch of forms but in the end requires a work permission document for everyone.
5.				There is lack of feedback as to what the user has done wrong.	
6.		.Confusing navigation mechanism.			
7.					
8.				Bad explanations of what to do.	
9.	88				
10.					

	<b>1.Percievable</b>	<b>2. Operable</b>	<b>3.Understandable</b>	<b>4. Robust</b>
<b>Soundcloud</b>	The website is not operable with voiceover and is therefore not perceivable for blind people.	The website is not operable with voiceover		Webpage is not compatible with voice over.
<b>Photoshop Through UIOs Website</b>		There is something wrong with the application which makes it not operable.		Webpage is not compatible with voice over.
<b>UIO's Calendar</b>		The course code is a potential link, but it's not operable and dead because there is no link.		
<b>Vegvesen.no</b>		It is not possible to pay for a theory test online even though their website says it's possible.		
<b>YouTube</b>		It's impossible to buy a membership because of a never-ending loop when paying.		
<b>Adobe</b>		Refused to connect when trying to get a free trial.		
<b>Hello Fresh</b>		It's not possible to fill in the discount count before pushing the "Buy Now" button.		
<b>Instagram</b>	No descriptions of photos for blind people.	Not possible to rewind videos.		Not possible to choose stories and voice over doesn't describe what's in the pictures.
<b>Inspira</b>			Confusion as to whether a file has been delivered or not.	

	1.Percievable	2. Operable	3.Understandable	4. Robust
UIOs student card app		The app is not operable as a key.		

## 10 Discussion

There are a lot of troubles and errors in UIs, and with new technology comes new troubles. While I was writing this assignment I got into a certain type of mindset where I look with a critical view on UIs and trying to figure out what's wrong with them and how they may become better. I have kept this mindset after finishing this thesis and find a lot of errors and troubles in UIs as I use my different devices. I have done qualitative research and have gained insight into the participants knowledge, views and opinions. I have also gained insight into what challenges they have with their use of interfaces. I have studied three groups of people's use of interfaces: blind, elderly and young people and students. I also interviewed two experts, but didn't get any insight into their personal use. The blind struggle the most with use of interfaces, then it is the elderly and finally young people and students struggle the least.

Among WCAG principles it was number two about the web site being operable that had the most fails among the web sites I tested. A lot of web sites are partially not operable simply because a part or parts of it are not possible to use.

### 10.1 Self-Efficacy

Self-efficacy is a person's belief in their ability to complete a task or achieve a goal. (Cherry K., 2023). It is crucial that a person has enough self-efficacy that they can try to do the task at hand with a UI. It can sometimes be difficult to distinguish whether a problem is because of the users lack experience or if it's because something is off about the way it was designed. Some people have an easier time, while others have a more difficult time while using interfaces and that may relate to a person's Self-efficacy. Because people with little self-efficacy find it hard to even try

doing a task in a UI, they also give up easier. Some people have a lot of self-efficacy but still fail because of their lack of knowledge. This was for example the case with person 8. He seemed to believe that he could do it but continued to do the same mistakes over again.

## **11 Conclusion**

There are many troubles in modern UIs. Some of the troubles are there by accident and other troubles are there intentionally. The troubles may be there to intentionally make profit, but the question is whether the companies make more money on giving users a little trouble or if they would make more money and have more satisfied costumers if the troubles where avoided. In other cases, the usability is lower because it is expected from the user to be able to use the webpage the way it is. That may be the case for example for the student webpages for the University of Oslo. Sometimes it seems simple to make changes in the UI, but it may be more complicated than expected.



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