MASTER THESIS
in
Universal Design of ICT
May 2016

Identifying and overcoming Organizational Barriers in Organizations to Ensure Universal Design in Practice: A Case Study of the Norwegian Broadcasting Corporation

Lars Henrik Nordli

Department of Computer Science
Faculty of Technology, Art and Design

OSLO AND AKERSHUS
UNIVERSITY COLLEGE
OF APPLIED SCIENCES

1.1 Preface

This master's thesis will report on research conducted with and at the Norwegian Broadcast Corporation (NRK) regarding how NRK can achieve universal design (UD) of their website in practice. NRK initiated this project through an assignment proposal and as the project evolved from being a purely technical investigation of NRK's content management system (CMS), it became an organization-wide research that also included the employee and organizational aspect of universal design. This research has given me valuable in-depth understanding of how to conduct research in the area of Human Computer Interaction (HCI), as well as knowledge regarding organizational processes in an accessibility and universal design context.

There are several people and institutions that have made this research possible. I would like to thank my supervisor, Wondwossen, for the support, patience, guidance, and useful tips along the way. I would also like to thank Anthony for the interest and enthusiasm in my research, and for providing me with knowledge in new areas that helped shape this report and the outcomes of the research. I would also like to thank Tamara for her love, support and advice.

Third, I would like to thank NRK for welcoming me into their environment and allowing me to do real-life research – this proves to me that NRK are dedicated towards improving their services for the users and the population of Norway. The office space that I was provided with had some really great people. I would also like to thank all the participants at NRK for allowing me to "steal" their precious time during their workday. The scientific contributions this research would be impossible without them.

Lastly, I would like to dedicate this master's thesis to my late father, Øistein Nordli. He always told me that I could accomplish anything I set my mind to and he has been right there with me through the course of this research.

Lars Henrik Nordli
Oslo, May 16, 2016

1.2 Summary

Universal design (UD) of information and communication technology (ICT) is a fundamental principle that ensures accessibility to ICT products and services, anti-discrimination, and in turn equal ability participation in society for all.

Previous research suggests that NRK's publishing system, Polopoly, does not create or promote the creation of accessible content on NRK's website (Kessel, Sanderson, & Chen, 2014). In addition to this, previous research shows that NRK's website does not comply to national regulations, i.e., WCAG 2.0, and that users experience usability barriers when using NRK's website (Sanderson, Chen, & Kessel, 2015).

This research's aim is three fold. First, this research aims to extend previous research at NRK (Kessel et al., 2014; Sanderson et al., 2015) on how the editorial employees experience and use the publishing system Polopoly. Second, this research aims to identify barriers that hinder universal design (UD) in practice. Lastly, this research aims to present recommendations for how these barriers can be solved to promote, ensure and achieve UD of NRK's website in practice.

The identification of barriers is conducted through an instrumental case study at NRK, where one on-site observation and seven semi-structured interviews is used as data collection. Document data at NRK was also collected and analyzed.

Through the use of a theoretical framework on institutional theory, this research regards NRK as a social institution, containing members, rules, policies, values, practices and barriers. Institutional change theory can be applied to NRK when regarded as an institution. This theory is the fundament on which the recommendations to solve the barriers are created.

This research suggests that NRK's editorial employees, as an institution, experience multiple barriers concerning accessibility and UD awareness, organizational collaboration and structure, and various technological barriers that affect their ability to promote, ensure and achieve UD in practice. In addition, this research shows that the work environment and the inherent properties of their profession continuously

pressure the editorial employees with time, which further inhibits the ability for institutional change.

This research recommends that NRK employ institutional layering to promote, ensure and achieve UD in practice without causing sudden or major changes in the organization. The recommended solutions can be read in Section 9.2.

2 Table of Contents

2.1 List of Acronyms

NRK	Norwegian Broadcasting Corporation
UD	Universal Design
ICT	Information and Communication Technology
CMS	Content Management System
PP	Polopoly (NRK's CMS)
AT	Assistive Technology
NSD	Norwegian Social Science Data Services
ADAA	Anti-Discrimination and Accessibility Act
QA	Quality Assurance

2.2 List of Figures

2.3 List of Tables

3 Introduction

Technology has become and currently is a big, integrated, part of people's life (Mossberger, Tolbert, & Stansbury, 2003), businesses (Brynjolfsson & Hitt, 2000) and governments (Rahman, Rashid, Yadlapalli, & Yiqun, 2014). Technology is now an all-encompassing entity of the global and local society (Graham, 1998). The emergence and widespread use of e-governments, digital health cards, digital tax returns, electronic medical journals, digital payment and bank services, internet shopping services, digital public and health services, digital recruiting services, internet entertainment and internet news services as well as digital educational services (Carter & Markel, 2001) are some examples of this fact. Technology is also an integral part of participation in society and social participation (Mossberger, Tolbert, & McNeal, 2007). Information technology has been, is, and will become a bigger part of societies in terms of social and economic development, as well as occupational and cultural activities. Therefore, we define today's developed societies as a part of the information society (Alampay, 2006; Webster, 2006). Information technology is therefore an essential component for nations to develop and participate in the economic process (Odedra-Straub & Straub, 1995; United Nations, 2001).

Despite the emergence of the information society, there are still a big part of the world population that has limited access to technology, or does not have access to technology at all, which is often referred to as the Digital Divide (Mossberger et al., 2003). The Digital Divide explains how people, based on nationality, gender, race among others, experience different levels of access to technology (Mossberger et al., 2003). If people experience usability barriers and challenges to the extent that they cannot use the product or service as intended, they are discriminated against by governments and service providers (Diskriminerings- og tilgjengelighetsloven, 2013).

Global ageing describes how the average mean age has and will continue to increase, according to (World Health Organization, 2011). As a consequence of increased age, disabilities like dementia, arthritis, loss of sight and loss of hearing are much more likely to occur with age, and with the global ageing the share of the global population with these disabilities will drastically increase (World Health Organization, 2003). This shows that the global population has different ability to use technology,

and exist in different environments with varying access levels to technology, despite technology's importance for social participation and development.

In order to prevent people from being discriminated against and excluded from social life and global, as well as local, societies and the services it includes, accessibility and universal design of technology should be an integrated part in societies (Steinfeld & Maisel, 2012; Stephanidis & Emiliani, 2002). It is also important to not further marginalize groups with unskilled, disabled and elderly in the society (Klironomos, Antona, Basdekis, & Stephanidis, 2006). Universal design is defined as "the design of products, environments, programs and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (United Nations, 2007).

There have been accessibility initiatives in Europe to ensure accessibility for disabled users and the public in general. For example, The United Nations (UN) released their Rights for People with Disabilities in 2007 (United Nations, 2007), and Norway have had several initiatives (Norwegian Ministry of Children and Equality, 2009; Norwegian Ministry of Children Equality and Social Inclusion, 2015) to promote and ensure equal participation and inclusion for all in society. This research is a contribution to Norway's obligation to promote access to all people.

Research on web accessibility and universal design has had a main focus on users' experience and accessibility outcomes in services, suggesting that various services contain accessibility barriers (Blanck, 2014; Brown & Hollier, 2015; De Andrés, Lorca, & Martínez, 2010; Kelly et al., 2009). However, extensive research has yet to be made on how universal design is applied in practice in businesses and organizations. Most service providers tend to "retrofit" (Souza & Manning, 2000; Brian Wentz, Jaeger, & Lazar, 2011), ignore or not take advantage of (Sullivan & Matson, 2000), or not take universal design into account (Putnam et al., 2012) when creating products and services. In addition, there is evidence that technical improvements and accessibility guideline or requirement conformance is not enough to achieve UD in practice (Cooper, Sloan, Kelly, & Lewthwaite, 2012; Koutsabasis, Vlachogiannis, & Darzentas, 2010; Matthews & Aston, 2013; Power, Freire, Petrie, & Swallow, 2012; Vigo & Harper, 2013). Rather, research shows that processes and practices, policies

and awareness within businesses and organizations are fruitful areas to promote and ensure accessibility, to in turn employ universal design of the services they deliver (Erlandson, 2007; Iwarsson & Ståhl, 2003; Ostroff, 2011).

The ability for users to access digital news services is an integral part of participating in the society by staying up to date on current and recent matters, to participate in debates, and, perhaps most importantly, to receive information in emergency situations. The press, physical as digital, is a place where truth is presented, and ideas are shared. As Siebert, Peterson, and Schramm (1963) state, “In order for truth to emerge, all ideas must get a fair hearing; there must be a “free market place” of ideas and information. Minorities as well as majorities, the weak as well as the strong must have access to the press”. It is therefore imperative that people are able to access digital news services independent of social, environmental or physical disabilities.

The Norwegian Broadcasting Corporation, hereafter referred to as NRK, is a governmentally owned, non-commercial public broadcaster that delivers digital print and multimedia content each day to the population of Norway. NRK’s website has the main goal of reporting on current news and providing insight into national and international matters. NRK’s mission statement (NRK-plakaten, 2012) reveals that “NRK are to deliver relevant content to all” (Vedtekter for Norsk rikskringkasting AS, 1996). Despite this, research shows that NRK’s website does not conform with national regulations (Sanderson et al., 2015) and that users experience accessibility and usability barriers on the website (Kessel et al., 2014). Research also shows that NRK’s publication system does not conform to industry guidelines, or promote universal design at a technical level (Kessel et al., 2014). Research has yet to investigate how the editorial employees at NRK experience and use the content management system, what practices, processes and policies at NRK regards accessibility or universal design, and how the editorial employees take universal design into consideration when creating content for the web.

The aim of this research is three-fold: the first aim is to extend previous findings regarding accessibility and universal design at NRK from Kessel et al. (2014) and Sanderson et al. (2015). The second aim is to gain an in-depth understanding of how

procedures, processes and culture in organizations influence universal design in practice, through an instrumental case study at NRK. Lastly, this research aims to recommend how organizations can change to promote and ensure universal design, using the results from this research at NRK. These measures will be presented as concrete recommendations that NRK can employ to their organization.

This research asks: How do organizational norms, values, and procedures influence Universal Design in practice?

- How do social institutions inhibit or constrain organizational change?
- How do social institutions act as a basis for promoting Universal Design in practice?

All organizations can be viewed as a social institution. An institution is defined as a collection of established rules and organized activities and practices that, in some way, perpetuates and changes over time (March & Olsen, 2006). This research will use institutional theory and institutional change theory to accomplish three goals: the first goal is to identify any causal relationships between identified organizational barriers and achieving UD in practice. The second goal is to recommend a change that resolves these barriers in the most effective way. The third goal is to apply the findings of this research to other institutions, i.e. organizations and businesses, beyond the case being studied.

3.1 Map of the Thesis

This thesis continues in six parts. Section 4 presents a literature review that presents relevant research. Section 5 presents the methods for data collection and analysis used in this research. Section 6 explains this research's specific case in detail, including the organization and the technical tools the editorial employees use. Section 7 presents the results from data collection and analysis. Section 8 discusses these findings and what limitations can be applied to the findings. Section 9 present concluding remarks of the research in addition to provide the research subject, NRK, with concrete measures to resolve the identified barriers in this research. Reference lists and appendices can be found from sections 10 to 13.

4 Literature Review

This section examines previous, relevant, research that is related to this research. Section 4.1 introduces and explains the concept of universal design and accessibility, including the users and situation where this is relevant as a concept. Section 4.2 presents an in-depth view on the social implications of accessibility. Section 4.3 explores issues related to social institutions and institutional change, which help to drive a theoretical perspective that may help shape the course of this research. Section 4.5 presents the technical aspects of accessibility, including relevant guidelines. Section 4.6 discusses how web accessibility and universal design can be promoted, ensures and maintained in organizations. Section 4.7 presents usability barriers and solution to these barriers shown with previous research. Finally, section 4.8 presents a conceptual view on accessibility in digital news services.

4.1 The Concept of Universal Design

The term universal design emerged from the North Carolina University in the late nineties, and created movement of students and researchers, with the goal of making interior and exterior design easier to use for disabled people. Advocates for this design defines universal design as “The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.” (Connell et al., 1997). The same advocates are also responsible for creating the seven principles of universal design:

1. Equitable use
2. Flexibility in use
3. Simple and intuitive use
4. Perceptible information
5. Tolerance for Error
6. Low physical effort
7. Size and space for Approach and use (Connell et al., 1997)

These principles aim to make physical space, products, technology or whatever it may be, as easy, efficient and satisfactory as possible. The universal design concept

and principles can be applied to many domains, and this research applies the concepts of universal design and its principles to technology, specifically websites.

United Nations (2007) defines universal design as “design of products, environments, programs and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (United Nations, 2007). (Petrie, Savva, & Power, 2015) defines universal design of websites so that “all people, particularly disabled and older people, can use websites in a range of contexts of use, including mainstream and assistive technologies; to achieve this, websites need to be designed and developed to support usability across these contexts.” (Petrie et al., 2015). Persson, Åhman, Yngling, and Gulliksen (2014) defines universal design of websites as “the extent to which products, systems, services, environments and facilities are able to be used by a population with the widest range of characteristics and capabilities (e.g. physical, cognitive, financial, social and cultural, etc.), to achieve a specified goal in a specified context” (Persson et al., 2014).

Although there are slight differences in the various definitions presented above, it is clear that universal design is a concept where all users are taken into account early in design and development stages. Accessibility is a similar concept that also strives to make products and services accessible to all, although the ideology has some nuances that differs it from the universal design concept.

4.1.1 Web Accessibility vs. Universal Design

The general goal of universal design is to design for all people, so that there will be no need to retrofit or make the design accessible at a later stage. Universal design is more than adaptation and has the goal of including all people, to the greatest extent, in the design process to begin with (Justis- og politidepartementet, 2005). The universal design goal is also argued to be more cost-efficient and less time-consuming than the accessible goal that designs for specialized users, e.g. blind, deaf etc., because it does not raise any usability barriers to begin with and will therefore avoid post-design costs and configuration (Lazar, Goldstein, & Taylor, 2015; Maisel, 2010; Trewin, Cragun, Swart, Brezin, & Richards, 2010; Brian Wentz et al., 2011).

In a web context, the main difference between web accessibility and universal design is that web accessibility ensures that websites are usable for users with disabilities with or without assistive technology, while universal design ensures that the broadest possible user base, including disabilities, age, culture, language, among others, can use the solution.

Maisel (2010) suggests that users can be unable to do or participate in activates caused by environmental barriers, or on the other hand be enabled by environmental facilitators. Further, Maisel (2010) states that "[universal design] avoids erecting environmental barriers in the first place and ensures the environment is usable by everyone in the community" (Maisel, 2010, p. 136).

Mpofu and Oakland (2009) further state that "Design intended for specific users (e.g., accessible design) are not likely to be universal. Nonetheless, while all accessible design is not universal, all universal design is accessible" (Mpofu & Oakland, 2009, p. 275).

Erkilic (2011) states that universal design" ... is originated and developed within the discourse on disability ...". Also, legislation that addresses accessibility and universal design, both in terms of physical space and ICTs, often focuses on people with disabilities (Diskriminerings- og tilgjengelighetsloven, 2013; United Nations, 2007). Dobransky and Hargittai (2006) and Solomon (2000) define a gap between a user's ability and the ability requirement of technology as the "disability divide". Organization (2001) uses the medical model to define disability, that is a characterization of a person directly caused by trauma, disease or other health condition. The following section explains the different types of disabilities and the accessibility barriers they face.

4.1.2 Types of Disabilities

Sensory impairments cover impairments in the senses, such as sight, hearing, smelling, tasting, sensation of touch and balance. Blindness, deafness, color-blindness, and contrast sensitivity are a few examples of such impairments. In an ICT context, these kinds of impairments make it difficult, or impossible, to perceive visual

or auditory feedback and navigate and operate ICTs without alternative methods of guides or feedback, such as tactile guides (Lazar et al., 2015).

Cognitive impairments cover impairments in skills such as thinking, concentrating reasoning, reading and writing. Dyslexia, ADHD, Autism and Dementia are a few examples of such impairments. In an ICT context, these kinds of impairments may make it difficult for users to read and/or comprehend written text, process graphics and graphical changes and remember the use of specific ICTs. Accessibility measures that can be made to ICTs for these kinds of impairments include easy-to-read textual information, definitions or explanations for unusual words and jargon, correct use of graphics and graphical changes and intuitive and customizable user interfaces and other assistive technologies like screen reader software (Karger & Lazar, 2014; Lazar et al., 2015).

Motor impairments cover impairments in dexterity and movement. Amputations to legs and/or arms, damages to the nervous system or neuromuscular system, and other dexterity impairments such as rheumatoid arthritis will effectively disable the use of arms, legs or a combination of these. In an ICT context, these kinds of impairments may make it difficult, or at the greatest extent impossible, to use touch screens, mouse pointer devices or other physical input methods. Accessibility measures that can be made to ICTs for these kinds of impairments include enabling use of alternative input methods, e.g., speech recognition and keyboard-only input, and assistive technologies (Lazar et al., 2015).

Although persons with disabilities face accessibility barriers when using ICTs, Organization (2001) addresses the need for an aspect of disability that considers a person's environment and how it disables a person due to physical environment or attitudes from the society. The following section will look at environmental aspect of disabilities, and Section 4.2 addresses the social implications of accessibility.

4.1.3 Non-disabled Aspects of UD

Accessibility to a technology is for many disabled users a requirement. But non-disabled users can also benefit from increased accessibility and universal design. There are several examples of how universal design has benefitted non-disabled

users. Some commonly known inventions that emerged from the universal design movement are the “dropped curb”, and the automatic doors openers often used in shopping malls or stores. The dropped curb, designed by architect Selwyn Glodsmith in the 1960s (Warschauer & Newhart, 2015), was an architectural design invention to enable wheelchairs to enter the sidewalks from the street by creating an angled ramp on selected places of the curb. This invention was later appreciated by people with baby trolleys, bikers, and skateboarders to name a few examples. Automatic door openers are another example of how something designed to ease entrance for people with wheelchairs or walkers, also benefitted people carrying grocery bags or babies into the store (Burgstahler, 2004).

4.1.4 Situational Disabilities

Lin and Seepersad (2007) defines situational disabilities as “ordinary users operating in extraordinary environments”. These situations put users, who may or may not have an existing sensory, cognitive or motor disability, into a state of temporary impairments due to environmental factors. For example, a user without a hearing disability may still have difficulties hearing in a noisy environment, a user without any cognitive disabilities may have difficulties concentrating under stress, or a user without a motor disability may have difficulties using hands when holding onto handrails in a train or bus. (Lazar et al., 2015)
exemplifies how closed captioning of TV broadcasts do not only benefit people with hearing impairments, but is useful for persons who are in cafés or gyms where external noise might overpower the original audio from the TV broadcast.

The users who experience usability barriers with technology often use assistive technologies (AT) (ISO, 2011). Assistive technologies can be either software solutions or physical devices that assist users to overcome usability barriers. Examples of assistive technologies are screen-readers; alterative pointer device used by feet, eye tracking or head; braille keyboard; software zoom; high-contrast software; voice recognition software and many more. These software solutions and devices are customized to an array of disabilities and needs. Assistive technologies are for many people absolutely crucial to being able to use technology. One goal of universal design is to lower the need for assistive technologies through removing usability barriers.

4.2 Social Aspects of Accessibility

4.2.1 Information Society

According to modernization theory, the modernization of societies occurs in a series of stages and phases. Each of these phases have a base for production. As an example, the industrial society was characterized by industry, and how machines, factories and corporate made up the society and everything within (Alampay, 2006). In the same way, the information society have had, and still has, information (technology) as basis (Alampay, 2006).

4.2.2 Digital Divide

The difference in access to ICTs, globally, is often referred to as the digital divide. The digital divide is defined as “situations in which there is a marked gap in access to or use of ICT devices” (Campbell et al., 2001, p. 1). Specifically, researchers have presented evidence that new ICT solutions do not consider this digital divide and the level of ICT access between men and women (Richardson, Ramirez, & Haq, 2000), rich and poor (Gómez, Hunt, & Lamoureux, 1999), urban and rural areas (Campbell et al., 2001), and people with different levels of education (Madhusudan, 2002; O’Farrell, 2001).

Researchers have presented the idea that ICTs are tools for accessing information, knowledge and communication opportunities (Kirkman, 2000, p. 46). Taking this idea further, the difference in access to ICT will deprive people’s possibility to consume information and participating in societies, and is therefore evidently an important part in a society’s development (Heeks, 1999).

However, researchers argue that the idea of the digital divide is unjustified and non-existing, because those who need ICTs have them, and those who do not need ICTs do not have them (Warschauer, 2004). At the same time, other researchers provide anecdotal evidence that access to ICTs can make a difference to people who have been deprived of it (Ching, 2004; Goldstein & O'connor, 2000). As additional evidence of this concept, three independent surveys, examining the UK population,

reported that “Those who are most deprived socially are also least likely to have access to digital resources such as online services” (Helsper, 2008, p. 9).

In any case, the gap that the digital divide presents may decrease, or even disappear, with universal service universal access. Verhoest and Cammaerts (2002) defines these terms as based on affordability, accessibility and quality of service. Universal service focuses on the availability in people’s homes, while universal access focuses on the availability in all communities. This may explain why developed countries strive for universal service, while developing countries strive for universal access, due to the limitations of market and resources (Alampay, 2006).

There are, however, two sides of this coin that is the digital divide. On one side, researchers argue that ICTs alleviate poverty (Duncombe, 2002) and increases the possibility for economic development (Alampay, 2006). Information access allows people to participate in labor markets with other people (Ellis, 2000). On the other side, researchers claim that ICTs are not crucial to societal development, on the contrary, that ICTs will only cause the existing inequalities to grow (Nulens, 2000). (Warschauer, 2004) exemplifies this by looking at how ICTs have developed India’s information technology industry, it has not contributed to eliminate inequality between the rich and poor.

4.3 Organizational Aspect of Accessibility

Boos, Grote, and Guenter (2013) have argued that organizational barriers in businesses and organizations have a great impact on the development of new products. Boos et al. (2013) presented a number of organizational issues and evaluated how they affect the organization and product, in addition to the advantages and disadvantages of solving these issues. Interestingly, even though solving these issues may increase operational efficiency and performance, it may also cause disturbances in the general workflow in an organization. They argued that one of the main reasons that organizational issues emerge and perpetuate is that misalignment with tasks and users causes disagreement in the organization. The effect of the misalignment grows with the product’s life cycle, making a late misalignment more impactful than an early misalignment.

Early prediction of these misalignments is challenging, but Boos et al. (2013) presented a toolbox to simplify the analysis of potential organizational issues. This toolbox divides employees into three levels: the work process, the work system, and the individual employee. The work process level assesses the envisioned work process and its implications, including responsibility changes, variability of requirements and stakeholder views. The work system level assesses changes and consequences of task completeness and task independence. The individual level assesses how an individual is able to fulfill responsibility, taking into account the constraints and factors throughout the development of the product. The three levels are distinct, but yet interconnected. This means that a change in one level may affect one or more of the other levels in the socio-technical system (Henry & LaFrance, 2006).

4.3.1 Institutions

An institution is defined as a collection of established rules and organized activities and practices that, in some way, perpetuates and changes over time (March & Olsen, 2006). March and Olsen (2006) states that “Institutionalism connotes a general approach to the study of political institutions, a set of theoretical ideas and hypothesis concerning the relations between institutional characteristics and political agency, performance and change” (March & Olsen, 2006). Barley and Tolbert (1997) have previously states that “… institutions are socially constructed templates for action, generated and maintained through ongoing interactions.” (Barley & Tolbert, 1997).

Tina Dacin, Goodstein, and Richard Scott (2002) states that “Instituional theory has risen to prominence as a popular and powerful explanation for both individual and organizational action.”.

Researchers suggest that there are three conceptions of institutions; regulative, normative and cultural-cognitive. These conceptions can also be interpreted as elements in institutions, that “together with associated activities and resources, provide stability and meaning to social life” (W. R. Scott, 2001). Any institution will include combinations of the three elements, where the elements point to different ingredients and processes at work in complex structures.

4.3.1.1 Regulative Systems

The regulative approach focuses on the rules and governance in an institution. In this institutional view, the biggest drive to affect compliance is coercion, being forced to. The legitimacy of the behavior is closely linked to the conformity of existing rules (W Richard Scott & Davis, 2007). As an example, economic historian Douglas North points out that institutions are similar to the rules in a competitive team sport. He explains that, in a competitive team sport, there are both formal written rules and unwritten codes of conduct that supports one another. He also mentions that, in a competitive sport as well as in an institution, violations of these written and unwritten rules comes with punishment (North, 1990).

4.3.1.2 Normative Systems

The normative approach focuses on the participants in an institution, and how they create norms and behavior based on the participants' mutual/common morals, values and social obligation to each other. The biggest drive to affect compliance is normative. The legitimacy of the behavior is closely linked to widely shared norms defining appropriateness. Selznick (1996) has defined these norms as an organization's culture or character. Order is achieved through the creation and enforcement of rules. Sociologists are common promoters of the normative elements of institutions (W Richard Scott & Davis, 2007).

4.3.1.3 Cultural cognitive Systems

The cultural-cognitive approach focuses, as the name suggests, the culture and understanding in an institution. The biggest drive that affects compliance is mimetic. The legitimacy of the behavior is closely linked to what is comprehensible, recognizable and culturally supported. For example, languages, religions, legal institutions and country borders are some institutions that create mental frameworks and cultural sense that all participants in the institution agree on. This approach is the most recent, and often associated with the new institutionalism (March & Olsen, 2006). Anthropologists and organizational theorists are common promoters of the cultural-cognitive elements of institutions (W Richard Scott & Davis, 2007).

Institutional theory highlights how cultural influences affect decision-making and formal structures in the institution. Institutions also represent the constraints and barriers in organizations, and these barriers tend to lead the people towards a certain type of behavior (Barley & Tolbert, 1997).

4.3.2 Institutional Change

Institutions are mostly defined as relatively enduring, and are therefore perpetual and difficult to change (Mahoney & Thelen, 2010). Despite this, March and Olsen (2006) state that the "Rules, routines, norms and identities are both instruments of stability and arenas for change" (March & Olsen, 2006). This suggests that although institutions are difficult to change, institutions are likely to change incrementally and over time (Mahoney & Thelen, 2010). As Barley and Tolbert (1997) state, "Institutions, therefore, represent constraints on the options that individuals and collectives are likely to exercise, albeit constraints that are open to modification over time" (Barley & Tolbert, 1997).

Greif and Laitin (2004) argues that although viewing institutions as self-enforcing and is advantageous to answer why institutions exist and persists, this view, exclusively, fails to address how institutions can change and therefore investigates the exogenous drivers for institutional change. They argue that there can be two main reasons for change in institutions: one reason is that the validity and soundness of the values, rules and practices in an institution is too weak for it to be self-enforced, and will therefore change. The other main reason is external shock, in other words how external parameters affect the values, rules and practices in institutions, and will therefore change. Examples of external shocks are customer complaints or new or altered legislation that applies to the institution, and therefore forces it to change. Further, research suggest that barriers in the institution can cause an institutional change (Tina Dacin et al., 2002). These barriers may be big or small, as Tina Dacin et al. (2002) state, "Institutional change can proceed from the most micro interpersonal and suborganizational levels to the most macro societal and global levels." (Tina Dacin et al., 2002).

This process of change is often referred to as deinstitutionalization. Deinstitutionalization explains how institutions, including its rules and practices, can

weaken and disappear, and by doing so make institutions receptive for new ideas and practices, that may ultimately create new institutions (W. R. Scott, 2001).

Oliver (1992) presented three major sources that can pressure change in institutions. These were functional, political and social sources. Functional pressures are those that evolve from perceived problems or efficiency in existing practices. Political pressures are those that evolve from shifts in the underlying power distributions, that makes organizations question the legitimacy of the institution. Social pressures are those that evolve from a differentiation in groups, for example group diversity, different practices or beliefs in groups, or changes in laws or social expectation in groups (Oliver, 1992).

Researchers Mahoney and Thelen (2010) presented four types of institutional change (p. 15). These modes are Displacement, Layering, Drift and Conversion. Displacement is described as “the removal of existing rules, and the introduction to new ones.” (Mahoney & Thelen, 2010). Layering is described as “the introduction of new rules on top of or alongside existing ones” (Mahoney & Thelen, 2010). Drift is described as “the changed impact of existing rules due to the shifts in the environment” (Mahoney & Thelen, 2010). Conversion is described as “the changed enactment of existing rules due to their strategic redeployment” (Mahoney & Thelen, 2010). These modes have different characteristics, i.e. advantages and disadvantages.

When relating the case in this research to NRK and regarding NRK as an institution, this research assumes that NRK is difficult to change suddenly. However, NRK might be able to change incrementally and over time. The barriers that exist at NRK can cause organizational change through one or more of the different modes of institutional change. We can also inform on what type of change may best fit NRK as an organization. This institutional change, or deinstitutionalization, may be a step towards promoting, ensuring and achieving UD in practice.

4.4 Accessibility as Organizational Change

This section presents research on how accessibility in context of training, decision-making, policies, regulations and practices and empirically exists and conceptually can be improved in organizations.

4.4.1 Usability Training in Businesses

Teacher and student Poore-Pariseau (2010) argued that accessibility and usability training should be a mandatory requirement in businesses for all professionals involved in creating web content. The author also suggested that standards must be familiar to the employees, and enforced in the business.

4.4.2 Decision-making and Employee Perspective of Accessibility Practices

Putnam et al. (2012) presented a survey conducted with user experience (UX) and human-computer interaction (HCI) professionals. This survey showed that the professionals reported a varying understanding of the accessibility scope of their work, even though the majority of respondents reported to consider accessibility in their daily workflow. Further, the survey revealed that many of the respondents reported that they felt unable to control or affect the businesses decision-making process, in regards to universal design and accessibility. This result indicates that the knowledge and effort among the employees is present, but suppressed by organizational structure and high-level employees. Also, some of the respondents expressed worry that colleagues at the same or similar position had a tendency to not care and trivialize user-testing results in current practice. Luckily, the same respondents expressed hope for change in current accessibility practices.

Research on this area suggests that product accessibility is greatly affected by organizational issues regarding decision-making, reporting, accessibility practices, and varying amount of knowledge of accessibility requirements and techniques. Increasing awareness of universal design for all and accessibility for the disabled in organizations, is an essential factor to enable web site owners, managers, and researchers among others to allocate more resources to accessibility in development of new products. Decision-makers and managers should also think of the financial benefits of delivering universally designed products to customers. For example, a

study by B Wentz and Lazar (2016) showed that 83% of people that experienced accessibility barriers with products choose to buy a more accessible alternative.

4.4.3 BS8878

The British Standard 8878 (BS8878), based on the PAS 78 from 2006, is a code of practice for web accessibility. The document presents a framework that addresses the (organizational) process into making a product, and thereby compliments technical guidelines (such as WCAG 2.0), that focuses solely on the product itself and conformance (Sloan & Kelly, 2011). As stated by Horton, Sloan, and Swan (2015), “BS8878 encourages a process of documenting decisions and justification for them throughout the project lifecycle, and recognizes organizations may need to take a pragmatic approach where accessibility aspirations come into conflict with other objectives or are affected by project constraints”. Unfortunately for organizations, this code of practice is currently copyrighted and not freely available for organizations to use (Sloan & Kelly, 2011). A draft of the standard, from 2011, is however available on the Internet, but should not be used as an official British Standard, as stated in the document (Harrison, 2010). The BS8878 targets the decision-makers in product development, in addition to technical experts, i.e., developers.

The document addresses the legal aspects, policy aspect, procurement aspect, e.g., from external product developers, authoring tool procurement, product development aspect, and user experience aspect of web accessibility as well as the users of the product including their goals, tasks, equipment, i.e., devices, browsers, and ATs.

BS8878 uses web accessibility as a focus, but there are also elements that promote the universal design concept. For example, the draft of the BS8878 states that “The product’s accessibility policy should be created at the initial conception of a web and be an active document” (Harrison, 2010, p. 10). This policy should act as the base for all decision-making in the product’s life cycle. The BS8878 also recommends continuous web accessibility monitoring, see Section 4.4.4.

The use of process frameworks, like the BS8878, is recommended to ensure web accessibility while also tackling the shortcomings of the technical guidelines, that is strong product and technical focus (Ali, Al Balushi, & Al-Badi, 2013).

4.4.4 Compliance Monitoring

In the book “Ensuring Digital Accessibility through Process and Policy”, Lazar et al. (2015) explains how compliance monitoring may help ensure and improve accessibility in an organization’s end-user products as well as internal IT equipment. He defines compliance monitoring as an organizational policy that proactively and continuously assesses accessibility compliance. The BS8878 draft also addresses this need, stating that “Each of the organization’s web products should have its own accessibility policy.” (Harrison, 2010). Lazar further explains that compliance monitoring is necessary for organization for three main reasons. One reason is that companies are usually driven to improve accessibility in their products by outside users, governments or accessibility advocates. Relying on feedback from external sources to improve accessibility does not provide the organization with expertise or knowledge towards IT accessibility. This development may not ensure accessible in future products, and could potentially cause additional accessibility issues to occur. The second reason is that when accessibility issues are improved or solved, the alleviation of the accessibility issue may be transitory rather than instant. This is a clear disadvantage for the end-users, and may result in exclusion and discrimination of users in the time period where the product is still inaccessible. The third reason why proactive compliance monitoring is necessary, is that it is considerably less expensive to make IT accessible in the early stages of design, rather than retrofitting or changing already developed products (Brian Wentz et al., 2011).

4.4.4.1 Performing Compliance Monitoring in Practice

Compliance monitoring should first and foremost be performed through accessibility evaluation of the product. Accessibility evaluation should ideally be performed before implementation in the product for best results. Dynamic products, like websites, has in addition the need for a regular and ongoing accessibility evaluation to make sure that recent changes or implementations have not interfered with previous accessibility measures or created additional usability barriers (Lazar et al., 2015).

Although there are numerous ways of conducting accessibility evaluations, there are three core methods commonly used: user testing, expert inspection and automated

review. These methods do, however, have some inherent weaknesses that must be considered when choosing evaluation methods. User testing is complex and require careful planning which takes time. Also, when testing with disabled users, the users may only uncover usability barriers that relate to their own disability and therefore may not give a representative indication to all usability barriers. Expert evaluation may focus on technical guideline compliance rather than actual usability barriers, and the experts may lack the knowledge of users. Automated review, through e.g. automatic testing, see Section 4.6, can only assess the existence or non-existence of attributes or properties, and is unable to assess for example the effectiveness of labels. These different evaluation methods should therefore be used in relation to the goal of the evaluation, e.g. legal compliance (Karger & Lazar, 2014).

4.4.5 Accessibility Regulations

Lazar et al. (2015) also informs that accessibility regulations in many countries have the shortcoming of including and enforcing technical guidelines towards accessibility compliance, while organizational aspects, like enforcing implementation of a compliance monitoring policy or process guidelines, for example the BS8878, are left out. This fact applies for this research, as the National Regulations in Norway only addresses accessibility compliance in accordance to technical guidelines.

4.4.6 Incorporating Accessibility Evaluation in Existing Processes

According to Lazar et al. (2015), “updates to web sites will often get sign off from marketing, legal and other departments; in those instances, incorporating accessibility into the signoff process should be a minor procedural adjustment” Lazar et al. (2015). If there are no existing signoff routines to content, the responsibility is forced onto the content creator. In these cases, content accessibility can be enforced and improved through information (accessibility reports that goes to the content creator, increased awareness), guidance (include journalists in the process of making policies and guidelines, receive training through courses or videos) and sometimes penalties. Lazar et al. (2015) also stressed the importance of making an accessibility plan. The accessibility plan should be specific and should address at least five major points; what tech are covered, which triggers for evaluation are required, which

evaluation methods should be used, who is responsible for the implementation, how do results get communicated.

This research has shown that processes, policies, awareness and organizational structure affect the ability to achieve UD in practice. However, there is also a technical aspect of accessibility and universal design that needs to be addressed, as this is the platform for content creation and consummation.

4.5 Technical Aspect of Accessibility

4.5.1 Content Management Systems and Accessibility

There are many causes for businesses not achieving universal design in practice. According to López, Pascual, Menduiña, and Granollers (2012), a content management system can act as a bridge between web content and creator, even those without computer technical backgrounds. In other words, authoring tools were made to remove the technical details, code and markup to bloggers, news organizations and other content creators (Harper & Yesilada, 2008). One might suggest that this fact makes the authoring tool's role in content creation immensely important. For this reason, researchers have investigated the effect accessible authoring tools have on web content, and to what extent its ability to aid the content creator, promotes a universally designed product and compliance with industry guidelines.

Lazar states that the tool for creating content, be it a CMS or a learning management tool (LMS), must be accessible and able to create accessible content for the output to be accessible to the users Lazar et al. (2015).

As a worrying starting point, Freire, Russo, and Fortes (2008) state that most content management system developers do not take into consideration the, industry standard, Authoring Tool Accessibility Guidelines (ATAG), see Section 4.5.3, or other similar guidelines while developing authoring tools. This results in the fact that the authoring tools lack accessibility features, and in addition discourages, or at worst removes, the ability to create accessible content in the authoring tool.

Bittar, Amaral, Faria, and Fortes (2012) assigned numbers to guideline compliance and to what extent it complied or not. The number 0 corresponded to “does not comply”, 0.5 to “partially complies” and 1 to “complies”. Using this scale, they compared Dreamweaver; Eclipse – Helios; Netbeans 7.1; NVU 1.0; and Microsoft Expression Web. They found that none of the tools collectively complied with the assessed WCAG 2.0 criteria, see Section 4.5.2, although some of them complied in varying degree, individually. In addition to this finding, they presented evidence that might suggest that paid authoring tools and authoring tools specialized for Web development met the selected criteria at a higher degree compared to the free or open-source ones. Also, none of the authoring tools created accessible tables, and very few made the user aware of the use of e.g. link titles, heading titles and structure, among others.

Pascual, Ribera, and Granollers (2012) evaluated ATAG 1.0 and WCAG 1.0 conformance for two other popular CMS-systems, Blogger and Wordpress. They found that Blogger and Wordpress failed on 71,43% and 53,57%, respectively, when evaluating towards ATAG 1.0 compliance. Similar results were found when evaluating WCAG 1.0 conformance, and also that both content management systems, with their default settings, did not fulfil a single one of the ATAG priority one requirements. Specifically, there were two main problems that both systems showed: the creation of inaccessible content and the lack of UD promotion provided by the authoring tool. Although this study did not check system conformance with the current version of WCAG, version 2.0, the research still proves that ATAG conformance relates to WCAG conformance – as intended by the guideline authors.

Eshkevari, Antoniol, Cordy, and Penta (2014) and Nguyen, Köstner, and Nguyen (2014) introduced the term “plugin-conflict” in content management systems. This term describes how plugins can disrupt authoring tool and other plugin capabilities and functionality. A plugin is a piece of software that is added to the authoring tool’s base software, and contributes to add functionality and features, to meet the authoring tool user’s needs and wishes. In the research, they argued that a seemingly endless combination of plugins, developed by programmers and communities all over the world, might provoke a plugin-conflict. This conflict results in

disruption with other installed plugins and the authoring tool the plugin is being added to – even when the plugins may function as intended when isolated. This disruption leads to interference and bypass of other installed plugins. This conflict can also occur when updating the plugin or the authoring tool.

4.5.2 Web Content Accessibility Guidelines (WCAG)

The Web Content Accessibility Guidelines is a set of guidelines that "covers a wide range of recommendations for making Web content more accessible. Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these" (World Wide Web Consortium, 2008).

Aizpurua, Arrue, Harper, and Vigo (2014) presented evidence that the WCAG 2.0 guidelines, especially with the use of automatic tests, did not cover all the accessibility issues provided by users of a web page. First, the researchers isolated the areas of a web page where the user experienced problematic situations. The isolation was conducted through collecting evidence of a participant's coping behavior while performing a task. Secondly, they developed algorithms from the user's coping tactics through translating the behavior into machine-readable code, so that the behavior could be simulated. Lastly, these algorithms were then deployed to the web page in question through several browser extensions. They also suggested to expand the algorithms to notify experts, researchers and the web page owners. The notification would make challenges that may not be addressed by formal, theoretical guidelines, visible, and further assessed in the appropriate manner. The researchers suggested that this method would be far superior to guidelines, because it is both product and user specific.

Power et al. (2012) presented an empirical study of problems encountered by blind users on the Web. The study showed that only 50.4% of these problems were covered by the WCAG 2.0 guidelines. In addition to this, the study indicated that even when web pages implemented techniques to meet the WCAG 2.0 Level A requirements, they did not actually solve the experienced problem. Based on this, the

researchers suggested a design principle approach rather than a problem-based approach to ensure a higher degree of accessibility.

Cooper et al. (2012) state that the W3C Web Accessibility Initiative (WAI) and its guidelines for authoring tools and websites focus more on the product itself, and not enough on user goals and requirements. They also state that web developers and other employees with only recent knowledge of the technical guidelines and properties, are not faced with the social aspect of web accessibility between user and product. They argue that there are other factors besides technical properties and usability metrics involved making the Internet accessible, which are: political, economical and social aspects. They also state that end-users, staff, and processes should play a larger role than before in creation and during development of web sites to achieve a higher degree of accessibility. This concerns internal operations in the organizations or companies that develop accessible web solutions. The authors presented evidence that standards that focus on best practice and process, in addition to addressing user requirements and ways of use, may yield a much more accessible end product.

4.5.2.1 Alternatives to WCAG

Cooper et al. (2012) have presented additional accessibility initiatives, like the IBM Social Accessibility Project and Fix the Web, which enable the users to report their experiences without the need to report the technical underlying aspect. Unfortunately, these systems have yet to widespread and scale up to the extent the initiators initially wanted them to. They also discuss the specification and use of BS8878 (Harrison, 2010) that the authors argue is more process- and user centered, see Section 4.4.3. This standard emphasizes and supports collection of user requirements, testing and redesigning, and makes it a part of the product's entire life cycle.

4.5.3 ATAG

Research has showed that compliance with the Authoring Tool Accessibility Guidelines (ATAG) 2.0 is an essential step into making content made with the autorhing tool accessible (Treviranus, 2008). The ATAG guidelines address two

aspects of authoring tools, namely promoting creation of accessible content, and making the authoring tool itself accessible to people with disabilities (World Wide Web Consortium, 2015).

4.5.4 WAI-ARIA

The ARIA (Accessible Rich Internet Applications) specification for web pages makes it possible for HTML-documents to contain metadata about structure and composition, states and context changes (World Wide Web Consortium, 2016a). HTML element roles are defined via the role-attribute. Form elements, like input boxes, checkboxes, and drop-down-menus, as well al dynamically manipulated content through JavaScript can utilize the state attribute to work more favorably with ATs. The WAI-ARIA specification is a part of the HTML5 standard, and implemented in most web browsers and supported in most text-to-speech software. For example, a header element can be given the header-role to signify its role in the webpage, that will be identified as such by AT, software and the end user. The WAI-ARIA specification was developed and recommended by the W3C Candidate Recommendation as of 2011. Despite this, a study by Watanabe, Geraldo, and Fortes (2014) reported that surprisingly few web pages implemented the WAI-ARIA techniques.

This specification is a crucial tool because of the increased use of client-side programming languages, e.g. JavaScript and AJAX (Alimadadi, Mesbah, & Pattabiraman, 2016). These programming languages enable web site content to change state, role, content, position among others. Pilgrim (2013) reported that people who use ATs to interact with web pages that are client-side-programming-heavy, may not be notified or aware that the web page have changed. An example of such a change is a button turning into a drop-down menu. This may be a crucial context change the user may not be made aware of. However, Watanabe et al. (2014) presented evidence to suggest that alternative keyboard navigation methods can be used, e.g. Links Fallback and Button tabs, which serves a similar purpose as the ARIA specification, although with a higher number of disadvantages compared to the ARIA specification.

4.6 Accessibility Testing and Evaluation

4.6.1 Usability Testing and Usability Metrics

Automatic Accessibility Testing (AAT) are software or web services that assesses a website for accessibility guideline errors, for example WCAG 2.0 conformance, programmatically.

Vigo, Brown, and Conway (2013) presented research on how a number of AATs assessed guideline success criteria. Although they admitted that AATs were somewhat helpful, they found that most AATs neither covered nor comprehended the WCAG 2.0 success criteria in full. In addition, they found that tests that offer a greater degree of completeness tend to skew conformance results, due to the high probability of false positives in these tests. The researchers found that only one of out two success criteria was analyzed, and out of those analyzed were only four out of ten success criteria checked. Further, the authors compared the effectiveness, coverage, completeness and correctness of six WCAG 2.0 AATs to usability expert reports. These AATs were: AChecker, SortSite, Total Validator, TAW, Deque, and. This suggested that the use of an AAT is better than no evaluation at all, and that using multiple automatic checkers yielded the best results when confined to automatic tests. However, they stressed the importance of expert evaluation to achieve top results.

In addition to the strong recommendation among researchers not to rely solely on AATs for guideline compliance, Fernandes, Batista, Costa, Duarte, and Carriço (2013) found that it was crucial to evaluate a web site's accessibility in several stages of its life cycle, due to the increasing number of Rich Internet Applications (RIA) on the Internet. RIAs are web pages that allow end-user interaction, data storage and manipulation, among others. Facebook is an example of a RIA. These RIAs often contain real-time, dynamic manipulation of web content and structure through client-side code that makes the web site developers lose control over the web page content and structure. The authors presented three life-cycle evaluation stages: before browser processing, after browser processing, and after browser processing considering user interaction events. These three stages are closely interconnected

and a fault in one of the stages may cause several additional errors in one or more of the remaining stages.

Koutsabasis et al. (2010) also argue that web accessibility evaluation methods often require technical expertise or knowledge, that results in uncertainty of when or how to utilize these evaluation methods. They propose a methodology that has a clearly defined process concerning the use of web accessibility evaluation tools that consists of three steps: identification of user requirements and goals, evaluation and redesign, and establishment and follow-up of web accessibility policy. They state that this methodology will reach and maintain web accessibility to a greater extent than the current, technical, approaches – for example to the WCAG 2.0 guidelines. This suggests that a conversion of new and existing accessibility requirements, to requirements that are comprehensible and practicable, is favorable to both businesses and end users.

Further, they presented an automated web accessibility process on nine scientific e-publishing sites, in order to identify accessibility effort and barriers. They evaluated the web sites through human judgment and simple heuristics. They found that the accessibility barriers identified by heuristics were not addressed by the automated tests.

Some researchers argue that usability metrics in user testing may not be the most efficient and precise method to identify and solve usability barriers. Molich et al. (2010) suggested to use the CUE-8 rules for best practice when measuring usability. Some of these rules that were proven beneficial included: the importance of strictness with measurements in quantitative tests; to exclude failed times from average completion time; that confidence interval may be subject to change due to the abnormal distribution of time-on-task; to combine qualitative and quantitative results; to justify sample composition and size, which should also be clearly defined; and to not mistake quantity of data with clean data, as this may not always be the case.

Aizpurua et al. (2014) argue that user testing in general may not actually be the most precise measure for identifying accessibility. They state that this is due to the

difference in the participant's perception and evaluator's perception of the user test. They proposed that evaluators and participants should have informal and friendly discussions in familiar environments with a participatory-evaluation approach, in order to mitigate misunderstandings between the feedback and actual participant experience. In addition to this, they suggested that participants should not always be given tasks, but rather navigate web pages freely in order to identify challenges and problems that may not be elicited from given tasks. They also stress the importance of technical and social knowledge to fully and appropriately interpret the feedback given from the participants.

4.7 Web Usability Barriers and Solutions

4.7.1 Cognitive Barrier Solutions

Rello and Baeza-Yates (2014) have presented evidence that textual content can be made easier to read and understand by dyslectics through lexical simplification strategies. This strategy provides the user with synonyms of complex words, on demand, through an algorithm, which are based on dictionaries. Lexical simplification strategies can be adapted for use with content developers as well.

Font size and line spacing have impact on readability and comprehensibility of a piece of text, especially for those with dyslexia. To further investigate this, Rello, Pielot, Marcos, and Carlini (2013) conducted an experiment on students diagnosed with dyslexia in Spain. The research showed that line spacing did not have any effect on readability or comprehension of a text on the web. They made a recommendation for using 18 points font size for text on the web to best accommodate those with dyslexia.

Santana, Oliveira, Almeida, and Ito (2013) found that by avoiding italic fonts; avoid pure white backgrounds; avoiding too small fonts; using mono-spaced, sans-serif fonts; avoiding too large text sections without line breaks; justified text; using boxes, borders and backgrounds and white space, often and between paragraphs; and highlight visited links, dyslectics found it significantly easier to read and understand textual content on the web.

4.7.2 Motor Barriers and Solutions

People with motor impairments are greatly dependent on sufficient and usable navigational properties when exploring and interacting with web pages. Motor impaired users show alternative methods of identifying and interacting with links, selecting pages, scrolling in pages, and navigating back and forth between multiple web pages. These methods vary depending on the type of, or combination of, AT that the user utilizes. The methods, with or without the use of ATs, tend to make the user spend more time on identifying and interacting with links and buttons, compared to able-bodied users. Pérez, Arrue, Valencia, and Moreno (2014) suggested that this behavior may be mitigated and "eased" through; adding "hot areas" around links; larger button sizes; providing page indexes, e.g. in the form of site maps, and navigation bars; and to provide quick access to different topics.

4.7.3 Sensory Sisabled users' Barriers and Solutions

Pascual, Ribera, and Granollers (2014) presented results from a user test with deaf users on two web sites created in Wordpress. They found that one of the pages was accessible, while the other was not. Although the researchers stated this not to be statistically valid, due to the low numbers of participants, they found that the participants felt irritated when encountering un-captioned video content, and that reading completion was remarkably low due to what the participants expressed as being too complex information, especially when retrieving information from graphs or tables. Further, the comprehension coverage of the WCAG 2.0 guidelines was presented as somewhat arguable due to the lack of guidelines concerning "easy to read" and "web content comprehension". This suggests that the WCAG 2.0 guidelines may not be sufficient in providing the user with understandable textual content.

In order to tackle the usability barriers that hearing impaired users experience on the web, Chung, Min, Kim, and Park (2013) presented a work, in progress, that simplifies and provides visual representation of textual information and multimedia content, like audio or video, for increased comprehensibility among hearing impaired users. The research argued that this technique is useful and efficient due to the deaf users' affinity to the visually oriented sign language.

Visually impaired people benefit greatly from correct navigation mechanisms, due to the fact that many of users utilize screen-reader software. This software allows them to listen to textual content and multimedia on a web page. Even though this software enables visually impaired users to consume content and interact with web pages significantly, a downside with this software, compared to those visually abled, is the lack of ability to glance at sections of a web page. The users are unable to do this because screen-reader software presents the web page content sequentially from top to bottom. This creates a behavior in visually impaired users of being cautious not to miss crucial content through wrong navigation techniques. This behavior strains the, already strained, cognitive load the visually impaired users experience.

4.7.4 Navigational Barriers and Solutions

Brian Wentz and Lazar (2011) have identified common issues regarding web page navigation. These issues are: ambiguous or duplicate hyperlink description; titles with different function, i.e. context-specific; extensive amount of menu items not directly connected to the application that the users are forced to navigate through (every time) in order to access the main application; dynamically altered or added content with the use of JavaScript and similar languages; tab ordering, labeling; and unclear or hidden confirmation messages and buttons among others.

4.7.5 Non-textual Content Barriers and Solutions

Splendiani and Ribera (2014) proposed a method that may decrease ambiguity and increase relevance of alternative texts to on-textual elements through the use of a decision tree. The method consists of slightly modifying the existing task of writing image, video, table, graph, and figure captions. The content authors can follow a decision tree in a “checklist-like” manner to make the most out of the caption. The cognitive load required to analyze the decision tree is argued to be lower than having to consider previous knowledge due to the visual representation and can ultimately save time in the decision-making process while still creating relevant and rich figure and image captions. The researchers state that this method does not interfere with existing workflow. Although focusing on (medical) academic papers, the method is suggested to be applicable in other areas as well, e.g. in a web context.

4.8 Accessibility and Digital News Services

Stewart (2014) states that “Few multimedia journalists are actually acquiring the skills needed to work toward a solution, and the industry has few minds that understand both the profound importance of storytelling and the critical fundamentals to accessible design.”. A study from 2003 evaluated 69 online news sites with visually impaired users and concluded that only 7% of the evaluated homepages were fully accessible (Davis, 2003).

5 Methods

This section presents the methods for data collection and data analysis utilized in this research. Section 5.1 explains action research and how it was used in this research. Section 5.2 explains why and how case study was used as a method in this research. Section 5.3 explains how qualitative methods were used to collect data for this research. Section 5.4 explains which analysis methods were used on the data. Section 5.5 discusses the limitations of the data collection and analysis methods that were used in this research. Finally, section 5.6 discusses the ethical considerations that were taken into account in this research.

This research uses NRK as a case study to gain insights on the drivers for creation and perpetuation of organizational barriers that hinders NRK to achieve UD in practice. Institutional theory and institutional change theory is used as a framework to explain the possible causal relationship between organizational barriers and achieving UD in practice. Institutional change theory is used to assess how the barriers can promote change in the organization.

Action research is used to help bridge theory from the theoretical framework and observed practice within the case being studied (Brydon-Miller, Greenwood, & Maguire, 2003) in addition to identify the existing barriers and possible solutions alongside the research subject (Berg, Lune, & Lune, 2004, p. 197). As a final reason to use action research, the results of this research will be shared with the research subject, which is an essential part of action research (Berg et al., 2004, p. 197).

Qualitative data from multiple sources are commonly used in case studies (Lazar, Feng, & Hochheiser, 2010, p. 147) p. 147; (Berg et al., 2004, p. 197). The qualitative data for this research is collected through one formal on-site observation, seven semi-structured interviews, and document data identification. Qualitative data is superior to e.g. quantitative data in the way it provides a way to better explain or describe specific behavior (Lazar et al., 2010, p. 149), and is therefore well-suited for this research.

5.1 Action Research

The methods used to achieve the goal of the research can be identified as action research. Action research is defined as when a “formally trained researcher stands with and alongside the community or group under study, not outside as an objective observer or external consultant” (Berg et al., 2004, p. 202). Action research identifies problems and solutions in corporation with the research subject, which a researcher alone might not identify. The research subject is also made aware of the results of the research, which provides a better understanding of the problems and solutions for the research subject in question (Berg et al., 2004, p. 197). Action research often results in less biased analysis and may introduce solutions that might work better than from an external expert or outsider without in-depth knowledge of the research subject, e.g., accessibility advocates (Berg et al., 2004).

There are three distinct modes of action research; the technical/scientific/collaborative mode, the practical/mutual collaborative/deliberate mode, and the emancipating, enhancing/critical science mode (Berg et al., 2004, p. 202). The technical/scientific/collaborative mode focuses on identifying a problem in collaboration with a practitioner, who then facilitates its implementation within a group. The practical/mutual collaboration/deliberate mode focuses on having the researcher and the facilitator identify problems, issues and solutions in a mutual manner. This enables empowering and emancipating stakeholders working with the practitioners, at the cost of measurement precision and the perpetuation due to the association of change agent. The emancipating/enhancing/critical science mode focuses on two things; one focus is to decrease the gap between day-to-day problems and theories used to explain and resolve the problem, and the other focus is to raise practitioners’ understanding of the fundamental problems in a group through bridging theory and practice. (Berg et al., 2004, p. 204). This action research is most similar to the emancipating/enhancing/critical science mode because it focuses on decreasing the gap that is not achieving universal design in practice, and because it focuses on using institutional theory and institutional change as theories to explain practices and how they can change to improve and ensure universal design in practice, supported by (Brydon-Miller et al., 2003).

5.2 Case Study

According to Lazar et al. (2010), a case study is an “in-depth study of a specific instance … within a real life context” (Lazar et al., 2010, p. 144). Further, they explain that case studies work well to “build understanding, generate theories … present evidence for the existence of certain behavior, or to provide insight that would otherwise be difficult to gather” (Lazar et al., 2010, p. 144).

According to (Berg et al., 2004, p. 251), “Case study methods involve systematically gathering enough information about a particular person, social setting, event, or group to permit the researcher to effectively understand how the subject operates or functions”. Case studies are effective at investigating entities such as phenomena, communities, or institutions, in addition to uncover characteristics of the entities. Also, with the rich data that case study methods provide, researchers are able to identify nuances, patterns, and deviations that other research methods might overlook (Berg et al., 2004, p. 251).

The case study, as a method, is “an extremely useful technique for researching relationships, behaviors, attitudes, motivations, and stressors in organizational settings” (Berg et al., 2004, p. 260). The case study method was therefore chosen for this research because it is a good fit - in the sense that investigating NRK in context with web accessibility can provide sufficient, and even additional, understanding of organizational barriers and the drivers, i.e., stressors, behind them. The case study method was used to investigate the research problem in-depth, with sufficient insights into underlying reasons, factors, patterns, variations and such.

Stake (1995) suggests three different types of case studies that have arisen from the different purposes that researchers have used case studies. These three types are intrinsic, instrumental and collective.

Intrinsic case studies focus on gaining a better understanding of the case, rather than testing and developing new theories to explain. Instrumental case studies focus on gaining a better understanding of external theoretical questions or problems by using the case as a tool.

Yin (1994) and Tellis (1997) have introduced three designs for case studies; exploratory, explanatory and descriptive: exploratory case studies may be useful as a step in a larger research process, where fieldwork and data collection often occur before defining a research question. Explanatory case studies may be useful to examine variations and influences in and of complex phenomena in, e.g., organizations or communities. Descriptive case studies may be useful for research that provides a framework of theory that the research fits in.

The case study used in this research has both an exploratory and explanatory design. The case is exploratory in the way that it aims to extend previous research within the specific context of the case. At the same time, it is explanatory in the way that it aims to answer the question of how organizational barriers relates to achieving UD in practice, and how these barriers can cause a change in the case to promote (Mahoney & Thelen, 2010), ensure and achieve universal design in practice. One can argue that the research question of this research has a stronger focus on the explanatory design of the case.

This research can be identified as both and intrinsic and instrumental case study. The case is intrinsic in the way that it gives useful insight into the how editorial employees create web content, specific to NRK's website, which achieves this research's goal to extend previous research conducted at NRK. At the same time, the case is also instrumental in the way that the research aims to gain a broader insight that might "go beyond the case at hand" (Lazar et al., 2010, p. 156), e.g. other businesses or organizations. This research argues, however, that there is a greater focus on the instrumental values of the case study.

This research can also be identified as both a holistic and embedded case study. This case is holistic in the way that it analyzes only one unit, i.e., the editorial employees. At the same time, this case is embedded in the way that it analyses multiple units within the same case, i.e., web content creation practices, document data, organizational structure and universal design awareness (Lazar et al., 2010, p. 160).

5.3 Qualitative Methods & Data Collection

Qualitative methods are rich textual or multimedia data that provides in-depth information about what is collected data on. This data is in contrast to quantitative data not reliant on numbers or exact units.

This section goes into detail on how the qualitative data collection methods were used to collect data for the research. Section 5.3.1 provides details on the observational data that was collected to gain a better understanding of the background and motivation for the research, in addition to domain knowledge about the technical tools. Section 5.3.2 provides details on how the interview data was collected. Lastly, section 5.3.3 provides details on how document data was identified and collected.

5.3.1 Observational Data

5.3.1.1 Introductory Meeting with NRK

The background and motivation of this research emerged from an assignment proposal made by NRK regarding universal design of its website. To further understand the background and motivation for this research, an introductory meeting with contact person from NRK was conducted before the research had formally started. The meeting was audio recorded, with the employee's verbal consent. In addition to the audio recording, notes were taken to complement the audio recording for later investigation. A summary of the meeting was written shortly after the meeting found place.

This report provided useful information that helped shape the direction and scope of the research. The assignment proposal alone could be interpreted to focus on the technical aspect, namely the publishing system. After the introductory meeting, however, it was made clear that the editorial employees themselves were also valuable research subjects. This shaped the research to include both the technical aspect, as well as the organizational aspect of universal design of NRK's website.

The report can be read in whole in Appendix C.

5.3.1.2 Technical Details of NRK's CMS

All textual and multimedia content on NRK's website is published through NRK's in-house developed CMS called Polopoly (PP). A brief introduction to PP was conducted to better shape the qualitative interview guide, as well as to improve the level of domain knowledge when investigating and interviewing the editorial employees. (Louise Barriball & While, 1994, p. 333) suggests that "Interviewers must have some knowledge of the subject domain being explored in order to obtain valid and complete data during the interview". The introduction lasted for a brief hour.

5.3.1.3 Formal On-site Observation

The On-site Observation was performed formally with one participant. Notes were taken to document significant events during the observation. These notes are presented in Section 7.2. The participant was free to elaborate or comment at any time, but was not required to do so.

5.3.2 Interview data

Interviews as a data collection method is said to have the ability to give in-depth insight, provide ideas and comments that would otherwise be lost in, e.g., surveys, and be useful for exploring phenomena (Lazar et al., 2010, p. 178).

The interview was semi-structured to enable the interview to provide further clarification, additional questions, and additional comments made by the interviewer, as suggested by Lazar et al. (2010, p. 189).

There are, however, some challenges that come with interviews. Interviews require effort related to taking notes and watching non-verbal cues, and will therefore normally not employ many participants. Another challenge is that it removes the real-life context of topics being investigated, for example suggested improvements and experiences with a computer system. Interviews will therefore only provide the data that the participant remember (Lazar et al., 2010, p. 179). This is why the interviews were combined with additional data collection methods, as suggested by (Lazar et al., 2010, p. 179).

5.3.2.1 General Procedure

The majority of the interviews were face-to-face interviews with the participants. All participants had to provide a written consent form to participate in the interview and to allow, or deny, audio recording of the interview. This consent form was on beforehand approved by NSD.

One of the seven semi-structured interviews was conducted over telephone, as the participant was unable to meet at the location of the interview because the participant worked at a separate district office. Phone interviews introduces the consequence of not being able to records non-verbal cues like facial expressions or gesticulation (Lazar et al., 2010, p. 204), and this was taken into consideration in the analysis process. This participant was provided with the same consent form as the other participants through email, and was also consensually audio recorded in the same manner as the other participants.

5.3.2.2 Participants

Initially, the research set a goal for five qualitative interview participants from NRK, but ended up with seven interview participants in total. The participants had the following requirements to be found eligible for the interview:

- The participant had to be involved in the process of publishing textual, image, or video content to NRK's website
- The participant had to have a position as a journalist, editor, editor in-chief or shift leader in NRK

The participants were sampled both purposively and through snowball sampling. They were sampled purposively because the employees who were not involved in publishing content to NRK's website were not eligible for the interview. A group e-mail was sent to four department chiefs at NRK who were involved with publishing content on NRK. The e-mail introduced the chiefs to the research goal and aim. These department chiefs were then responsible for the initial recruiting of the participant, and resulted in the two first participants for the interview. One of the first two participants also agreed to participate on the formal on-site observation. The remaining participants were later snowball sampled through asking other employees

to provide contact information to other department leaders who could then recommend participants for the interview. This snowball sampling resulted in an additional five participants.

5.3.2.3 Interview Guide

The semi-structured interview guide ensured that the interview process would follow a certain structure and that the necessary topics that influences UD in practice would be addressed. The main themes from the semi-structured interview guide were

- responsibility and activities;
- Polopoly as a CMS;
- familiarity with UD;
- UD considerations taken when creating web content;
- the employee's knowledge of internal or external accessibility guidelines;
- internal processes at NRK; and
- plain language.

The interview guide had to be altered after the first qualitative interview, when the order of the questions caused the interview to change back-and-forth between the main themes that might have seemed confusing to the participant.

The interview guide contained a majority of open-ended questions as well as a few close-ended questions where this was applicable. For example, one question from the interview guide was a close-ended question about if the participant was familiar with the term universal design or not. If the participant would answer yes to this question, there was an accompanying open-ended question to allow the participant to define or elaborate on the familiarity of the term. For this reason, some of the open-ended questions were not addressed if the participant did not have any knowledge about the topic, and thus no ability to further explain or elaborate. It should be noted, however, that not addressing an open-ended question was still useful data. In other words, using the previous example, it is still useful to record that the participant did not have any knowledge about of familiarity with the term universal design, since it can be seen as an institutional barrier that prevents the participant

from promoting, ensuring and achieving UD in practice, and would thus help to achieve this research's goal.

The interview guide can be read in whole in Appendix A.

5.3.2.4 Duration

Initially, the interviews were planned to last for approximately 45-60 minutes. However, the average duration of the interviews ended up being around 30 minutes, varying from approximately 19 minutes to 47 minutes. The significant difference between the shortest and longest interview duration may be a result of the participants being influenced by a stressful and high-paced environment, which is the nature of their workplace and environment. One employee had to leave for about five minutes to attend an urgent matter, and came back to the interview situation after this was handled. Despite this, the interview gathered all applicable themes for the participant. See Table 5.1 for a full overview of the interview durations.

Interview ID	**Interview duration (minutes, seconds)**	**Minimum interview duration**	**Maximum interview duration**	**Average interview duration**
1	34,32			
2	28,53			
3	30,08			
4	29,50			
5	47,40			
6	21,22			
7	18,57			
		18,57	**47,40**	**29,95**

Table 5.1 Durations of the interviews, including minimum interview duration, maximum interview duration and average interview duration.

5.3.2.5 Time of Day

The interviews were conducted during the participant's work hours, usually right before or after 12 in the afternoon. In retrospect, this may not have been the ideal time to conduct the interviews, due to the nature of the stressful and high-paced environment, which may have affected the duration of the interviews.

5.3.2.6 Location

The interviews took place at the participants' work place, NRK, for practical convenience for the participants, i.e., no travel time required. One participant attended the interview through phone from NRK's department in Trondheim, the remaining six attended a face-to-face interview at NRK's offices in Oslo.

5.3.3 Document Data

Document data was collected as a part of achieving the research goal. Organizational document data like policies and guidelines have been essential parts of practical universal design achievements both nationally (Diskriminerings- og tilgjengelighetsloven, 2013) and in previous research (Lazar et al., 2015). NRK's documents regarding accessibility and universal design, or the lack thereof, were therefore a useful data source to achieve the research goal.

The document data was identified primarily through research on NRK's website and in the database for Norway's national legislation Lovdata. This uncovered the Broadcasting Act (Kringkastingsloven, 1992), The Anti-Discrimination and Accessibility Act (Diskriminerings- og tilgjengelighetsloven, 2013) including the national regulations for UD of ICTs, and the Statutes for the Norwegian Broadcasting Corporation (Vedtekter for Norsk rikskringkasting AS, 1996). However, as explained in Section 7, additional important document data was uncovered through the on-site observation and the semi-structured interviews, namely the informal e-mail regarding input of image descriptions, and the Blue Book. Additional informal observation through the organization by the researcher did not uncover any additional documents. The contents of these regulations and documents can be read further in Section 7 and Section 6.

5.4 Analysis

5.4.1 Thematic Analysis

Grounded Theory, a concept developed by Glaser and Strauss (1967), was used as a basis for the analysis of the qualitative data that was collected. The analysis of the data followed the Grounded Theory's four stages of analysis: open coding, concept development, concept grouping into categories, and finally theory foundation (Glaser & Strauss, 1967). The procedure of summarizing and categorizing qualitative data is an approach also recommended by (Berg et al., 2004, p. 200). The theory foundation was conducted in accordance to the theoretical framework established in this research to achieve the research goal. In other words, after the data was categorized, it enabled the researcher to use institutional theory and institutional change theory to propose how the identified barriers can change to promote and ensure accessibility and universal design of web content.

There is, however, one inherent limitation to the analysis of qualitative data that is that the results are made subjectively from interpretations by the researcher that may create biased results and should ideally be reviewed with other researchers to increase the validity, as suggested by (Lazar et al., 2010, p. 212).

5.4.1.1 Interview Data

The first three qualitative interviews were transcribed in full, but this turned out to be a significantly time-consuming process, which would introduce the risk of delays in the remaining stages of the research. Open coding of the data was therefore directly utilized for the remaining interviews. The open coding focused on drawing out relevant answers and comments made from the interview participants. Oun and Bach (2014) states that coding "helps organize it [interview data] and also guide us to introducing the interpretations of it as one qualitative method." (Oun & Bach, 2014).

5.4.1.2 Observational Data

The on-site observation and the field notes was neither audio nor video recorded, in accordance to the approved research plan from the NSD, see Section 5.5. The notes made from the on-site observation and from general, informal observation was coded, categorized in the same manner as the interviews, explained in the previous

section. Since there was only conducted one on-site observation, it was considerably less raw data to analyze. Some of the observational data was out of the scope of this research, and was therefore discarded.

5.4.2 Recursive Abstraction

Recursive abstraction is a method to summarize coded data into smaller parts, for example in the form of bullet points. After all the data was coded, it was recursively abstracted to make the data noticeably less dense and easier to put into context with the other interviews and corresponding themes. This has proved to be effective when analyzing interview data, for example, Polkinghorne and Arnold (2014) stated that "By compacting the data using themes and codes, it becomes possible to identify patterns that otherwise are not apparent".

It should be mentioned, that a negative effect of recursive abstraction method is that the data may be summarized and concluded poorly, or in a different manner than the interviewee intended, leading to a skewed or incorrect result (Oun & Bach, 2014). For that reason, the recursive abstracted summaries and conclusions were continuously cross-checked with the coded data. This ensured that the summaries and conclusion stayed consistent and with the participants' intention.

The codes were then placed into a matrix containing the interview guide and observed themes, additional themes that emerged outside the interview guide, in correlation with the participants' answers and comments to the interview guide themes, in addition to the observed data. The structure of the matrix was inspired by examples from Polkinghorne and Arnold (2014). An excerpt from this matrix can be seen in Table 5.2.

Themes	**ID 1**	**…**	**ID 7**
Work Environment	- Hectic before TV broadcast - New team every week	…	- Different tempo in different positions - Desking is stressful
…	…	…	…

Accessibility and UD considerations	- Readability and not use technical terms	…	- We are to add fact boxes

Table 5.2 An excerpt of the matrix with coded interview themes and interview participant answer

Further, the development of concepts focused on finding, grouping and separating codes that were similar or unique, respectively, into concepts. After the concepts were developed, these concepts were then grouped into categories. The categories were developed in accordance to what were the driving force for the emergence and perpetuation of the concept, i.e., awareness barriers, organizational barriers and technology barriers. The awareness barriers emerge and perpetuate through the accessibility and UD awareness aspects of the organization and relate to how the participants were familiar with accessibility, universal design, national and international legislation and the like. The organizational barriers emerge and perpetuate through the organizational aspect and relate to how the participant experienced organizational structure, work environment, communication and collaboration, internal policies and the like. The technology barriers emerge and perpetuate through the technical aspect of the organization and relate to difficulties with technical tools, in this case the CMS, hardware, and the like.

5.4.3 Process Tracing

Process tracing is a tool often used in qualitative analysis to identify and describe political and social phenomena, and the causal relationships within it. It is important to note, that process tracing as a method works only when there is sufficient and valid diagnostic evidence to the case in question. The previous analysis steps in this research provided sufficient data to roughly trace the social phenomena, organizational routines and technical tools and usage in the organization. Collier (2011) states that “Process tracing can contribute decisively both to describing political and social phenomena and to evaluating causal claims.”. Process tracing is also a relevant tool for studying cognitive processes underlying decision making (Ford, Schmitt, Schechtman, Hults, & Doherty, 1989).

Process tracing is a highly appropriate tool in this research, that aims to identify and describe how organizational barriers emerge, evolve and facilitates change. The

insight it gives into practices and decision-making in the organization is useful for reaching this research's goal. Process Tracing was conducted on the collected qualitative data after the steps of the Grounded Theory had been applied to the data. This process resulted in an overview of how the editorial employees create articles and the actors involved in the process. This process and the actors involved are illustrated in Figure 5.1.

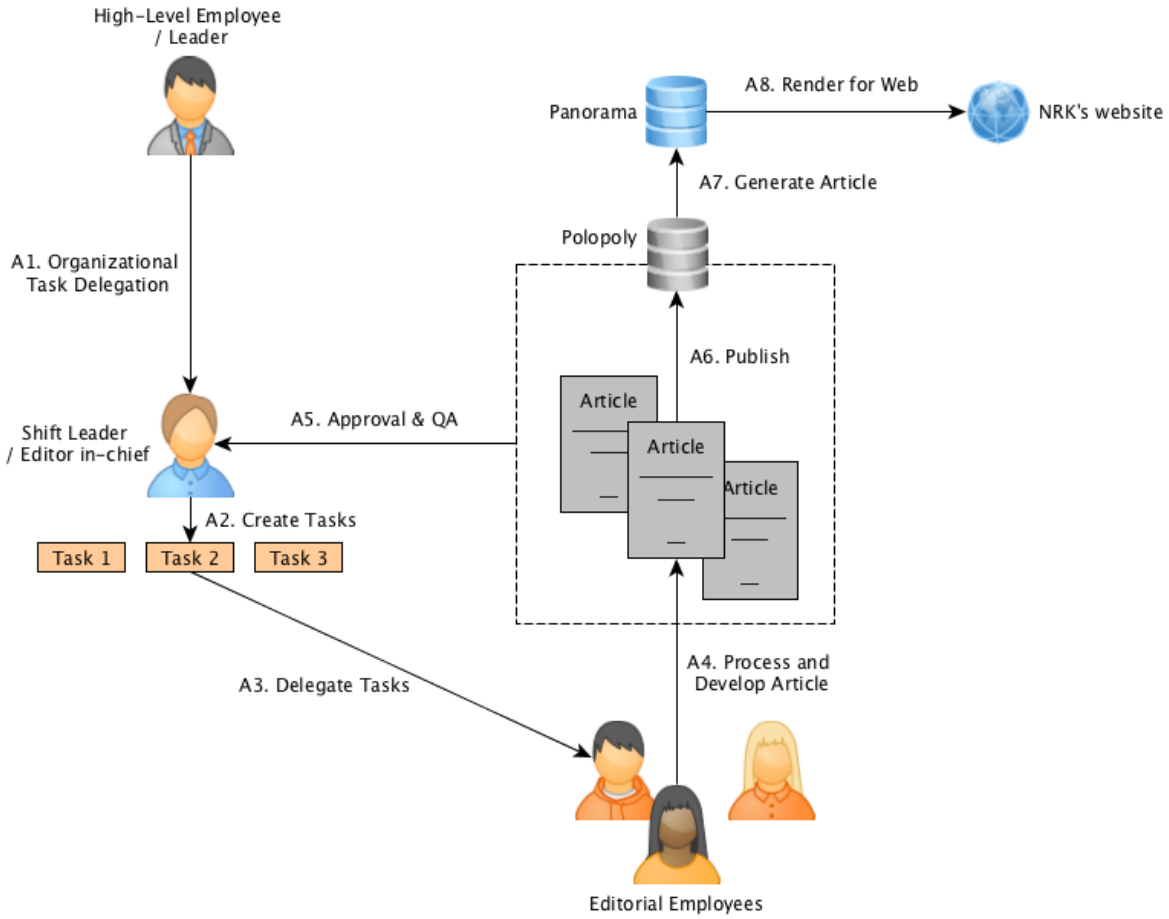


Figure 5.1 The Article Publication Process at NRK. Action A1 and A5 is not always performed, according to the results of the research.

5.4.4 Heuristic Evaluation of NRK's website

The heuristic evaluation of NRK's website was conducted to identify the current status of the website, and to identify the usability barriers that the CMS currently creates. Sanderson et al. (2015) states that "some of the issues identified in the heuristic evaluation have already been rectified …", which provided an indication that an updated heuristic evaluation was needed. The heuristic evaluation was also a

result of several temporary stand-stills in the research that emerged due to time challenges during participant recruitment to the research.

The evaluation was done in a similar manner to Sanderson et al. (2015), at least to the extent that this was applicable to the research. The same pages that was evaluated in previous research was also evaluated in this research, in order to make the evaluation comparable to previous evaluations. In addition to this, WCAG 2.0 success criteria, level, page compliance of the respective success criteria and author's comments to the page compliance was organized in a matrix, which was heavily influenced by the research conducted by Sanderson et al. (2015). An excerpt of this matrix can be seen in Table 5.3.

GID	Guideline	Level	Conformance				Comment
			Ytring	Distrikt	Kultur	Viten	
1.3.1	Info and Relationships: …	A	Yes	Yes	Yes	Yes	
1.4.1	Use of Color: …	A	Yes	No	Yes	Yes	Distrikt: Emphasis is color only

Table 5.3 An excerpt of the matrix used to perform heuristic evaluation on selected pages on NRK's website

The page compliance was expert evaluated and recorded in the matrix. It should be mentioned that some of the success criteria were not evaluated because they were not applicable for the selected pages. The findings of the heuristic evaluation can be read in full in Section 7.1.

5.4.5 Heuristic Evaluation of Polopoly and Panorama CMS

As a part of extending the research of Kessel et al. (2014), a heuristic evaluation of Polopoly, Panorama and connected applications was initiated, but not completed due to time constraints.

This research can therefore not provide an updated heuristic evaluation of the CMS or connected applications, although previous research by Kessel et al. (2014) suggests that the CMS is not fully compliant with ATAG 2.0 guidelines. This research therefore urges future research to investigate the current compliance state of the CMS, rendering system and connected application in addition to suggest means for increased, or complete, compliance with ATAG 2.0. This research will still provide recommended measures to make the CMS comply to the ATAG 2.0 guidelines, because it is one of the technology barriers that are identified in this research.

5.4.6 Limitations of the Methods

One limitation that was observed from the interview method, was that the interview guide used specific technical terms, for example universal design. This may not have been the most beneficial mean to investigate the participants' awareness towards universal design, as they might just be unfamiliar with the term, but familiar with the concept. However, the analyzed data did not show that this had any significant drawbacks in terms of investigating awareness with the participants.

5.5 Ethical Considerations

The ethical aspects of the research were early clarified, as suggested by Corbin and Morse (2003), and approval from Norwegian Social Science Data Services (NSD) was received before the data collection process started.

All participants were informed both orally and in writing of the participation before the on-site observation and interviews, as suggested by Corbin and Morse (2003). The participants were made aware that they could withdraw from the interview or observation at any time without a reason. They were also made aware how they would participate, and how the data would be handled. In this specific research, they were made aware that they would not be identifiable in the research, neither directly, nor indirectly.

One particular ethical concern regarding this research came across was how the freedom of speech of the participants should be treated. Since they are employees, i.e., subordinates, they may face the situation where they might compromise a promotion, or their position in the organization, if they speak out of line according to leaders. This is why this research dedicated to keep all information about the participants as confidential and unidentifiable as possible. This is an important aspect of the data collection, seeing as if the participants feel scared or unsure about expressing problems and changes in the organization will compromise the validity and breadth of the collected data. In other words, for the barriers to be identified properly, to in turn assess and overcome these barriers, the participants' answers must be as honest, true and unfiltered as possible. Although it is difficult to predict how data collection will play out in qualitative research (Corbin & Morse, 2003, p. 94), this was an aspect that had to be predicted on beforehand, so the consent form and research would take this into consideration.

5.5.1 Confidentiality Declaration

A confidentiality declaration was signed with NRK to ensure that identified information, like trade secrets, routines or other factors that can be leaked to other competing media organizations.

5.5.2 Approval for Data Collection Methods

Research that fulfills certain criteria for data collection requires approval from the Norwegian Social Science Data Services (NSD). Specifically, research that collects or processes computer based equipment (audio-recorders, laptops, smartphones etc.) and or if data collected contains sensitive data (name, social security number etc.) (Norsk samfunnsvitenskapelig datatjeneste, 2016). This research did not collect any sensitive data, but the research used an audio recorder for the interviews. This audio recorder did not have the ability to connect to wireless or wired internet, as is required by NSD.

The data collection and processing methods were approved by NSD. Also, the written consent form that the interview participants had to sign upon participation was approved by NSD.

6 Case Presentation

This section provides in-depth information about the case, how the case relates to accessibility, legislation, and what previous research on the case have uncovered.

6.1 Norway's Obligation to Accessibility

6.1.1 International Obligation

At an international level, Norway has ratified itself on UN's Convention on the Rights of Persons with Disabilities (United Nations, 2007), which in Article 9 obligates the state parties to promote and ensure access to physical environments and ICTs for all people in the society. The convention requires products, environments, programs and services to be accessible to all people. Also, Norway is one of the few countries in Europe that require the application of universal design as an enforceable legal standard, and that consider inaccessibility as discrimination (Zero Project, 2014), through the Anti-Discrimination and Accessibility Act (ADAA), see Section 6.1.2.

Norway is a part of EU (EEA) and are therefore…

6.1.2 National Obligation

At a national level, Norway requires access to and universal design of environments and ICTs through The Anti-Discrimination and Accessibility Act (ADAA) from 2009 (Diskriminerings- og tilgjengelighetsloven, 2013). The ADAA's main goal is to "promote equality irrespectively of disabilities" (Section 1), and states that "The Act shall help to dismantle disabling barriers created by society and prevent new ones from being created" (Section 1). Section 14 of the ADAA targets universal design of ICTs, that require all websites meant for the public to meet a number of guidelines specified in WCAG 2.0 by the end of 2021 (Forskrift om universell utforming av IKT-løsninger, 2013). Specifically, the national regulations state that all web solutions should at least meet all success criteria at level A and AA, with the exception for success criteria 1.2.3, 1.2.4 and 1.2.5. The exceptions in the national regulations do therefore not address the guidelines for audio description of media alternatives (Level A and AA) and live captioning (Level AA). The law enforcers of the ADAA are The Equality and Anti-Discrimination Ombud (Likestillings- og diskrimineringsombudet),

The Equality Tribunal (Likestilling- og diskrimeneringsnemnda) and The Agency for Public Management and eGovernment (DIFI).

As a contribution to the obligation from the EU and UN discussed in Section 6.1.1, The Norwegian Parliament released an Action Plan for Universal Design and Increased Accessibility in 2013 to ensure that all physical environments and digital solutions in Norway are universally designed by 2025 (Norwegian Ministry of Children and Equality, 2009). This action plan scheduled and set in motion specific measures and efforts towards environment and digital accessibility, in addition to acknowledging the importance of universal design as a social and individual tool. The action plan refers to the ADAA, including Section 14, and UN CRPD, and shows that Norway takes its national and international obligation towards accessibility into account. The Digidel 2017 program, initiated by this action plan, aims to increase the digital participation in the society. The Action plan was later revised in 2015 (Norwegian Ministry of Children Equality and Social Inclusion, 2015).

This section demonstrates that Norway has both international and national responsibility to promote and ensure accessibility to and universal design of the physical environment and ICTs solutions to prevent discrimination and increase societal participation.

6.2 Introducing the Case: The Norwegian Broacasting Corporation (NRK)

NRK is Norway's largest media organization and public broadcaster, delivering news articles online, TV content and radio content. All of NRK’s products are available on NRK’s website. NRK is a governmentally-owned, non-commercial organization that relies on yearly fees from the population on Norway.

NRK has over 3500 employees spread across Norway through district offices in each major county. To get an idea of the size of the organization, it can be compared to other Norwegian broadcasting corporations like TV2, with 764 employees, TV3 with 49 employees, and TVNorge with 113 employees (MedieNorge, 2009).

Internationally, it can be compared to The British Broadcasting Corporation's (BBC) 19739 employees (British Broadcasting Corporation, 2015).

The size and role of the organization, nationally, is important to consider because it amplifies the organizational challenges that the editorial employees face, in addition it amplifies the importance of how editorial employees in NRK consider accessibility and universal design of the web content they create. In other words, if the data presented here are representative for the organization as a disbursed whole, the organization will affect the accessibility and universal design of their product significantly in a positive, or negative direction, respectively.

6.2.1 NRK's Obligation to Accessibility

The Action Plan for Universal Design and Increased Accessibility from 2015 contains measure ICT 12, that specifically targets "universal design of all of NRK's public broadcasting media" (Norwegian Ministry of Children Equality and Social Inclusion, 2015). However, this measure does not cover NRK's digital services, but rather to subtitle TV programs.

NRK is authorized to engage in broadcasting activities under the Broadcasting Act (Kringkastingsloven, 1992). NRK's name, purpose, requirements, core activities, board, and organizational structure are specified through the Statutes for The Norwegian Broadcasting Corporation (Vedtekter for Norsk rikskringkasting AS, 1996), issued by the Norwegian Parliament. Section 2 of these statutes describes the organization's main mission and goals. These missions and goals are referred to by the organization as NRK's official policy (NRK-plakaten), hereafter referred to as the NRK Policy. This policy reports that

- NRK should support and strengthen democracy (Vedtekter for Norsk rikskringkasting AS, 1996)(§12);
- NRK should provide sufficient information so that the public can actively participate in democratic processes (Vedtekter for Norsk rikskringkasting AS, 1996)(§12a.);
- NRK should be accessible to the public (Vedtekter for Norsk rikskringkasting AS, 1996)(§13); and that

- NRK's services should take into consideration people with disabilities (Vedtekter for Norsk rikskringkasting AS, 1996)(§13c.).

All these statements can be interpreted to underline the importance of accessibility in and universal design of NRK's products.

In summary, NRK's website must adhere to their own NRK Policy (Vedtekter for Norsk rikskringkasting AS, 1996), the Broadcasting Act (Kringkastingsloven, 1992) and national regulations regarding universal design of ICT (Forskrift om universell utforming av IKT-løsninger, 2013), which obligates the organization to provide access to the whole population of Norway independent of disabilities. As a Norwegian organization, it is also required to promote and ensure access to its product in accordance with the UN CRPD (United Nations, 2007).

6.3 NRK's Employees: Journalism in 21st Century

The employees at NRK create digital print and multimedia content daily. Journalists, editors and domain experts, collectively referred to as editorial employees, are continuously creating and revising news articles at NRK's website. This makes the web content subject to constant change according to different work practices and product views from both internal and external sources. For example, a change in an article can occur because an editor in-chief disagrees or wishes to add additional important content to the article. As another example, where articles are based on collaborations with external experts, journalists etc., articles may change if the external source notices that something is wrongly reported.

McNair (2009) explains that the traditional objective model of journalism changes towards a model where journalism is increasingly "networked, globalized and participatory". However, the model of journalism is forced to change as a result of more users consuming media on portable devices, such as smart-phones, and more importantly that any amateur writer can post news on a blog or through social media (Jenkins, Purushotma, Weigel, Clinton, & Robison, 2009; McNair, 2009). This development provokes the readers, watchers and listeners question which news sources are credible and valid, in the vast amount of news sources that exist.

Therefore, it is more important than ever to connect news agencies' brand names to quality, so that the consumers have news sources that are trustworthy and objectively correct (McNair, 2009).

Also, consumers have drastically changed the way they consume news due to the increase in news sources and the availability of the news sources. This creates a need for more frequent updates of the news sources, which in turn may undermine the more time-consuming investigative and analytical reporting. As Weaver (2009) states, "… news websites demand frequent updating throughout the 24-hour news cycle, restricting time for fact checking and independent reporting, especially the investigative and analytical reporting that often takes weeks or months to do.".

The developments and consequences presented in the previous section suggest that the editorial employees at NRK are likely to work on multiple smaller tasks at once, in a fast paced and quickly moving environment, with less room for time-consuming and investigative reporting (McNair, 2009; Weaver, 2009). Therefore, the additional cognitive effort of ensuring accessible content may not always be considered a priority for the editorial employees, as suggested by Law, Yi, Choi, and Jacko (2006).

6.3.1 NRK's Content Management System for Publishing Web Content

The employees at NRK have frequent daily interactions with the content management system Polopoly (PP), which together with the rendering engine Panorama create the web content on NRK's website. Most of Polopoly's functionality is developed in-house at NRK. Polopoly stores both textual content and metadata, over which the editorial employees have control. Panorama renders web pages based on text content and metadata. The editorial employees do not control the rendering process. Figure 6.1 provides and illustration of the interplay between the editorial employees, the CMS and the rendering engine.

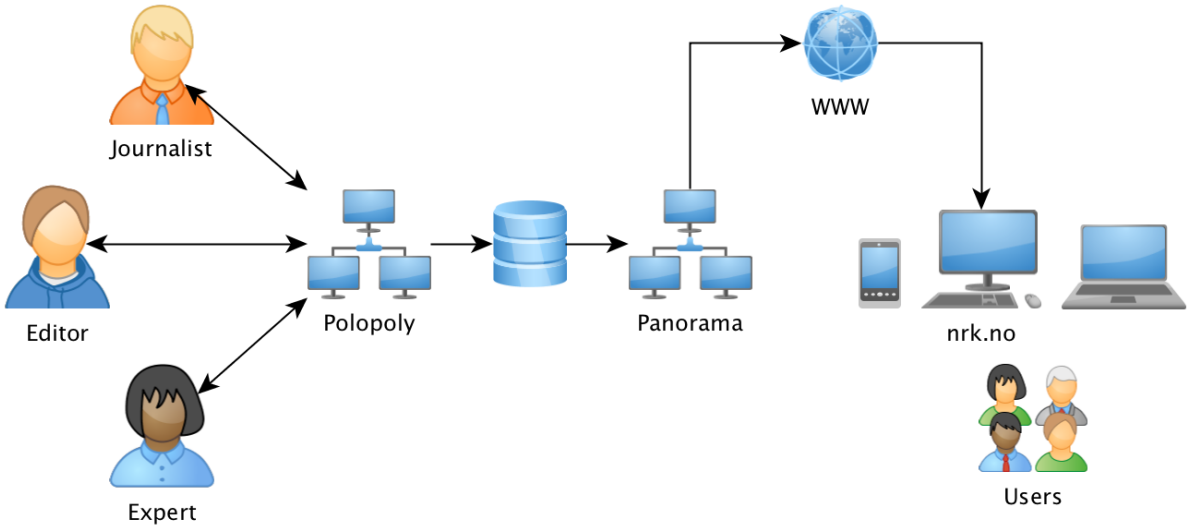


Figure 6.1 How editors use Polopoly and Panorama to publish content to NRK's website

6.3.1.1 Support Systems for Polopoly

6.3.1.1.1 Topic Universe (Saksunivers)

The Topic Universe (Saksunivers) is used to tag articles with topics that the article reports on. For example, if an article reports on a matter regarding a specific, ongoing criminal case trail, the article can be tagged as such. This is a sort of categorization of the articles, and helps the users to find similar or related articles on specific matters. This functionality also helps the editorial employees when providing links to similar articles on the same topic in an existing article.

6.3.1.1.2 Program Bank (Programbank)

The Program Bank (Programbank) is, as the name connotes, a repository of all non-textual multimedia, i.e., video content, audio content and images. All multimedia content that is produced at NRK is contained in the Program Bank. However, multimedia is not importable to Polopoly directly, but has to be imported through two support systems: Kaleido for images and Guro for videos.

6.3.1.1.3 Kaleido

Kaleido is the link between The Program Bank and Polopoly that enables the content creator to add images to articles. Kaleido is only used for image import to Polopoly.

6.3.1.1.4 Guro

Guro is the link between The Program Bank and Polopoly that enables the content creator to add videos to articles. Guro is only used for video media import to Polopoly.

6.3.1.1.5 Tansa

Tansa is an external application that is used for spell-check that is not integrated into PP directly. The Tansa application only runs on Windows operating system.

6.3.1.2 Front-page View: Desking View

Desking is the activity of organizing front page content. NRK's website consists of three main parts, a front page at level one, multiple sub-front-pages at level two, and full view of single articles at level three. The front page generally consists of latest news articles in various perspectives. This is the page that is presented by the user when accessing nrk.no in a web browser. Sub-front-pages are the second level part of the website. This is the front page for different content sections, themes or district news (Distriktsnyheter). Both front pages consist of recent and related articles, flows and streams.

6.3.1.3 Flows

Flows act like content containers and control the composition of a page. A page can contain one or more flows of various elements like articles, streams, navigational elements or customized elements. The flows follow a grid system of eighteen columns, and the space consumption can be specified for each flow. For example, a nine-column flow will cover half the page and a three-column flow will cover three eighteens of the page.

6.3.1.4 Surrogate

The surrogate is a flow, but is distinct from the other flows in the way that it does not contain content. The surrogate flow decides how and where a single article is displayed, and is only active when an article identifier is provided in the URL.

6.3.1.5 Perspectives

Perspectives act like view modes, and can be either a reference (single link), brief (title and excerpt), lean (image, title and excerpt) or full view (title, image, excerpt and full article content).

6.3.1.6 Streams

Streams act like feeds and can contain various like real-time news updates, videos, sports results or radio shows as examples.

6.3.1.7 Composing View

The article content itself is written in a separate view, disconnected from the front page views. The composing view controls title, featured image, excerpt and the main text content, all of which are required attributes to publish an article. The main text content can contain other elements than just text, namely references to other articles, image, audio and video content, specialized content, e.g. social media sections or graphs. The title, excerpt and featured image is usually what is placed on the front page. Figure 6.2 presents a screenshot of the composing view. See Figure 6.3 for an example of front page view, and Figure 6.4 for an example of full article view on NRK's website.

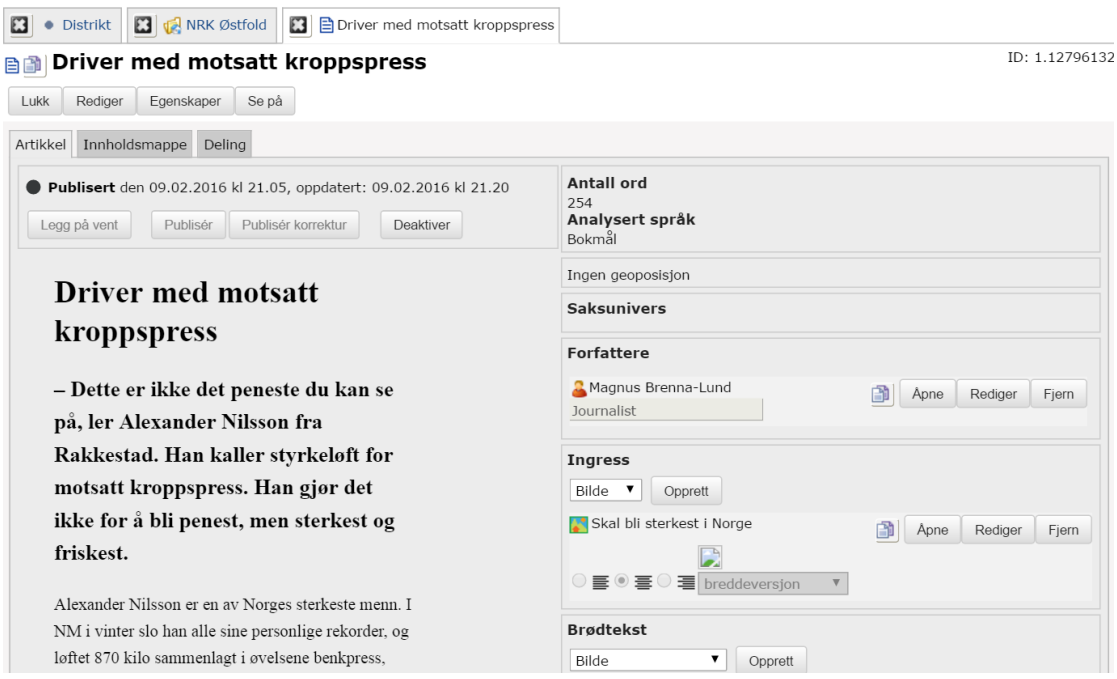


Figure 6.2 An example of a the composing view.

Maler bilder med forhistorisk blekk

En 95 millioner år gammel blekksprut gir liv til sjelden kunst.

Figure 6.3 Example of an article in front page view

Maler bilder med forhistorisk blekk

En 95 millioner år gammel blekksprut gir liv til sjelden kunst.

Publikum ved Naturhistorisk museum kunne følge Esther van Hulsen i arbeidet med det 95 millioner år gamle blekket.
FOTO: STIAN STEINSLI

MER OM ARKEOLOGI, HISTORIE OG ANTROPOLOGI

Publisert 04.05.2016, kl. 22:53

- Jeg var overrasket over at fargen hadde holdt seg så godt etter 95 millioner år, forteller kunstneren Esther van Hulsen. Oppdraget hun fikk av paleontolog Jørn Hurum var nokså enestående. Et kunstverk skulle males med blekk fra forhistorisk tid, funnet i et fossil.

Unik fossil

Figure 6.4 An example of full article view

6.3.1.8 Images

Images are uploaded as an element the previously presented support system Kaleido. After an image is uploaded, the user is required to define different cropped versions of the image that are used based on device or browser view. The content creator is then able to add a title and a description to the image, in addition to credit the photographer. After this, the image is ready to be added to the article, where it's possible to provide an article specific image description. The general description is generated as an alternative text in the front page view of the article, and the article specific image description is generated as the alternative text in the full article view, effectively giving the image two alternative description depending on the context it is shown – this is unbeneficial, as discussed in Section 7.1.1.1. As expected by previous research (Kessel et al., 2014), the labels for adding information to the image does not promote accessibility or universal design, and the content creators do not have an option to select if an image is purely decorative. Figure 6.5 shows an example of the image adding view.

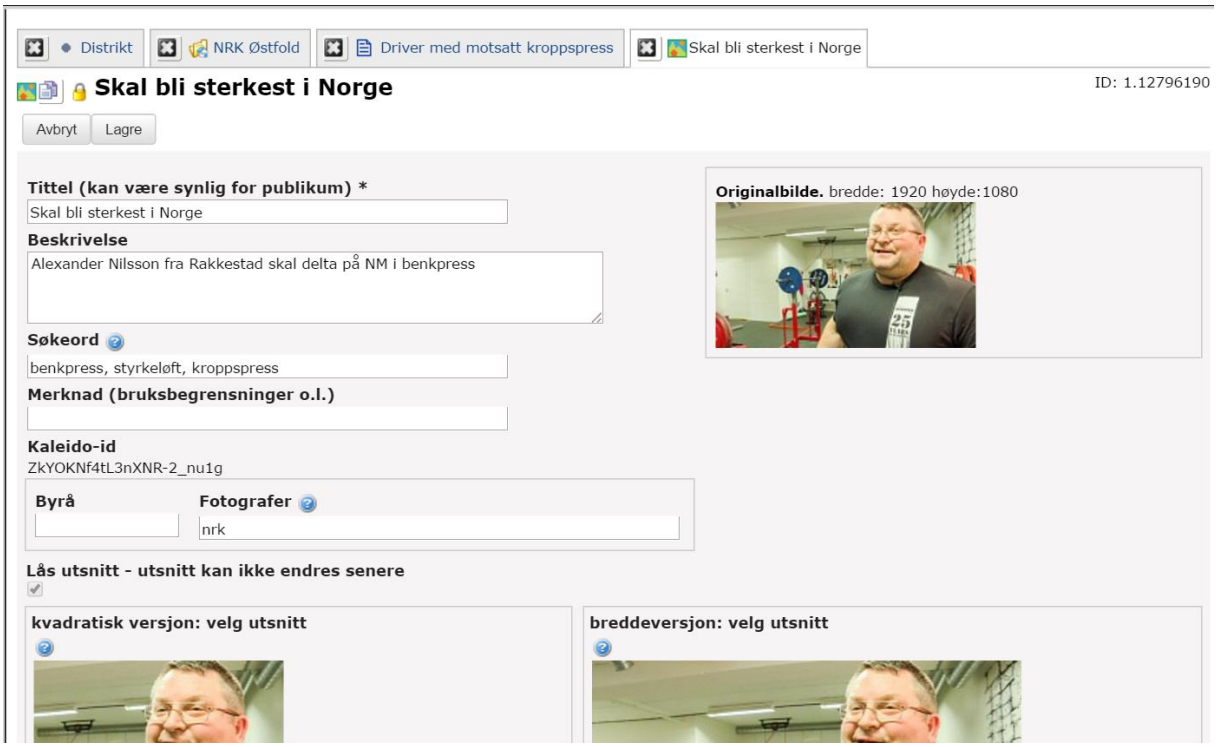


Figure 6.5 An example of the image adding view, with original image, input fields and labels.

6.4 Case Justification

This research aims to identify the drivers for creation and perpetuation of organizational barriers that hinders organizations from achieving universal design in practice. Organizations, including its norms, values, processes among others, is per definition a type of social institution (March & Olsen, 2006), and can therefore be informed by institutional theory. This will help answer the first part of the research question. Theory on institutional change can inform the research on how the identified barriers in the organization can act as opportunities for change, and effectively promote and ensure universal design in practice in an organization and thus answering the second research question of this research.

NRK introduced the “Election-vending-machine” (EVM, Valgomaten) during the Norwegian County Elections in 2015. The EVM made it possible for users to give a calculated indication as to which party to vote for in the election based on answers to a selected set of questions. However, the EVM was reported to be “completely inaccessible with screen readers” (Interessegruppe for synshemmede EDB-brukere (ISE), 2015), and therefore excluded those users with visual impairments from participating in the election in a matter equal to the whole population. With only a few days left before the voting period ended, the EVM became accessible with two major screen reader software.

NRK published in March 2016 an article regarding website security, more specifically on secure information transfer through the HTTPS-protocol. NRK found that the websites of 102 Norwegian public organizations did not comply to recommended level of security (NRK, 2016b). These organizations were made aware of this by NRK. In May 2016, NRK published another article that reported that 50 of the 102 websites had increased their level of security as a result of the findings by NRK (NRK, 2016a). This suggest that NRK has power to influence organizations nationwide, that can be used to for example promote accessibility and universal design to other media organizations or public organizations.

No research has been done on how the editorial employees at NRK experience the content management system or organizational challenges at NRK (Sanderson et al., 2015). There has been no investigation of the rendering tool, Panorama, and how its processes and connected applications changes the content in the rendering process. This research will identify technical issues with Polopoly and Panorama systems (Kessel et al., 2014). This suggests that research is yet to cover the technical tools and editorial employees at NRK.

NRK expresses concern regarding the lack of accessibility and universal design on its website, made evident by (Kessel et al., 2014) and (Sanderson et al., 2015). NRK also states that accessibility is something that the organization strives to pose as a good role models to other news agencies and corporations. NRK states that “complying with national regulations is far from our main goal … Our main goal is to go beyond the regulations and make sure that as many users as possible have access to NRK's web content”, as stated in Appendix C.

6.5 Previous Accessibility Research at NRK

The technical systems do not create universally designed web content to the user, neither individually nor collectively: Polopoly does not inform about or aid the authors with creating accessible and universally designed content, while Panorama's effect on the content is somewhat unknown, but believed to have impact on the accessibility (Kessel et al., 2014). Plug-ins for e.g., spell-check and multimedia management may play a part in the rendering process, suggested in research by Eshkevari et al. (2014) and Nguyen et al. (2014).

Kessel et al. (2014) and Sanderson et al. (2015) have conducted research on NRK's CMS, produced web content and consumers and state

- that only nine out of 43 applicable WCAG 2.0 success criteria were met on selected, representative, pages on NRK.no;
- that the content management system fails to a great extent on ATAG 2.0 Part B success criteria; and
- that consumers experience usability issues in structure, layout, multimedia, language content among other points.

7 Results

This section presents the findings from the data collection methods and analysis. Section 7.1 presents the specific instances where NRK's website fails on WCAG 2.0 success criteria. Section 7.2 presents the findings made from the on-site observation. Section 7.3 presents the findings made from the semi-structured interviews. Section 7.4 presents the document data identified from the to aforementioned methods. Section 7.5 presents the additional themes that the editorial employees made in the semi-structured interviews.

The findings suggest that the editorial employees experience numerous barriers on a daily basis, that affects their work in some way. The analyzed data from data collection suggests that the editorial employees were not significantly dissatisfied with PP and Panorama as publishing systems, but were rather dissatisfied with organizational matters and had therefore more to report regarding organizational matters.

Suggested by this research and previous research by Kessel et al. (2014) and Sanderson et al. (2015), NRK's webpage does not conform with WCAG 2.0 guidelines and in turn the National Regulations for Universal Design of ICTs (Forskrift om universell utforming av IKT-løsninger, 2013), a part of the ADAA (Diskriminerings- og tilgjengelighetsloven, 2013).

This research suggests that the majority of the editorial employees are unfamiliar with universal design as a concept, that the majority do not take any measures towards universal design or increased accessibility when creating content, and that they have received little to no specific information or training regarding UD or accessibility.

Further, the findings suggest that the editorial employees are not aware of the existence of neither internal nor external guidelines concerning universal design and accessibility, including the National Regulations and the NRK Policy, that they experience workflow barriers in efficiency and collaboration, and that unclear chain-of-command makes it difficult to know who to consult with on various matters. The

findings further suggest that NRK as an organization have no formal guidelines, policies or routines that considers or addresses universal design or web accessibility. In addition to this, this research suggests that the editorial employees experience technical barriers daily, connected to functionality and poor design in PP.

The identified barriers are grouped into three barrier levels in which they will be presented; awareness barriers, organizational barriers and technology barriers. These barriers are explained in detail in Sections 7.2 and 7.3.

The findings will be presented according to the different data collection and analysis methods utilized in the research. Section 7.1 presents the findings from the heuristic evaluation of NRK's website. Further, Section 7.2 presents the findings from the on-site observation. Lastly, Section 7.3 presents the findings from the semi-structured qualitative interviews.

7.1 Findings from Heuristic Evaluation

7.1.1 Identified Barriers from Findings

As mentioned in Section, all applicable WCAG 2.0 guidelines were evaluated. This section presents the areas of NRK's website that did not comply with the WCAG guidelines. The heuristic evaluation of NRK's website showed that many of the issues that have been identified by Sanderson et al. (2015) have been rectified for this research. However, there are some issues that were not reported in previous research, and some issues that persist from previous research.

7.1.1.1 Text Alternatives (1.1.1)

To assess whether the selected pages conform with or fail the guidelines for Text Alternatives is somewhat challenging. This is because a number of the images, videos and other non-textual content, like graphs. have sufficient, in-context, equivalent purpose alternative text or description, but a fair share of the non-textual content elements have very direct and overly descriptive alternative texts.

For instance, if there is a picture of a person, the alternative text is usually the name of the person, as illustrated in Figure 7.1. This can be interpreted as both right and

wrong in the sense that the image clearly depicts the person involved, and therefore has a sufficient descriptive alternative text. However, only the person's name may not be sufficient from a content contribution perspective, i.e., how the image of this person creates context to the presented article. In other words, in Figure 7.1, the presented article reports on how people prefer real paper to e-readers when reading text. The article title or excerpt does not contain the person's name, but when the article is read in full it is evident that the person in the image is in fact the person making the statement. Therefore, it can be interpreted as an insufficient content creating alternative text because when the image is first presented, the image's context is not communicated clearly enough through the supplemental text.

– Dei aller fleste likar papir betre enn Kindle

Det store kvefsebolet i norsk bokbransje heiter e-bok. I dag lanserte Nasjonalbiblioteket nytt forslag til utlånsmodell for elektroniske bøker.

▼ <figure class="
▼
<img id="NfJR4xqoVcFQyzdGfdqDww" title="Foto: Thomas Wiborg / NRK" alt="Aslak Sira Myhre" src="" srcset="https://gfx.nrk.no/NfJR4xqoVcFQyzdGfdqDww-zfyDF07L0-Cz7Wn5k3Pzg 80w, https://gfx.nrk.no

Figure 7.1 This alternative text is too descriptive and does not provide the image's context to the article being presented

There are also alternative texts that seemingly puts the image in another context than intended. As an example, Figure 7.2 shows the excerpt for an article. The article reports on how a performing music group has received threats after controversy. The alternative text on the image in the preview Figure 7.2, however, reports that the group is scheduled to play at a music festival. This is clearly the wrong context to the

article. At the same time, the image description in the full-length article presents the image back into in the correct context to the article. Images and their alternative text are reused throughout different articles, and that might be the underlying reason why alternative texts sometimes differ from the context they are being presented in.

Razika får drapstrusler etter å ha oppfordret til Israel-boikott i 1. mai-tog

```
:usler-etter-a-ha-oppfordret-til-israel-boikott-i-1.-mai-tog-1.12928227">
 class="image widget lean plug-image">
v class="responsive-img F169" style="">
<img id="Tf4OsKtD7CqLnIXKe1a9Mw" title="" alt="Razika til
Månefestivalen" src="
///yH5BAEAAAAALAAAAAABAAEAAAIBRAA7" srcset="https://gfx.nrk.no
```

Figure 7.2 The alternative text to the image provides wrong context to what the article reports

As a final point, there are no images that lack alternative texts, which is an improvement from previous research made by Sanderson et al. (2015). With that in mind, this research concludes that some, but not all, images lack equivalent purpose and therefore fails partially on WCAG 2.0 guideline 1.1.1, level A.

7.1.1.2 Distinguishable (1.4.1)

Distriktsnyheter, a part of NRK's website that report on district specific matters, has an element called "Latest Messages", which is a list of all recent events and articles that has happened in the district. This list uses color as only means of

communication when something is important or urgent. This emphasis is not being addressed correctly programmatically, and therefore fails on 1.4.1 Level A. See Figure 7.3 for an example where color emphasis is used, but as only means of distinguishing a visual element.

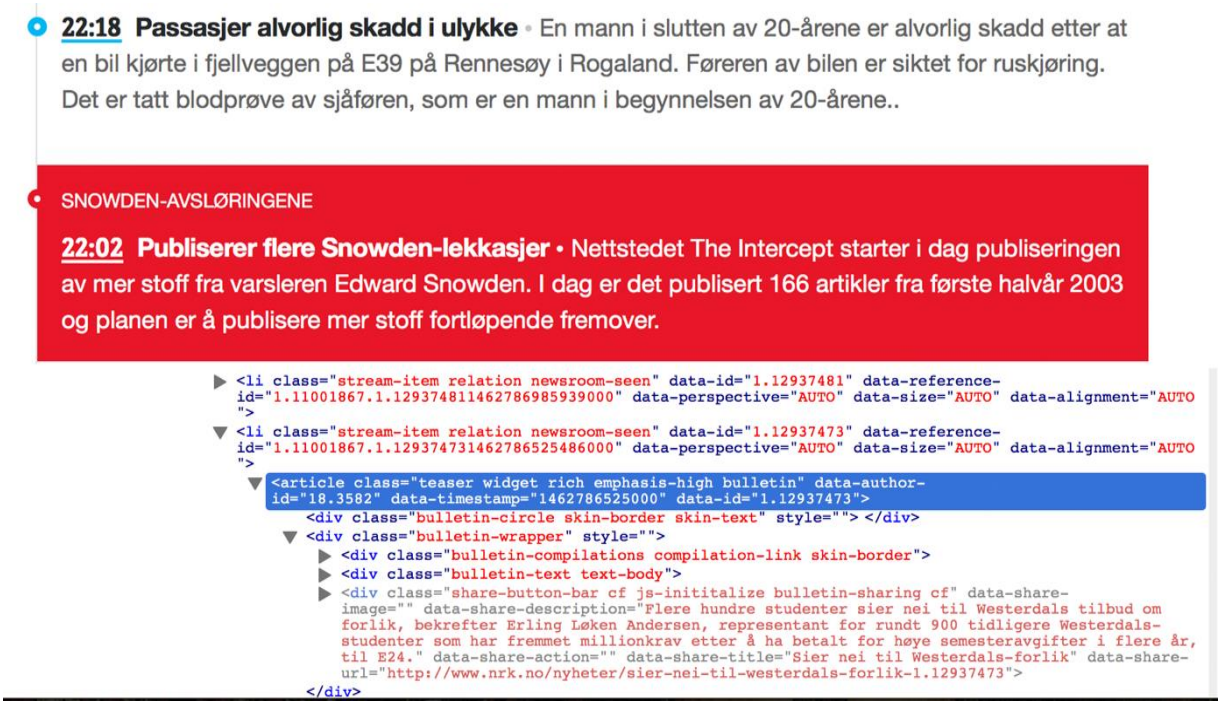


Figure 7.3 There is no other way to distinguish an important news event than by color

7.1.1.3 Contrast (1.4.3)

The selected pages contain numerous action links, i.e., links that promotes the user to perform an action. Some examples of these action links are “Watch video”, “Watch images”, or “Discuss”, that invites the user to watch the video, images or to discuss on a particular matter. These action links do, however, not meet the required contrast level for guidelines 1.4.3 level AA of 4.5:1. The current contrast level is 3.5:1 This becomes evident if the screen is in high contrast mode, as shown in Figures 7.4, 7.5 and 7.6.

Figure 7.4 Insufficient contrast on action links, here "See Video"

Figure 7.5 Insufficient contrast on action links, here "Discuss"

Figure 7.6 Insufficient contrast on action links, here "See the Images"

Also, the color scheme for Ytring (Opinions) on NRK's website does not meet the contrast requirements with a current contrast level of 2.75:1. Therefore, this finding suggest NRK's website to fail on WCAG 2.0 guideline 1.4.3 level AA, and subsequently 1.4.7 level AAA. Metadata, social action buttons, author names and related links will therefore not meet the contrast requirements, as shown in Figure 7.7.

Figure 7.7 Ytring's color scheme provides insufficient contrast between foreground and background for social media buttons and supplemental content

7.1.1.4 Keyboard Access (2.1.1)

Audio and video elements, where a play button is visibly present, are unreachable inoperable by the keyboard on the selected pages on NRK's website. The HTML code that produces these video elements do not, in fact, have any HTML-clickable elements that can trigger the video or audio content to start, see Figure 7.8, most likely because this is controlled by client-side programming, e.g., JavaScript. Assistive technology identifies and interprets the title of the video, the textual description of the still video/image, and the duration of the video, but it does not interpret or reach the play button, that starts the video. The audio and video elements are therefore suggested to fail on guideline 2.1.1 level A.

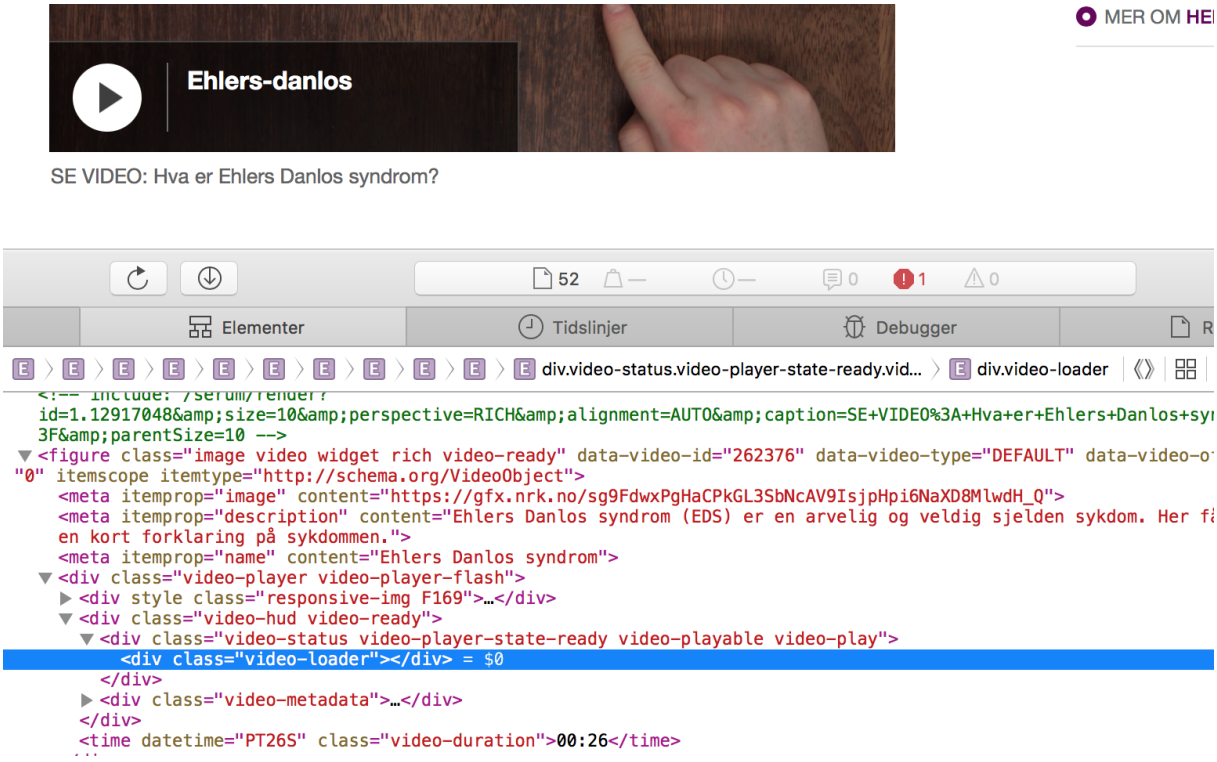


Figure 7.8 The play button for a video is inoperable from keyboard only, because there is no clickable HTML-element. Instead, the play button is in a div-element.

7.1.1.5 Keyboard Traps (2.1.2)

The Ytring page contains a Twitter widget that displays the latest tweets from NRK Ytring's account. This widget is reachable and operable by keyboard; however, it takes up to 20 tab-key strokes to get through the widget. This may be considered a keyboard trap, and suggests that the Ytring page fails on guideline 2.1.2 level A.

7.1.1.6 Bypass Blocks (2.4.1)

The selected pages of NRK's website evaluated in this research contains at least one main menu that enables used to navigate between different pages, e.g., Sport, Radio, TV. Some pages contain a second menu that enables the user to navigate within the selected topics, e.g., Movie category within Culture section. None of the menus on the selected pages contain skip-links or other measures to enable the user to skip repeating content. This results in a situation where the user has to navigate through at least one menu with 13 elements, and sometimes an additional menu. These findings suggest that the selected pages fail on guideline 2.4.1 level A.

7.1.1.7 Link Purpose (2.4.4)

Full-length articles usually contain action links to similar or supplemental content. As an example, an article about global warming can feature a link to an article where a representative from the government argues to increase awareness on global warming. These links have the action, i.e., read, read more, listen, watch, and follow, as text followed by the link, see Figure 7.9. The links themselves, however, does not contain the actions in them, and can therefore confuse the reader when the links appear without the supplemental text, e.g., when the user browses links. However, when assistive technology reads the article sequentially, the action text does appear before the link, and gives the reader the right context and purpose for the link.

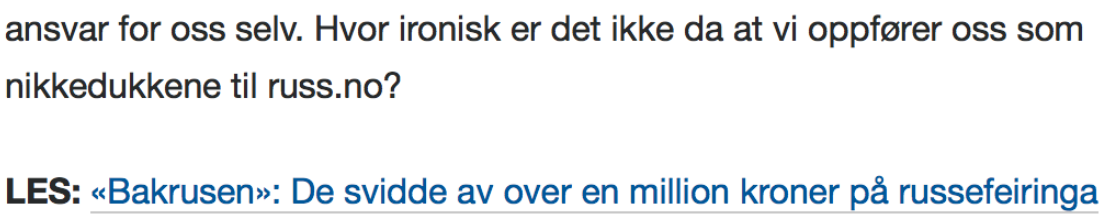


Figure 7.9 In-text links to supplemental content contains an action, here "Read: " followed by the actual link. The action is not read back to the user through assistive technology as it is not a part of the link text.

The author, or authors, of an article usually provides a link to their Twitter-account in the article's full-view. A Twitter icon to create link context and purpose accompanies these links, but this Twitter icon appears as hidden to ATs through the WAI-ARIA aria-hidden-attribute, see section 7.1.1.13. This means that the context of the link, i.e., being a link to the author's Twitter-account, is only conveyed graphically. These account links will therefore not convey necessary context or purpose because ATs only interprets the username with no indication of where the link leads to or in what context it is provided, i.e., an external link to the author's Twitter account.

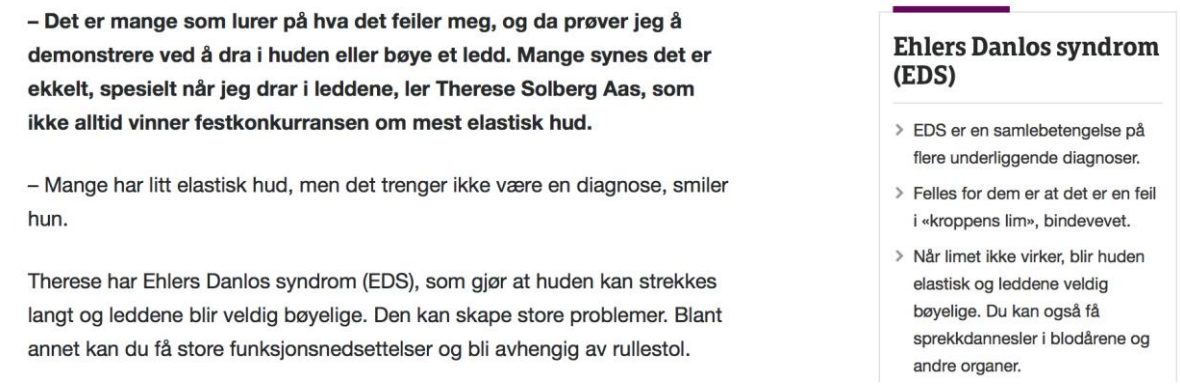
This finding suggests that link purposes on NRK's website fail, partially, on guideline 2.4.4 level A.

7.1.1.8 Focus Order (2.4.3)

The preview of articles, i.e., the selected pages' front page, operates in a logic and sequential way as one should expect. However, in articles' full-view mode, the order of which elements are interpreted by the browser is somewhat illogical and may not be as intended by NRK.

In the majority of the full-view articles, the order is as follows: article title, featured image, author(s) of the article with e-mail and Twitter links to the author, metadata like publish time and date, share links to Facebook, Twitter, Google Plus and e-mail, and finally the main content. One would expect that the main focus should be at the article content, with an exception of having the author name(s) before the main article content. This means that the user is forced browse through metadata and social sharing links before the user has any knowledge of the main content of the article.

Some articles in full-view contains a fact box, which is used to give the user additional information or definitions of concepts, technical terms or similar content that is not commonly known by the public. For example, if an article introduces or reports on a specific syndrome, the fact box will provide the user with a full definition of this syndrome, see Figure 7.10. This fact box is placed on the right side of the main article content, and is programmatically placed in an aside element. The use of the aside element is in theory correct markup, but it may not suit the application of the fact box, which is to further inform the user about the article content. Content placed in aside elements appears after the main article content in the flow, which forces the user to read the whole main content of the article before being able to interpret the fact box. In an event where the user skips to another article in the middle of the article, or if the user does not read the whole article, this fact box may never be recognized by the user at all. Also, there are no internal links from the term or concept to the fact box.



– Det er mange som lurer på hva det feiler meg, og da prøver jeg å demonstrere ved å dra i huden eller bøye et ledd. Mange synes det er ekkelt, spesielt når jeg drar i leddene, ler Therese Solberg Aas, som ikke alltid vinner festkonkurransen om mest elastisk hud.

– Mange har litt elastisk hud, men det trenger ikke være en diagnose, smiler hun.

Therese har Ehlers Danlos syndrom (EDS), som gjør at huden kan strekkes langt og leddene blir veldig bøyelige. Den kan skape store problemer. Blant annet kan du få store funksjonsnedsettelser og bli avhengig av rullestol.

Ehlers Danlos syndrom (EDS)

- EDS er en samlebetengelse på flere underliggende diagnoser.
- Felles for dem er at det er en feil i «kroppens lim», bindevevet.
- Når limet ikke virker, blir huden elastisk og leddene veldig bøyelige. Du kan også få sprekkdannesler i blodårene og andre organer.

Figure 7.10 A Fact box is supplied with the article in instances where the article contains unusual words, technincal terms or jargon. Here, the Ehlers Danlos Syndrome is explained in detail in the fact box

These findings suggest that the selected pages fail on guideline 2.4.3, level A.

7.1.1.9 Unusual Words (3.1.3), Abbreviations (3.1.4), Supplemental Content (3.1.5), Pronunciation of Words (3.1.6)

There are no evident mechanisms to inform the user about unusual words, abbreviations, supplemental content or pronunciation of words. A number of full-view articles do, however, contain a fact box which is meant to further inform the user on unusual words, abbreviations or supplemental content that is reported on in the article, but as mentioned in Section 7.1.1.8, there are no mechanisms to navigate to this fact box when an unusual word or abbreviation appears in the article content other than to navigate through the full content of the article. This finding suggests that the selected pages fail on guidelines 3.1.3, 3.1.4, 3.1.5, and 3.1.6, level AAA.

7.1.1.10 Focus Visible (2.4.7)

A keyboard focus indicator is not clearly visible on any of the selected pages. The only focus indicator used on the selected pages is the browser's built-in focus indicator. This focus indicator is different from browsers, operating systems, and versions. It is recommended to indicate keyboard focus explicitly by WCAG 2.0. These findings suggest that the selected pages fail on guideline 2.4.7 level AA.

7.1.1.11 Location (2.4.8)

The selected pages in the evaluation do not contain breadcrumb trail, and therefore fails to inform the user of its location at all times. It is recommended to indicate the user's location at all times, so that the user can navigate as efficiently as possible (Nielsen, 2007). These findings suggest that the selected pages fail on guidelines 2.4.8 level AAA.

7.1.1.12 Compatibility (4.1.1, 4.1.2)

The selected pages have been checked with automatic conformance checkers in addition to have been inspected. Among some of the errors are "duplicate IDs", "bad search value for form", "no legend labelling fieldset", and "missing role on span elements". This finding suggests that NRK's website fails on WCAG 2.0 guidelines 4.1.1 and 4.1.2 level A.

7.1.1.13 General Findings

Some articles in full-view include block quotes from either the article author, interviewee, or other entities related to the article. The selected pages have the blockquote-element as a container for this quote, which is recommended use of the element. However, the source of the quote is contained in a small-element, which is incorrect HTML5-syntax. The correct HTML5-syntax for blockquote- or quote-elements is to contain the source in a cite-tag (World Wide Web Consortium, n.a.-a).

The fact box element provides a source for the definition and information that is presented in the fact box. However, the source is a text-element, and not a link to the original source. This should follow HTML5 cite-syntax and should be contained in a cite-element. See section 7.1.1.8 and 7.1.1.9 for more information about the fact box.

The evaluated pages have frequent occurrences of WAI-ARIA-attributes that assists users with assistive technology, read more about WAI-ARIA in Section 4.5.4. For example, preview action links include a small icon depending on the action, e.g., a play icon to indicate audio action, an image icon to indicate image action, or speech bubble to indicate discuss action. These may not be useful for users with assistive technology, and should be hidden from the content flow, see Figure 7.11. The

selected pages have utilized the aria-hidden-attribute to make this evident to the web browser and assistive technologies. Another example of the use of WAI-ARIA-attributes is the definition of element roles. All the selected pages show the main menu and the top banner of NRK's website. Both the header-element that contains the menu, and the main menu itself has aria-role-attributes specified as "banner" and "navigation", respectively. See Figure 7.12 for an illustration of this.

Figure 7.11 The aria-hidden attribute is specified on the icon for Discuss-action link, which allows ATs to skip the icon and move on to the text.

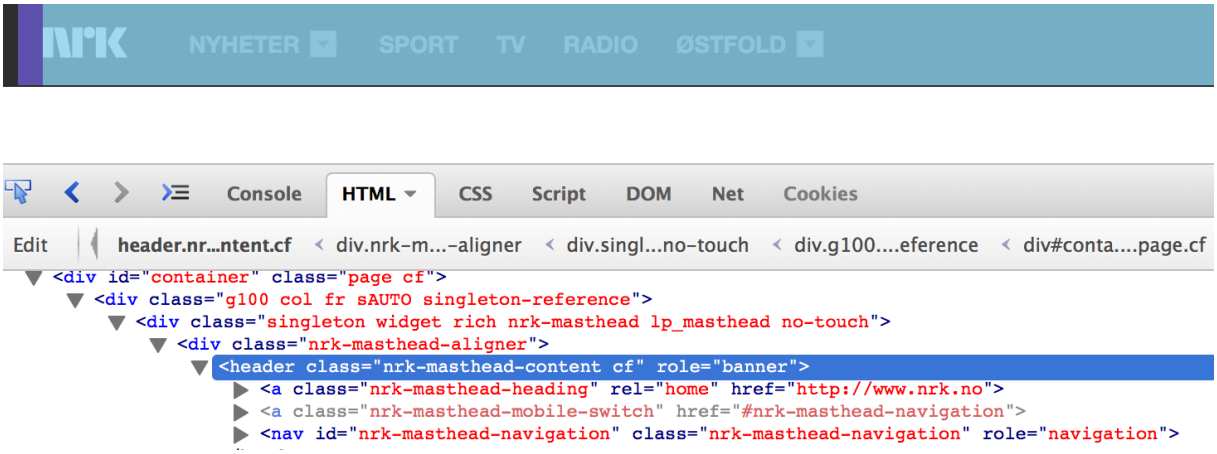


Figure 7.12 The ARIA role-attribute is specified in NRK's header element as "banner", which allows ATs to interpret the element as a banner.

The selected pages utilize HTML5-elements correctly, as defined by W3C HTML5-standards (World Wide Web Consortium, 2014). For instance, the selected pages

show header-element for header, nav-element for navigation menus, time-element for time- and date stamps, article-element for the articles, among others.

7.2 Findings from On-site Observation

7.2.1 General findings

The participant worked on adding text and multimedia content to a larger, in-depth, article, which was planned for publishing the same day through Polopoly CMS (PP). This section presents the routines and workflows that was observed by the participant's work. This also gives context to the identified barriers that will be presented in the next sections.

7.2.1.1 Adding Images to an Article

The participant showed some different steps that had to be made when adding an image to an article. In this case, the participant imported a new image from the computer's desktop, in contrast to choose an already uploaded image in PP. When the participant added the image, through Kaleido (Section 6.3.1.1.3), the participant had to take the following steps before the image was ready to be inserted into the article: upload the image from source (computer desktop), crop the image to various screen sizes (large screen, medium screen, tablet screen and mobile screen), and add a description. The participant reported that the general image description should be "as neutral as possible … describing exactly what appears on the image". After these steps, the image is ready to be added to the article. When the participant added the image to the article, it was possible to write a second image description, described to "be in specific context to this article". It evident that Kaleido and PP stores two image descriptions: one neutral and purely descriptive, and a second context specific description.

The research also uncovered that the participant performed simple retouching on the image, i.e., color correction and red eye removal. The participant reported that this was not a mandatory operation, but that the participant wanted to present the article with as high quality as possible.

7.2.1.2 Data Collection, Processing and Article Draft Creation

The participant reported to have gotten extensive amount of raw material for the article. Examples of these documents were interview transcriptions, field notes, video footage, audio recordings and memos from the reporter. The research observed that the participant did not use PP to create a draft for the article text, but rather used third-party text editors, in this case Microsoft Word. The text from Word was then copied and pasted into the PP article working area, followed by adding images, video, links to supplemental and similar articles and metadata, i.e., authors and reporters. The research did not, however, observe why this was the case.

7.2.1.3 Article Preview on Different Screen Sizes

After the text and multimedia content was added to the article, the participant opened the article in a preview window. This preview window enabled the participant to get visual feedback on how the article appeared on large screens, medium screens, tablet screens and smartphone screens. The participant was able to choose between presets or to scale the preview window freely. The participant reported that this was an established routine that all editorial employees have to perform before publishing an article. The participant also reported that “close to fifty percent of our users are on mobile phone screens”.

7.2.1.4 Use of Social Media

The participant had responsibility for promoting upcoming articles and TV broadcasts to the public through social media. This caused the participant to visit the editorial office’s account on Facebook. Some of the text that was published on social media was also used in bits and pieces throughout the article. When the article was submitted to quality assurance (QA), the participant scheduled a Facebook post to promote the article and the accompanying TV broadcast.

7.2.2 Awareness Barriers

7.2.2.1 Awareness and Understanding of Alternative Text on Images

The participant expressed uncertainty about what the image descriptions should be, and where this became visible and verifiable in the published article. The participant clearly recognized the use of and term alterative text, and that an image needed one

neutral descriptive description, and one context specific description. The participant asked “shouldn’t the neutral description and context-specific description be a sufficient alternative text?”. This suggests that the participant was familiar with the concept of alternative text, but rather unfamiliar on how it was generated and work for the end users. In addition to this, the participant also asked if “this [alternative text] is something that is solved technically, right?”, which may suggest that the participant do not feel responsible for how the alternative text was made in the final article. The participant further stated that “journalists will never enter any extra content to images or articles”, presumably because the journalists are in a high-paced and dynamic environment where the work must be finished quickly (McNair, 2009).

7.2.3 Organizational Barriers

7.2.3.1 Work Environment

The observation uncovered that the immediate environment of the participant was an open office space, which invited to collaboration and showed an extensive amount of face-to-face communication. Open office environments are suggested to affect employees negatively on satisfaction and productivity (Brennan, Chugh, & Kline, 2002).

7.2.3.2 Weekly Team Exchange

The participant reported a change in team on a weekly basis. In detail, the participant explained that a new in-depth article is created each week, and that the raw material for the article, e.g., images, videos, interview transcriptions etc., is supplied by a team. Since an article is original to a specific week, so is the team that provides raw material for the article.

7.2.3.3 Disagreements Across Disciplines in the Organization

The participant reported that there were some disagreements across disciplines in the organization. Specifically, the participant stated that “photographers often disagree with the developers when it comes to how images should be cropped and presented to the reader”.

7.2.3.4 Unused Intranet System

The observation also revealed that the organization's in-house developed intranet is not being used as intended. This intranet solution was seemingly intended for employee communication, discussion and document sharing throughout the organization. The intranet had records of all the employees and their role/position in the organization, and there were spaces where journalists, developers, leaders and other positions could gather documents, help articles and the like. The participant also expressed that "we [employees] use closed Facebook groups instead of Torget [the intranet system]". The existence and use of an intranet system in an organization is a recommended practice that can promote collaboration and communication in the organization (Chiu, 2015).

7.2.3.5 Delays in Quality Assurance (QA)

The participant reported that QA is assured by the original article author and at least one editorial office leader. The article that the participant worked on was scheduled for QA in the time of the observation. However, the original article author got an urgent call to a new task to be done, and that QA had to be put on hold. This created a delay in the participant's work and the article schedule. In order to be as efficient as possible, the participant submitted the unaltered article to the editorial office leader for QA. The observation ended before the QA process was finished, so the research is unable to determine whether this schedule interruption caused any additional delays with the article or not.

7.2.4 Technological Barriers

7.2.4.1 Slow or Frozen Workstations

The observation revealed that the participant utilized two computers at once, one with Windows operating system, and one with Macintosh operating system. The participant stated that "it is good to have two computers, so that I can work on one computer while the other is waiting" , here referring to the computer freezing or when a video is being rendering as "waiting". This finding suggests that the editorial employees experience productivity barriers caused by slow or frozen workstations that cause periods of waiting and inefficiency.

7.2.4.2 Failing External Applications and Integrated Tools in PP

As mentioned in Section 6.3.1, PP has numerous modules that handles multimedia, spell-checks among others. The participant had the responsibility to create a video for social media, specifically Facebook, to promote the article. The participant used the third-party video editing tool Adobe Premiere Pro to create, caption, render and finalize the video for web. The same video would also be used in the article. The process of importing a video into PP was observed to be a somewhat more comprehensive task than images, because the finalized video had to first be imported into the Programbank module. The participant explained that after the video was imported into the Programbank module, the video could then be inserted into an article in PP through an additional module, Guro 4.0. However, the observation revealed that the participant was unable to import the video into the Programbank, and was presented with a number of error messages. The participant further explained, that “this has been going on all morning … I have called technical support, but they have not called me back”. This finding suggests that technical errors in integrated modules in PP causes a barrier for the editorial employee.

7.2.4.3 Difficult and Slow Search in PP

All editorial employees have to follow an established routine to provide the user with links to supplemental and related articles in between the article text internally in NRK’s website. The observation revealed that PP has a search engine that is able to search for these related and supplemental articles. However, the observation further showed that the participant used Google search engine to search for related articles, using Google’s site-specification-functionality. As an example, the participant entered “site:nrk.no <topic>” to retrieve articles from NRK’s website on the specified topic. The participant further explained that “this is much quicker than the [slower] search in PP … it gives a better overview of the articles”. This finding suggests that the operation speed when searching in PP creates a barrier for the editorial employee.

7.2.4.4 Disturbing and Redundant Input Fields in PP

The observation revealed that there is an extensive amount of input fields in the article creation view. The participant entered content in the majority of these fields, but interestingly enough, some of the fields were left blank when the article was

submitted for QA. Specifically, an input field for geo location was left blank. The participant explained that this input field was supposed to track the article's geo location so that it can provide a richer experience to the user. For example, if an article's main content reports on matters that takes place in Russia, the article can be geo tagged to Russia. However, the participant stated that "it is possible to geo tag the article, but it is not visible anywhere in the published article or in the page [NRK's website] … it is disturbing and I don't want to spend time on it". This suggests that visible, yet redundant fields create disturbances and distractions with the editorial employee and thus creates a barrier for the editorial employee.

7.3 Findings from Qualitative Interviews

This section presents the findings, in the form of barriers, made from the qualitative interviews with NRK's editorial employees. The participants will be referenced through a unique ID number, based on the order the participants were interviewed. Further, the barriers are grouped into three categories. These categories are awareness barriers, organizational barriers, and technical barriers, see Section 5.4 for more detail on the categories.

7.3.1 Awareness Barriers

These barriers address what knowledge and degree of awareness the editorial employees have regarding accessibility, universal design and the national regulations.

The interview guide addressed this by questioning the participants their familiarity, definition and understanding of universal design.

7.3.1.1 Familiarity and Definition of UD

6 out of 7 participants claimed to be familiar with the term universal design. However, the participants' own definition of the term, was somewhat different from theory, and from the other recorded definitions.

One participant stated that "UD means that we are obligated/required by the law to retrofit/adjust our content so that everyone can enjoy content, no matter if they are for example blind.". This definition is interesting in the way that the participant addresses

it as a requirement from the law, instead of increased usability and accessibility. The participant also mentioned that they are very aware on how to make content easy to read, both in terms of how to write content, and to always have “weak-readers” in mind, given that most journalists are usually strong readers.

Another participant defined universal design as “a system that is usable by everyone, independent of previous technical experience and knowledge. One has to access many different applications to import things [content] into PP, audio, video, converting. Even if you know PP, you may not be trained or able to use these other applications.”. Further, the participant stated that “we notice that employees who are older or may not have the extensive technological interest … find it difficult to learn PP.”. This definition specifically targets previous computer experience and technical tools without focusing on webpages.

The participant reported to have previously made an in-depth article on Norway’s largest universal design center. According to the statements the participant made throughout the interview, it suggests that the participant was familiar with the concept before the interview, which may or may not been a result of writing this article.

Further, the participant reported that unawareness of how factors like background and foreground contrast, font size, font colors, font weights would affect usability for the users of NRK’s website. PP does not include this functionality, most likely because it would make articles deviate from the established article templates with its sizes, colors and fonts, as supported by another participant.

A third participant defined universal design, as “it should be understandable and available for those with visual impairments or hearing impairments”. It is, however, unclear what “it” refers to in the definition. This might be connected to PP as an application, content, web, physical space, and so on. This definitions is more closely related to accessibility than universal design.

A fourth participant defined universal design as “that all services in the society should be adapted to be usable independent of challenges. … What comes to mind first for me, is universal design in buildings”. The participant further expressed familiarity to

the fact that some users utilized screen-readers to consume web content. This definition targets universal design of physical space and does not address ICT or websites.

The last participant defined universal design as “that all of our systems should be able to communicate and work in the same way, so that the people who know one system, knows them all”. This definition also focuses on usability of the technical system, maybe at NRK. This definition also does not mention users, but focuses on “systems”, i.e. products.

Collectively, it seems that some of the participants have some degree of familiarity with the term, but the definitions are closer to explain accessibility rather than universal design. In addition to this, the participants focuses on products, technical tools, i.e., Polopoly, and requirement from the law.

7.3.1.2 UD Considerations

This section outlines what the participants reported as activities concerning UD and accessibility for the end users.

Four of the seven participants reported to actively take measures towards improving usability, accessibility or universal design for the user, however without using those terms. The remaining participants did not report to take any distinct action towards increased accessibility or universal design. For example, one participant reported not to do any particular adjustments to benefit users regarding language or readability. However, these participants expressed on other questions in the interview that they are aware of language, readability and easy comprehension of articles, in addition to show knowledge of what and how image descriptions should be entered to benefit blind or visually impaired users. This might be a result of that fact that these participants do not actually contextualize these measures with usability, accessibility or universal design as a measure to benefit users. Therefore, it is likely that this result does not actually indicate that no considerations or measures are taken by these participants.

It seems that the majority of the participants, as journalists, do take readability, length of text, and text comprehension seriously and as an active measure when creating articles. More specifically, three participants explicitly underlined the importance of language simplicity, readability and understandability when writing articles for NRK's website. One participant reported to have had several courses in how to write easily and understandably for the end users. Two other participants explicitly report that this is something that all journalists in the organization are required to focus on, and something that are actively reinforced and maintained through courses and constant reminders.

One participant explained that the editorial employees are unable to spend more time on article processing with the currently allocated time for this. Further, the participant states that "we must get allocated the time to further process our articles [for improved usability and universal design]". Interestingly, the participant suggests that "all journalists may not necessarily have to be forced to process articles for usability or universal design, this might be delegated to a particular employee or a group of employees in the editorial offices, like we have with social media … Someone has to do it, and they must get this time allocated".

7.3.1.3 Language, Readability and Ease of Comprehension in Articles

As an example, one participant explains that there had recently been made restrictions on how long an article can be, to further stress readability and length of article text – this is however different from the types of news articles, with an upper character limit of 450 words, and in-depth articles with an upper character limit of 1000. This restriction had been introduced as a results of "statistics made from NRK, showing that users do not read more than 450 words of an article before closing or moving on. The in-depth articles are rather a reading experience, and can therefore be allowed to have more characters".

As another example, another participant reported to previously have used a tool called LIX to calculated the readability index based on "repeating words and long words among others". This was reported as an external website the participant visited when creating articles, and not integrated into PP. It did not become clear

whether this was an organizational practice, or an individual consideration. However, the participant reported that editorial employees soon started to question the validity of the tool, and how it actually helped the language in an article. Therefore, the use was discontinued by the participant.

7.3.1.4 Alternative Text and Image Description

5 of the 7 participants reported that alternative text to images, in their words image descriptions, was something that they have been told to do through e-mails, see section 7.4.2, and that this is something they actively consider when adding images to news articles. Interestingly, however, the one participant seemed to be unsure of what an alternative text should be, and whether their colleagues in fact provided descriptive and contextualized image descriptions in practice.

One participant raised concerns about the extra time it took to enter such a description to images, stating that “It is more work to enter this description, and if something urgent happening, the solution is to make a short version of this.”.

Another participant raised an interesting point to adding good image descriptions, being how search engines index and search for images on the web. This was mentioned in context of Search Engine Optimization (SEO).

7.3.1.5 Definitions, Jargon, Abbreviations

The majority of the participants did not report on taking any consideration into the area of technical terms, jargon, abbreviations and the like. This is also suggested from the heuristic evaluation made in this research, in addition to be supported by previous research by Sanderson et al. (2015).

However, one participant reported that the journalists are encouraged to include fact boxes or info boxes on topics that require backstory, context or further explanation. Specifically, the participants stated that “We make sure that all articles contain sources, and fact boxes where more context is needed”. The participant further reveals that these fact boxes are, technically, elements in PP that can be re-used, changed, added or removed. This can be interpreted as a consideration that the

journalists, at least the one participant, makes to provide the user with an explanation to terms, jargon or context of an article. The heuristic evaluation shows, however, that this is not optimally implemented into NRKs website, see Section 7.1.

7.3.1.6 National Requirement for UD

Only two of the seven participants reported to know that a national requirement for ICTs existed and accounted disabled people and web sites. One participant was somewhat familiar to the wording of the requirements, and another participant had not read the actual requirement, and reported to be reminded through e-mails. The remaining participants reported some mixed responses. For instance, one participant reported to be familiar that a guidelines existed that regarded disabled users, but only for the physical space, referring specifically to wheel-chair access, and not for ICTs. The remaining five participants were not familiar with the existence of a national requirement for ICTs. One participant, frustratingly, stated that "I have heard of no such thing! … I have no idea what tools we have to improve our articles for people with disabilities. … I think it is discouraging – we [NRK] are a governmental organization …". Further, the participant reported that it recently had two new reporters on training, where this requirement was not mentioned at all.

7.3.1.7 UD Training

Five of the participants report to not have been a part of any courses or training regarding accessibility or universal design through the organization, the remaining two participants did not explicitly state that they had not been a part of any such training, but the answers provided by these participants may suggest that they interpret general journalist's writing courses and introductory PP courses as this.

7.3.1.7.1 Mandatory Polopoly Course

All of the participants reported to have been a part of a mandatory course in the content management system PP, although these courses had not informed the journalists on matters regarding accessibility or universal design, according to the participants. There is one exception to this however: participant 5 was informed that image descriptions were important due to the fact that visually impaired users utilized screen readers, as a part of the mandatory PP course. The participant stated that

“I’m unsure if this was a part of the course or just that the instructor thought this was important”. The findings show that only one participants reported this, and suggests that the specific instructor was especially concerned with accessibility and UD, and as a result made this a topic in the course.

7.3.1.7.2 Writing Course

One participant reported to have attended several journalist’s writing courses, organized and provided by NRK. It is, however, not evident if this is the case for all journalists or just something that this one participants had been a part of. It is, regardless, a finding of a type of course/training that the journalists have gotten from the organization.

7.3.2 Organizational Barriers

This section addresses the participants reports on organizational barriers and current practices. This includes practices, workflow and internal and external guidelines, in addition to knowledge about the Norwegian Regulations for UD of ICTs.

7.3.2.1 Internal or External Guidelines

None of the participants reported that they were familiar with neither any external nor internal guidelines regarding usability, accessibility or universal design. As an example of this, none of the participants reported to be familiar with the WCAG 2.0 guidelines, which are mentioned in the National Regulations. This might be connected to the fact that none of the participants reported to be extensively familiar with the National Regulations either. This may not actually affect how the participants consider accessibility and universal design, as the WCAG 2.0 guidelines are suggested to require technical knowledge and only frighten those who do not have this technical knowledge or experience (Power et al., 2012). Interestingly, only one of the seven participants reported to be familiar with the Statutes of NRK, referenced to as NRK-plakaten (Vedtekter for Norsk rikskringkasting AS, 1996), and what it says.

However, in the context of the same theme in the interview guide, four of the participants explained that there was one document that all journalists writing for web are required to know from the organization, called “Blåboka”, translated Blue Book.

This document explains how text should be structured and written on the web, in addition to contain rules for correct grammar and correct punctuation, see more in Section 7.4.1.

7.3.2.2 Placement and Communication within and outside the Organization

Most of the participants reported that barriers connected to physical location in the organization, and lack of communication are factors that are a big part of their work day.

For instance, the answers provided on this topic suggest that the participants exhibits a great distance between both different editorial offices and disciplines is so substantial that results in “complicated information flow between editorial offices”. One participant reported to have more or less lost overview and contact with other editorial employees in other editorial offices. The participant further explained that a close relationship with other employees in other editorial offices “creates a relationship of trust” and helps ensure priorities and quality of the articles. This is another indication that the size of the organization is, to an extent, hindering employee overview, contact and collaboration.

Another participant reported that the physical placement of editorial offices and responsibilities are on different floors in NRK’s office in Oslo. For an article, it is not uncommon to have the following structure of resources: the reporter is on one floor, the front page team in a different floor, and the editorial office and the shift leader who oversees the article is on another floor. This creates disturbances in the workflow and makes it difficult for everyone to be updated on the articles progress. Multiply this with around ten to fifteen articles a day, and the effects are even more substantial. This is evident by one participant’s statement, that “this [difficulties with communication] is time consuming and demotivating”.

Participant 3 reported that the way the editorial office is structured, in an open office environment, creates disturbances and interruptions. This is especially time-consuming when the workload is increased. One journalists may be focused on writing an article, only for the journalists to be interrupted and “needs to spend time on coming back in the train of thought”. Research shows that interruptions in and

between tasks effect the difficulty of resuming the original task in a negative way (Czerwinski, Horvitz, & Wilhite, 2004).

These communication problems also affect the efficiency of the workflow. The participants reported that they had experienced that the same article had been developed by two different departments, district offices, or journalists. For instance, one participant reported an experience that one of the district offices had created an article without the responsible editorial office being aware. Another experience reported was that articles would not be developed by anyone, because “everyone thinks that someone else is on the case”.

7.3.2.3 Teamwork and Collaboration

There seems to be obstacles in NRK that makes if difficult, or in worst consequence, impossible to utilize teamwork both within and between departments.

There seem to be three main means of communication and teamwork, these being group e-mails, Lync-conversations and a private, editorial employee designated Facebook group. The identified use of e-mail in the article publication process is illustrated in Figure 7.13. The participants report that the amount of different communication and collaboration tools creates a situation where they are unsure of what is reported where, and that messages and information “fall through”. Research shows that task management is poorly handled through e-mail and e-mail applications (Gwizdka, 2002) and that e-mail users feel that tasks through e-mail takes time and effort (Bellotti, Ducheneaut, Howard, & Smith, 2003).

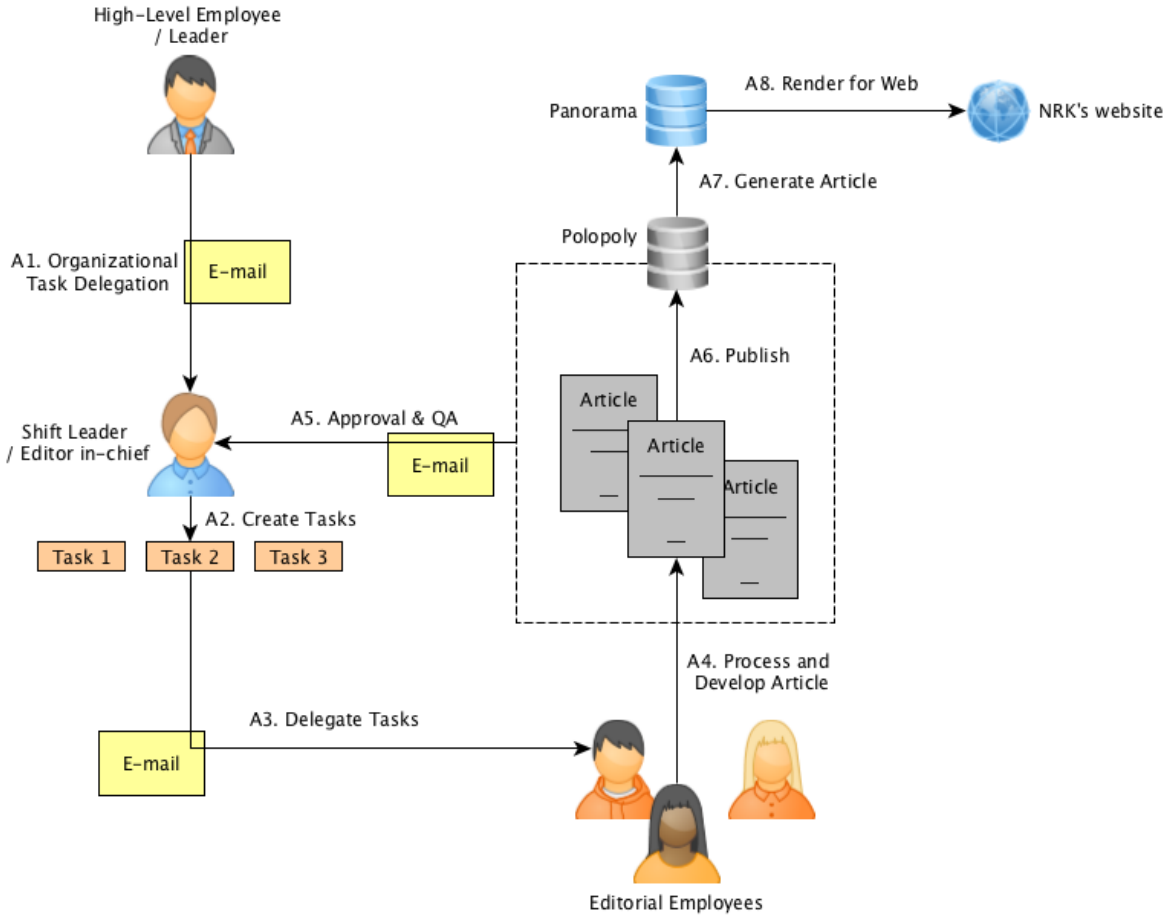


Figure 7.13 E-mail is used to convey tasks to, from and in between the high-level employees, shift leaders or editors in-chief and the editorial employees.

The Lync-conversations are seemingly used by three participants to communicate with other colleagues, editorial offices and departments. One participants reported that it was part of a Lync-conversation with a large number of journalists to stay connected to each other, and that this solution worked out “quite well”. Another participant explained that this Lync-conversation has been used for only a couple of years, and that it was the result of an attempt to improve communication and article status among various editorial offices and district offices. For example, the participant explained that the reporting editorial office should be connected to this Lync-conversation if there’s a current event like a traffic accident, so that they can give and receive continuous updates on the matter.

However, the participant questioned whether this group Lync-conversation is communicated within the organization well enough, so that journalists can stay connected and communicated that way. The participant also stated that “the employees should notify others in the conversation if you are calling external sources. In a dream scenario, everyone would see this and there would be better coordination between the editorial employees in different locations and editorial offices. Unfortunately, this is currently not the case”. Another participant made a point that an extensive use of Lync as a communication tool “interrupts (me) and feels like a distraction on several occasions … when there’s a lot of activity on there [Lync]”.

One participant also reported that there is no formal policy to notify other departments of district offices that may be interested in a topic or case. This has created several situations where the party who has not been notified, questions the fact that other departments in the “same organization and same team” are not working together to create content.

One participant explained that there are no routines for external proof reading of articles, and that this is unbeneficial for the editorial employees as well as the end-user. The participant states that “This creates more responsibility for the editorial employees … it is a shame. Someone should really read through the articles before they are published”. The participant expresses that this is unbeneficial because other employees are highly likely to give valuable input and to read the articles with an “independent set of eyes”, giving the article a more nuanced and objective viewpoint, which is an obvious benefit for the end-user regarding content and for the editorial employee by ensuring that the content is objective and reporting, as most articles should be. This suggests that collaboration with other editorial employees is, to an extent, not prioritized, even though the editorial employees express that it is something that would assist and relieve their work.

It should be noted that another participant explained that article content is verified and quality assured, from time to time, by the editorial office leader or shift leader for bigger, in-depth articles. So the participant may not accurately depict the editorial employees as a whole, but it’s clear from these two statements that proofreading and

QA is performed to a grater extent with in-depth articles than with shorter, reporting news articles.

Specifically targeting collaboration, it is not uncommon for a journalist to collaborate with, e.g., a TV team or other reporters on a case. The way this collaboration takes place is, however, questioned by one of the participants, who expresses frustration over being a part of the case or article at a later stage. This creates a situation where either side of the collaboration are forced to abide the other side, which is anything other than collaboration, per definition. The participants reported that “it would be much more beneficial to be involved from the start, so that we [the different parties in the collaboration] can plan the layout, message and content of the article”.

Four of the seven participants reported difficulties in knowing task delegations, article progress and responsibility on a day to day basis. At least, it seems that there are some uncertainties knowing how and where this is communicated. Some participants reported that they are part of daily morning meetings where current status and workload delegation for the day is distributed is conducted. At the same time, one participant reported that they were not part of these meetings, while the remaining participants did not report on the existence of these meetings at all. Considering that almost all the participants expressed this to be an obstacle in their daily work, the finding suggests that the lack of task delegation overview is a large cause for frustration and unnecessary time consummation.

One participant suggested to create an all-encompassing case- and resource management software portal, where the editorial employees would have an overview of all the cases that were in progress, finished, and not yet started. These cases would then be delegated to one or more editorial employee that was visible to the rest of the organization. In other words, this portal would help editorial employees to know who is working on an article for which case, and shift leaders would also be able to always have an overview of cases to be delegated to available resources. This would in addition assist other journalists to be aware of what other departments and employees were working on, to improve collaboration, eliminate double work, and give a general status update of the daily work. The participant stated that it

would create an “overview over ‘this is what we are working on today’, without the risk of group e-mails ‘drowning’ in clutter and other e-mails”.

Another participant reported that Facebook had improved internal communication and collaboration. NRK’s internal collaboration system, Torget, is reported to be difficult to understand and use by the participants.

7.3.2.4 Hierarchy and High-level Employees

There seems to be some confusion with how the editorial employees relate to and understand NRK’s hierarchy, both internally and externally from other district offices. In general, it is evident that there should be a clearer line of hierarchy, and that the editorial employees miss someone to have the last say on matters.

The general understanding among the participants of hierarchy, leaders and responsibility shows signs that the barriers experienced concerning hierarchy, leaders and responsibility results in news articles being published late, frustration and demotivation with the editorial employees, misunderstandings in the chain of command, and barriers demoting collaboration.

One participant explained that editorial offices in the same department, i.e., web-investigative and digital storytelling editorial offices, have different leaders. The participant reported that this is confusing and illogical when the two editorial offices, in fact, report on the same matters – in this case in-depth articles for NRK’s website. The participant expressed further dismay regarding workflow and how leaders deal with unexpected situations that occur related to TV broadcasts. When a new episode of their in-depth reporting show is about to air, it is necessary to create one or more feature articles for the relevant episode, in addition to handle social media videos. The participant explained that “something unexpected almost always happens right before the show is about to air … I wish that people higher up [leaders] would be better prepared, and handle those kinds of situations one month early rather than right before”. The participant further stated that there were “one or two more leader levels than necessary” and that a commercial organization would have been organized in a different way. This is a clear indication that the editorial employees

feel like the way that the structure and responsibility of the leaders is affecting their work regarding efficiency and stress, in an already stressful position.

Two other participants reported that, on several occasions, competitor news agencies had been noticeably quicker on publishing breaking matters than NRK, due to disagreements between leaders at different departments. This have resulted in waiting periods where the editorial employees wait for "the green light" to publish an article or report on a breaking news matter. One of the participants stated that "There has to be a clearer chain of command … There are a lot of comments from above [the leaders] with messages and counter messages that forces us [journalists] to check with everyone again on the new decision – this steals a lot of time for us.". The other participant reported that "… none of the leaders or chains of command have any more power than the others or if they are on higher levels".

Four of the participants seemed to miss a person with responsibility of making final decisions on different matters and situations, and that this has resulted in delays, frustrations and demotivation. However, they do not propose to have one person making decisions an all matters, but rather that "they [leaders] should figure out who has the last say on distinct matters and situations" on a last-say-basis, considering that disagreements and discussions cause unnecessary delays and frustration. This is further supported by another participant, who stated that "it is difficult to know who to ask when I have a question about an article".

These findings suggest that the current structure and leader behavior also demotes collaboration between the editorial employees. One participant reported that "one has to make sure that one does not step on other editorial offices' feet [interfere or report on same cases] if one is writing about the same case or a similar matter … this requires coordination". The participant further reported that because it is unclear who has responsibility of coordination, coordination takes a lot of time from the editorial work and thus demotes collaboration between editorial employees.

Another participant, who is a part of NRK's office in Trondheim, reported to have experienced arrogance and "we-know-best"-attitude from NRK's office in Oslo. The

participant further reports that this has created barriers between the two offices when proposing cases to report on, or with collaboration in general.

7.3.2.5 Efficiency

The findings suggest that the efficiency of the editorial employees is reduced due to lack of collaboration and coordination between the employees themselves, in addition to the departments they are a part of - this causes frustration with external sources. The interviews also revealed that the available tools for case collection and news reporting, are not being utilized in full.

Two participants reported to have encountered several situations where the same article was written multiple times by different employees, and that some articles were not being written at all because “everyone thinks that someone else is on the case”. This may be related to how resource delegation is being communicated to the employees in the course of the day. The inconsistency in status update practices between different departments causes a situation where the editorial employees are not aware of their current and future tasks. This further supports that even though morning meetings and group e-mails attempt to solve coordination and resource management issues, there is still room for improvement on this area.

Another participant reported that external sources, i.e., police departments, witnesses, and the like, often express frustration because NRK’s editorial employees, the TV department, the radio department and district offices contact these external sources for the same matters, multiple times, and therefore act as “internal competitors”, even though they are on the same team in the same organization. This suggests that there are no routines or established practices concerning information retrieval. For instance, “if there’s been a stabbing … one can experience that a ‘DK’ [district office] is unavailable for coordination because they are on the phone with the police already. This is something one should clarify before the process [information retrieval from external sources] is started”.

One participant reported that the available tools for incoming tips are not being utilized in full. NRK has a system, called the “News Center”, that receives tips being sent in from the public, and press releases from external sources. This is a great

resource that initially was intended to collect and show potential news articles that could then turn into a news articles, so that NRK's website could be up to date. However, the participant reported that this system is not being used because there are no available resources to operate and delegate these incoming cases. For instance, "Everything there is being controlled by an editorial office assistant, with a hundred other messages that requires action … 20 minutes after you've been notified by your colleague, you get an e-mail from the tip reception". The participant further explains that a useful way to utilize this functionality is to delegate a tip or press release to "which DK [district office] and which editorial office should work on the case … however, this requires someone to manage the tip reception on a full-time basis". This further supports this research's previous findings, that the editorial employees experience to not be up to date on tasks and that a project management tool, or similar solutions.

7.3.2.6 Pressured by Time

The findings suggest that the editorial employees experience a great deal of pressure by time. One can argue that this should not be considered a barrier, per definition, because it is in the nature of the journalist profession (McNair, 2009). However, it is still a valuable finding that helps to shed light on how the environment affects the journalists.

The findings show that the editorial employees are not able to make finishing touches on their work, that the work environment is in general stressful, and that the workload is too great for it to be useful as a result of the high time pressure. One participant stated that "the time pressure is definitely something that affects the content, especially on the desk where first priority is to publish articles quickly … This is critical for the content unless you are somewhat knowledgeable on the topic that's being reported on".

Interestingly, one participant reported that "one does not have time for the finishing touches, and are therefore forced to go with a quick, sometimes 'dirty' solutions … instead of altering layout or content to the better". This supports the previous statements and suggest that the journalists may feel overwhelmed as a result of high pressure by time and the number of tasks they are expected to do.

7.3.3 Technological Barriers

7.3.3.1 General Findings

The majority of the participants expressed that PP has become much better as a CMS than it used to be a few years back. Four participants reported that technical errors and that PP was unstable previously. Most of the participants reported that they used PP every day, and more often than not multiple times a day. This is not a surprising result, considering that it is the main, and only, tool that publishes content on NRK's website. The majority of participants use PP for desking articles. Desking is a process that prepares an article for web publishing, e.g., revise grammar, simplify language, add images, videos, fact boxes and so on. One participant reported that it is also possible to publish short news messages through PP, much like a news bulletin board.

Another participant reported not to have a lot of previous experience with other CMSs, so it would be difficult to compare anything to it. Another participant reported that it experienced some bugs and errors in PP from time to time.

7.3.3.2 Button Placement

Two participants reported to utilize the built-in "on hold" functionality that saves the article progress which can be resumed at a later time. The functionality does not publish the article, which makes it possible to re-visit at a later time. However, one of the participants reported to quite often accidentally pressed the publish-button instead of the on-hold-button, due to the fact that the buttons are so close to each other that it's often difficult to tell them apart. Figure 7.14 provides a screenshot of the current position of the buttons.

Figure 7.14 The "On-hold" button and the "Publish" button have no graphical distinctions and are close to eachother. This causes the participants to misclick and by doing so perform unintended actions.

7.3.3.3 Use of External Text Editors

One participant reported write the article in a separate text editor, in this case Microsoft Word, and pastes it into PP when the text is ready. The reason for this was not specified.

This usage pattern may make it difficult for the CMS to promote and guide the editorial employee towards making accessible content, as there is no way to know to what extent external applications already do this.

7.3.3.4 PP is Complex, Slow and Sometimes Unreliable

6 of the 7 participants reported that PP is a complex functionality-rich system to work with. It has “a lot of buttons”, “input fields and functionality that’s not being used”, and it is “an intricate system that is time-consuming, especially noticeable when I’m in a time crunch”. One participant reported to usually see the system as a “jenga tower”, in the sense that a lot of functionality and tweaking have been added over the years, and that it is not easy to clean it up without possibly making the “tower” fall over.

Another participant reported that it had gotten used to “find workarounds, because it is a work tool” and that it had forgotten about the things that does not work. Another participant shared this technique, and reported that it helps after using it for some time and by “befriending the system”.

7.3.3.5 Incompatibility with Keyboard Shortcuts

Two participants reported frustrations over that fact that they were unable to utilize keyboard shortcuts, that they would frequently use in other programs, especially the keyboard shortcut for saving. However, an even larger issue, mentioned by both participants, was that if the editorial employee pressed the back space button when not in a text area, it will activate the web browser's functionality for backspace, which is to go back one page in the browser. Since there is no auto-saving-feature in PP, this leads to a consequence of losing all progress made in the article. This means that the participants are then forced to enter all textual content, title, excerpt, images, videos and other content once more. One participant reported to have gotten a habit of saving, or putting on hold, an article in progress as a result of this behavior. In combination with the on hold button being similar and close to the actual publish button, this leads to unwanted behavior that steals precious time (McNair, 2009), from the already compromised time, from the editorial employees.

7.3.3.6 Extensive View Switching

One participant expressed confusion and disturbance in daily tasks when being forced to switch between all the different views multiple times per article creation. Some of the different views are video, image and information box search and various import views. The participant stated that "if you had the possibility to stay in the writer view and not always be thrown out of it, it would be much better [time-saving]".

7.3.3.7 Participant's Suggested Improvements

The interview guide included a question where the participants could suggest improvements in PP that could improve their efficiency in the daily or common tasks. Most of the tasks are characterized as time-saving for the editorial employees, and some targets solutions to the identified barriers, mentioned in the previous section.

7.3.3.8 Auto-save Feature

One participant suggested that an auto-save-feature would be tremendously useful to tackle the challenge of losing work as a consequence of using incompatible keyboard shortcuts or pressing backspace in the web browser.

7.3.3.9 Print or Send Article Preview to External Sources

One participant reported that it would include a feature in PP that enabled it to print to PDF, or send a safe-URL to the preview of an article, to e.g., external sources, editors in chief, or other colleagues. This was suggested to save time on copy-pasting work into e-mails to verify details, layout or overall content before publishing. This would also solve the problem of images not being available to copy and paste into e-mails.

Another participant reported that a direct-import of news messages, including its metadata, images and so on, from external news sources would be time-saving. Today, the editors have to copy-paste text, images and metadata into PP from external sources, although the published work is not presented as NRK's creation. Therefore, it makes much more sense to, e.g., enter an external news entry's ID number into PP.

7.3.3.10 Include More Results in Article and Image Search

One participant suggested that the article search in PP, when connecting short news messages to already published articles, could include more results at a time. Short news messages are required to be connected/linked up to an existing article on NRK's webpage. This is to extend the functionality of short news messages. When creating a new short news message, an editorial employee will search for an article by titles, categories, "Saksunivers", or occurrence in the main text. This search shows the chronologically latest ten articles per page, giving the user the ability to go to next or previous page. This seems to work in some cases, but as the participant expressed, "if you're trying to find an article from last week, you have to click next pages for half an hour", that suggests that the editorial employee could benefit from more search results per page. The participant also reported similar issues when searching for images, where PP only provides the user with five results per page. The participant reported that finding images to articles where too time consuming, and that "I often use Googles site-functionality to find images on NRK".

7.3.3.11 Direct import of News Messages and Images from External Sources

Two participants reported that a feature to import images, included metadata, directly from external news and image sources, e.g., Scanpix, would be immensely time-saving. One of the participants explained the workflow of adding images to an article as “when you’ve found a picture on Scanpix, you first have to save it on your computer, import it into PP, write metadata, and choose picture cropping. A direct import of these images would feel more efficient”.

7.3.3.12 Support for 4:3 Video Format

One participent reported that the support for a 4:3, i.e. portrait mode in smart phones and tablets, should be supported. In addition to the support in format, the participant suggested that auto-play without sound (possible to turn it on by clicking) and in-article play, i.e., not being forced to press a button and fill the mobile screen with video (much like Facebook and Instagram), would be a good addition to the functionality of web pages.

7.4 Identified Document Data

The findings from the qualitative interviews, on-site observation and field notes regarding internal and external guidelines suggests that there is, in fact, no internal, formal, documents, policies or guidelines concerning web usability, accessibility or universal design. This research has neither been able to identify such a document. However, four of the seven participants report to contain knowledge about the “Blåbok”. The remaining three participants did not mention this document, but one can assume that these participants are familiar with the document, but just did not think of it in the context of usability, accessibility, or universal design, and therefore did not mention it. Another participant stated that “The document [“Blåboka”] is fairly easy to understand, the challenge is to remember all of it”.

7.4.1 Blue Book

“Blåboka” will hereafter be referred to as The Blue Book, and abbreviated as BB.

Most interestingly, the Blue Book does not contain any reference or mention of neither how to benefit disabled users, nor any of the terms usability, accessibility or universal design.

The Blue Book, in addition to its supplemental PowerPoint presentation, contains rules and guidelines regarding how textual content and multimedia should be incorporated into news and in-depth articles. It also contains grammar rules and punctuation rules. This document was seemingly created and periodically edited by the organization board. The document is not allowed to be republished in this thesis, but a detailed description of the document follows.

The main goal of BB is to introduce and enforce the online news article format to better address the fact that the articles on NRK's website is not being read in full, that many of the articles are not sufficiently rich on content and format, and finally to assist chief editors in delegating resources. The online news article format has, however, some exceptions: articles from external sources, events in progress, when there are academic reasons to not use the format, during experimental writing, and in comments or letters.

The document further introduces the four main formats being user, XS, S, XL and List format. As supported by interview participant 7, the word limit for the formats are 250, 450, 1000, and 3-5 bullet points, respectively. The document then proceeds to explain the different formats in-depth, and when and how to use the different formats. These formats are not relevant for this research, and will not be explained in detail.

The document then lists some quotes form different parts of the organization, sharing experiences and results of how the different formats, and its requirements and limits work. These experiences are not relevant for this research, and will not be explained in detail.

The Blue Book comes with a supplemental PowerPoint presentation, that one can assume is used, or at least has the potential for being used, for training purposes over a medium to large group of editorial employees. This was, however, not made clear in the data collection. The presentation gives guidelines on how to prepare for,

compose and execute a news article. The presentation proceeds to introduce guidelines on how to write a title, quote titles, excerpt, dateline (used when reporting outside of the office), main text content; images, videos and image descriptions. Further it guides how and when to use fact boxes, quotation marks, and links. The presentation follows to introduce check-lists when writing a news article.

In summary, it is evident that content to inform the readers on matters concerning accessibility, universal design and the like, has a small share of the total content of the Blue Book and the supplemental presentation. In the presentation, only 2 out of 42 slides contains information about image descriptions, and the Blue Book itself contains no mention of image descriptions or other accessibility related content.

7.4.2 E-mail Regarding Image Descriptions

Interestingly, there seem to be one informal document regarding accessibility and universal design in the form of a group-e-mail. All of the of the participants explains that they have, earlier and periodically, received a group-e-mail from the organization to change their practice on how they input image descriptions in articles to benefit visually impaired users using screen readers. All of the participant explains that this e-mail required them to enter description that is more related to the actual image contents and the context of which the image is in the article.

7.4.3 NRK Policy

When NRK was established, the Parliament of Norway made a legal document named The Statutes of the Norwegian Broadcasting Corporation (Vedtekter for Norsk rikskringkasting AS, 1996). This legal document contains the structure of NRK, the organization's mission, constraints and what content it should report on.

Section 3 of the NRK Policy outlines NRK's goals concerning all of the organization's services and products, and is often called "NRK-plakaten" by the organization itself. This section is publicly available on NRK's webpage and is found throughout the building where the research for this thesis was conducted. In this section, paragraph 13 states that "NRK should be accessible to the public", and that "NRK should take disabled people into consideration". This can directly relate to accessibility and

universal design, as well as textual content, closed captions and reliability and freedom of choice. Further, section 12 reports that NRK should promote democracy, section 14 reports that NRK should promote Norwegian culture and heritage, to bring out a few points. This amplifies the importance of NRK being accessible and universally designed, so that the whole population of Norway can participate in democratic debates, be reminded and build understanding of one's heritage and culture among others.

7.5 Additional Themes Outside Interview Guide

7.5.1.1 The Spearhead Project

One participant reported that NRK started a project a year ago, that is still active, called "Spydspissprosjektet", or translated as the "Spearhead project". The participant explained that the project is an attempt to improve efficiency regarding testing and implementing new, innovate editorial features. The motivation for the project was that the organization have for some time struggled to keep up with other competing news organizations' on staying "up-to-date" with editorial features, because of the organization's size that the fact that testing and implementing new features has traditionally been done by a separate management group, which has proven to be slow and ineffective compared to technology development rate. The project structured an employee, or a small group of employees, in each editorial office that would have the responsibility to test out new editorial features. An example of an editorial feature that has emerged from the project is the format and use of social media videos. The participant reported that the social media videos have become an established routine across multiple editorial offices, including Sport and Foreign Affairs, and that the videos have been frequently used in TV broadcasts – which the participant expressed as a surprising development. The participant further stated that "this is an indication the the project has been successful, in contrast to something similar being forced onto us [the editorial employees] from above as a strategy or resolution".

However, as a part of the project, the participant expresses that the project poses challenges related to lack of time, resources, and collaboration with other editorial employees. The participant explained that it on several occasions found it difficult to

know where to start, how to do it, or who to involve when testing out and implementing new editorial features. In addition to the uncertainty related to testing out and implementing new features, the participant reported that the responsibilities given from the project comes on top of the regular work, and that it “gets overshadowed by existing responsibility”. This is a clear indication that the project does not allocate sufficient resources and focus.

The participant explains that these videos currently are inaccessible to users on NRK’s website, because they are only a part of full TV broadcasts that are published on NRK’s TV section, hours after the original TV air date. The participant stated that, even as an employee of the Culture editorial office that has made the video, the participant is forced to wait until the TV broadcast is indexed and published on NRK’s TV section before the video is searchable and available. Because of the success and the established, cross-platform use of these videos and the current inaccessibility of the videos on NRK’s website, the participant suggested that the social media videos should be available from NRK’s website as a separate content section, in contrast to being a part of a TV broadcast, so that the user’s could navigate the videos and consume the content more efficiently.

The participant further explains that the social media videos, which includes text, supplies to the demand from the users to not be dependent of audio to consume the content. Interestingly, the participant stated that “this is useful for users in gyms or other situations where audio is not available, as well as for universal design and deaf users”.

8 Discussion

8.1 Revisiting the Aims of this Research

This research uses NRK as a case study to gain insights on any causal relationships between organizational barriers and achieving UD in practice. With institutional theory as a framework, this research attempt to explain the creation and perpetuation of these barriers. Lastly, theory on institutional change is used to assess how the barriers can promote change in the organization in context with universal design of web content in practice.

The introduction to this thesis stated the research question as this: How do organizational norms, values, and procedures influence Universal Design in practice?

- How do social institutions inhibit or constrain organizational change?
- How do social institutions act as a basis for promoting Universal Design in practice?

The results from this research suggest that the observed organizational barriers, as a part of the social institution NRK, inhibit the achievement of universal design in practice. Specifically, we see that the editorial employees at NRK show scarce awareness toward accessibility and universal design. Further, this research suggests that organizational structure and practices does not facilitate for promotion of universal design. Also, the lack of policies or documents regarding accessibility that the participants explained, does not promote accessibility or universal design to the employees at NRK. Lastly, there are several barriers that the participants have experienced that is time-consuming, which is unbeneficial in a profession and environment that the participants characterized as stressful and pressured by time. The results from the research also show that the participants have no additional time to process and edit articles further. In summary, this research shows that there are barriers related to accessibility and UD awareness, organizational structure, policies, practices, and technology that hinder current and future UD in practice of NRK's products. In combination with the heuristic evaluation, one might argue that the barriers have contributed to the failure of compliance.

8.2 Not Fully Compliant with WCAG

In addition to previous research conducted by Sanderson et al. (2015), this research suggests that NRK's website is not fully compliant with the WCAG 2.0 guidelines, which results in the fact that NRK is not compliant with the existing national regulations for universal design of ICT in Norway.

8.3 Not Fully Compliant with ATAG

Previous research presented in this report shows that the content management system Polopoly is not compliant with the ATAG 2.0 guidelines. It is highly recommended that authoring tools comply to these guidelines for increased accessibility in the created content (Treviranus, 2008). Further research is still needed on how the authoring tool, rendering tool and connected applications influence the created content on NRK's website, as it was not addressed properly by this research.

8.4 Identified Barriers

The barriers identified in this research are grouped into three main barrier groups: awareness barriers, organizational barriers and technology barriers. This grouping is necessary to address the origin of the barrier, and to indicate a clear direction to resolving the barrier.

8.4.1 Awareness Barriers

This research suggests that the editorial employee's awareness towards universal design is scarce, neither are they informed through training. However, it seems that the participants explain universal design more as accessibility for disabled people, product compatibility, computer experience and legal requirement. Further, this research suggests that the awareness and knowledge about the national regulations in Norway is little to non-existing, and that very few of the editorial employees take distinct accessibility considerations into account when creating articles. These factors result in barriers that makes if difficult, or to the greatest consequence impossible, for the editorial employees to know what, how, when and where accessibility considerations should be taken.

8.4.2 Organizational Barriers

This research suggests that the structure of the organization creates barriers for the editorial employees and inhibits their ability to communicate and collaborate internally. The research also suggests that it is difficult for the editorial employees to get an overview of tasks, in addition to responsibility with high-level decision makers. The research also suggests that the editorial employees are under a lot of time-pressure and has little to no extra time to put into processing articles. This might not work in favor for creation of accessible web content.

8.4.2.1 Document Data

This research suggests that there are no formal policies, documents, guidelines or the like internally in the organization. This results in decreased awareness hinders the improvement and perpetuation of accessibility on NRK's website. This is highly recommended by previous research (Lazar et al., 2015). There is, however, one document that all the participants were familiar with, although this document does not address any aspects in regards to increased accessibility or universal design.

8.4.3 Technology Barriers

This research, in combination with previous research, suggests that NRK's CMS is not compliant with the ATAG 2.0 guidelines and therefore do not guide the editorial employees towards increased accessibility or universal design (Kessel et al., 2014). Further, this research suggests that the content management system is highly complex and user-unfriendly. It also shows that the CMS is incompatible with commonly known, and used, keyboard shortcuts, has poor button placement, slow and cumbersome search features, and that there is an extensive amount of integrated applications that are unreliable at times. These factors contribute to content loss, unwanted actions, a need to use external applications that originally is not required and inefficiency. These outcomes are expressed to create disturbance and demotivation with the editorial employees, and the outcomes do not promote or ensure creation of accessible content on NRK's website.

That being said, the main technology barrier that hinders the editorial employees to create accessible content is without question that the CMS does not assist or guide

the editorial employees to do so. This research, in addition to previous research on the area (Treviranus, 2008), therefore recommends to make PP compliant with the ATAG 2.0 guidelines.

8.5 Social Institutions Observed at NRK

Social institutions are defined as social organizations, where the containing rules, norms, values, and practices validate and drive individual and social behavior in the organization (March & Olsen, 2006). A group, regardless of the size, with shared values, norms and practices can be viewed as a social institution. This research views NRK as a social institution with containing members, values, rules and practices. This enables the results to apply to not only NRK, but also to other social organizations, e.g. businesses or organizations, as well.

This research focuses on how NRK can achieve universal design of their website in practice. The results from this research suggests that the lack of awareness, knowledge and perceived responsibility on UD, i.e., norms and values, affect the practices performed when publishing content to NRK's website by not taking UD or accessibility considerations when creating web content. Language and readability of textual content is, however, an exception. In other words: the editorial employees that publishes content to NRK's website can be seen as members in the social institution. The actions taken toward increased user accessibility when publishing content to NRK's website can be seen as one or many practices in the institution. The knowledge about UD and accessibility, and the way that NRK does not promote or facilitate this knowledge, can be seen as the values and norms in the institution. The policies and initiatives to promote and ensure UD for the editorial employees can, naturally, be seen as the policies in the institutions.

8.6 Recommendations for NRK as Institutional Change

This research uses theory on institutional change, specifically institutional layering, to answer how NRK as an institution, including its containing barriers, member, policies, and practices, can change to promote UD in practice. See Section 9.2 for a detailed list of recommendations. Institutional change is defined as a change in the values, norms, and practices that constitute an institution. This change is caused by either

internal or external factors. This research has observed that a combination of internal stressors, i.e. this research, and external stressors, i.e. the legal requirement and previous research at NRK.

The results from this research also suggest that institutional change have previously occurred at NRK. Specifically, the Spear Head Project changed the practice of the editorial employees when publishing content to NRK's website to not only include textual content, but also a social media video with text captions. This social media video was later used in other disciplines at NRK, for instance in a TV broadcast. As a consequence of this institutional change by the Spear Head Project, the editorial employees have now employed the creation of this social media video into the norms of their social institution.

This research recommends intuitional layering as the main mode of change at NRK. Layering is a mode of institutional change that achieves "gradual institutional transformation through a process in which new elements are attached to existing solutions and so gradually change their status and structure" (Van der Heijden, 2011). In other words, the change in an institution is manifested through adding rules, values, norms and practices on top of existing ones (Mahoney & Thelen, 2010; Streeck & Thelen, 2005). For example, if a group of people introduce a shared calendar to keep each other updated on the other people in the group, they add, or layer, the practice of a shared calendar onto existing norms, values and practices that already exist in the group of people, i.e. the institution.

This research recommends layering in favor of the other institutional modes for change for three reasons. The first reason is that, conceptually, layering is useful because "... the new layers created in this way do not … directly undermine existing institutions, [and therefore,] they typically do not provoke countermobilization by defenders of the status quo" (Streeck & Thelen, 2005, p. 23), where the other institutional change modes, i.e. conversion, drift or displacement, may introduce more sudden shifts or major changes. The second reason is that the results from this research suggest that layering has been a successful mode of institutional change in the past through the Spear Head Project. This institutional change can be considered layering because the Spead Head Project added additional practices on top of

existing practices in the social institution, and is per definition an act of layering. The third reason, as suggested by Campbell et al. (2001), is that layering is suitable to explain why a gap between an institution's intention and actual outcomes exists.

The recommendations for NRK are mostly layering in the way they layer new practices and policies onto the existing practices and policies at NRK as an institution. Take the recommendation to assemble a UD Unit in each editorial office, see Section 9.2.4.4, as an example. This recommendation layers a new team of accessibility and UD specialists on top of the existing practices connected to publishing content to NRK's website, and is per definition institutional change through layering (Mahoney & Thelen, 2010). As a result of this, the editorial employees, shift-leaders and editors in-chiefs are not directly affected by this change, and will therefore not be introduced to new practices. One can however argue that the editorial employees will change their values and practices as a result of this institutional change through layering over time, which is true for institutional change in theory (Mahoney & Thelen, 2010). This development would be extremely beneficial in the way that the editorial employees would also feel responsible for creating accessible and universally designed content for their users.

The data collected, and recommendations made from this research gives us empirical data that can be used to confirm the assumptions made from the theoretical framework, in addition to further extend these assumptions onto different areas that have not yet been explored in institutional theory, i.e. achieving UD in practice. The results from this research may also apply to other institutions than NRK, e.g., businesses and organizations.

This research suggests that the barriers in NRK as an institution, inhibits change towards achieving UD in practice. The research also suggests that, through applying institutional change theory, NRK can overcome the barriers that exist in the institution through institutional layering. Layering may change NRK and its employees as an institution towards promoting, ensuring and achieving UD in practice.

9 Conclusions and Recommendations

Section 9.1 presents the conclusions that can be made from this research. Section 9.2 presents concrete recommendations for NRK to resolve the barriers identified in this research.

9.1 Conclusions from the Research

This research presents the importance of accessibility and universal design in ICTs. Organizations can effectively prevent user discrimination and will receive an increased and diverse user base of their products through proactively working towards increased accessibility and universal design of ICTs.

This research uses NRK as a case study to gain insights on any causal relationships between organizational barriers and achieving UD in practice. With institutional theory as a framework, this research attempt to explain the creation and perpetuation of these barriers. Lastly, theory on institutional change is used to assess how the barriers can promote change in the organization in context with universal design of web content in practice.

This research had three main aims: One aim was to extend previous findings from (Kessel et al., 2014) and (Sanderson et al., 2015). The other aim was to investigate how organizational barriers affect NRK's ability to achieve UD in practice. The third aim was to resolve the identified barriers to enable NRK to promote, ensure and achieve UD in practice.

The introduction to this thesis stated the research question as this: How do organizational norms, values, and procedures influence Universal Design in practice?

- How do social institutions inhibit or constrain organizational change?
- How do social institutions act as a basis for promoting Universal Design in practice?

This research has collected data from the employees at NRK through a case study. One on-site observation, seven semi-structured interviews and document data collection have identified the barriers that exist in the organization, that hinder the

employees from creating universally designed content. These barriers are categorized into awareness barriers, organizational barriers, and technology barriers. This categorization addresses the source of the various barriers. The theoretical framework used in this research suggests that there is in fact, a causal relationship between the identified barriers and NRK's inability to achieve UD in practice. This framework also allows the findings and recommendations to apply to other institutions, i.e. other businesses and organizations. Through theory on institutional change, this research can give concrete recommendations to NRK in order for NRK to achieve UD in practice.

Section 9.2 will give concrete recommendations for how NRK should move forward to break down the barriers that their editorial employees face, and in turn promote, ensure and achieve UD in practice.

9.2 Recommendations for NRK

This section presents recommendations for NRK to increase and ensure accessibility and universal design of their products. The recommendations are presented as proposed solutions to the barriers identified by the research.

9.2.1 Resolving Non-Compliance with WCAG 2.0

9.2.1.1 Text Alternatives (1.1.1)

This research recommends to further develop the image description input in the CMS, although the first, and simplest step, is to change the label of the field. Instead of being forced to send group e-mails frequently, a label change for this input field would always remind, and assist, the editorial employees what they should write as an image description, and why this is important (for users with ATs as an example).

Further, to increase the relevancy in and the users' experience of the image descriptions, editorial employees should be made aware of where the description occurs, and how it affects the users through the input field labelling. In addition to this, there should be a way for the editorial employees to flag an image, in the context of an article, as a purely decorative image. Further, these images with the decorative image flag, should then be rendered with a blank alternative text, so that

assistive technologies skip these images. This label should also be in a similar manner as for the general description field, so that the editorial employees know why this is important for the users.

9.2.1.2 Distinguishable (1.4.1)

The element for latest news should be programmatically identified as important instead of only relying on color to provide relevancy/context. Although there are many ways to separate important elements from a list of elements, a solution that does not alter the graphical or textual appearance is recommended. This can be achieved by using the aria-label attribute. This attribute provides the user with additional information about an element as defined in W3C's Techniques and Failures for Web Content Accessibility Guidelines 2.0 (World Wide Web Consortium, n.a.-b). The aria-label attribute supports any textual value, but this research recommends that "important" is the value of the aria-label attribute. The value could also reflect the class name "emphasis-high" that the element has, although this may seem confusing and irrelevant. See Code Block 9.1 for a full example.

```
<li aria-label="Important" ... class="stream-item relation
newsroom-seen" ... ... ...>
    <article class="teaser widget rich emphasis-high bulletin"
... data-timestamp="1463428941000" ...>
...
```

Code Block 9.1 An example of the use of the aria-label to create invisible labels for ATs

9.2.1.3 Contrast (1.4.3)

This research has shown that the orange color scheme found in Ytring (Opinions), and action links throughout the selected pages provide insufficient contrast between foreground and background colors. To achieve sufficient contrast to comply with WCAG guideline 1.4.3, the orange color should be altered to #BD5A01 for level AA or #874000 for level AAA compliance. The action links should be altered to #717171 for level AA or #565656 for level AAA compliance.

9.2.1.4 Keyboard Access (2.1.1)

To enable assistive technologies to identify and start video and audio content on the selected pages, the HTML element containing the play-button should be changed from a div element to a programmatically clickable element, for example an anchor-tag. This will ensure that assistive technologies identify and are able to operate on the element to start the video. Further, the link should be provided with a descriptive title-attribute, for example “Play <video name>”. A full example of this can be seen in Code Block 9.2.

```
<div class="video-hud video-ready">
  <div class="video-status video-player-state-ready video-
playable video-play">
    <a href="#" title="Play Dagsrevyen 12.03.15" class="video-
loader"></a>
  </div>
  ...
</div>
```

Code Block 9.2 An example of a video's play-button using an anchor-element so that ATs can operate this button

9.2.1.5 Link Purpose (2.4.4)

This research shows that action links and author Twitter account links do not provide sufficient context for the link. Therefore, it is recommended that the action links include the action, e.g., read, read more, listen, watch, in the title-attribute of the link. For example, if one is to read more about a specific topic, the title-attribute should be “Read more: <link content>”. As for the authors’ Twitter account links, these links should provide the context in the links title-attribute, e.g., through a title like “Go to <author name>’s Twitter account” or the like.

9.2.1.6 Focus Order (2.4.3)

This research shows that the focus order in articles’ full-view is illogical when navigating with assistive technology. Therefore, it is recommended that metadata containing supplementary content and social media sharing buttons are placed in an aside tag. This ensures that these metadata appear after the actual article, as it is

logical for a user to wish to read more, or share the article on social media after the article is read. It is still recommended that author names and publish date appear before the article content to provide sufficient credit to the author, and to let the user know when the article was published.

9.2.1.7 Unusual Words (3.1.3), Abbreviations (3.1.4), Supplemental Content (3.1.5)

This research shows that there are no mechanisms to define or clarify unusual words, abbreviation, jargon, pronunciation of words or supplemental content, except for the fact box.

However, the fact box which is included on many articles containing unusual or difficult language, should be reachable for the user directly from the article text, and not after the article. It is therefore recommended that the first occurrence of the word or concept should include a link to the fact box through the fact box's id-attribute. This link should also include the aria-describedby attribute, with the value of the fact box id to ensure that ATs can interpret the context of the link. Further, the fact box should include a link back to the content at the end of definitions, explanations or what the fact box reports on. This way, the user can navigate to the definition or explanation of the word or concept when the word or concept is introduced, and then navigate back to the content when the user has read the definition or explanation. See Code Block 9.3 for an example of this.

```
<p>Therese har <a id="fact-box-callback" href="#fact-box-
header-id" aria-describedby="#fact-box-header-id" title="Les
fakta om Ehlers Danlos Syndrom (EDS)">Ehlers Danlos syndrom
(EDS)</a>, som gjør at huden kan ... </p>
```

Code Block 9.3 An example of the use of internal link from the technical term to the fact box content. Also notice the aria-describedby-attribute that assists ATs to interpret the element.

```
<aside class="fact widget brief fact-collapsed lp_fact " ...>
  <span class="fact-border skin-background"></span>
  <h3 id="fact-box-heading-id" class="title fact-title">Ehlers
Danlos syndrom (EDS)</h3>
  <div class="fact-body text-body">
    <ul>
    ...
    <a href="#fact-box-callback">Back to text content</a>
  </div>
</aside>
```

Code Block 9.4 The fact box heading has recieved and ID-attribute that is reachable from the link in Code Block 9.3

Another recommendation to further improve article readability and comprehensibility, especially for those with cognitive disabilities, is to include a plain language alternative to article texts. This should ideally be placed before the article content, right after the heading. This way, the users can skip the full-content, including images and metadata. This input field should assist and guide the authors to input an easy-to-read summary of the whole article. It might not be effective to constrain the word count for this summary, but an integration and continuous feedback from a readability formula might be effective to measure this fields readability. This research recommends to integrate this feature instead of making the authors accessing it externally, in order to not further contribute to context changes. The previously mentioned readability index LIX shows little indication of being valid in research. However, previous research shows that the Dale-Chall formula is a valid and reliable readability formula (Begeny & Greene, 2014; Benjamin, 2012). If the editorial employees feel that this takes too much time, this task can be easily made a responsibility for the universal design team in the editorial office, see Section 9.2.4.4.

Abbreviations should be marked as such in the CMS, and the author should provide the unabbreviated version in the CMS. The abbreviation should further be rendered with the HTML 5 abbr-element (World Wide Web Consortium, 2012b). This ensures that assistive technologies convey the unabbreviated version of the word to the user. An example is provided in Code Block 9.5.

```
<p>The <abbr title="Content Management System">CMS/abbr> is
getting better.</p>
```


Code Block 9.5 An example of the use of the abbr-element with the unabbreviated version in the title-attribute

Further, unusual words should be marked as such in the CMS, and rendered with the dfn-element (World Wide Web Consortium, 2011). This ensures that assistive technologies convey the definition of the word to the user. An example is provided in Code Block 9.6.

```
<p>The <dfn aria-describedby="#def">Internet</dfn> is a great
place</p>
<p id="def">Internet is a web of nodes ...</p>
```

Code Block 9.6 An example of the use of the dfn-element. The aria-describedby-attribute is here used to let ATs know where the definition is located. The definition can also be visually hidden, or linked to a fact box

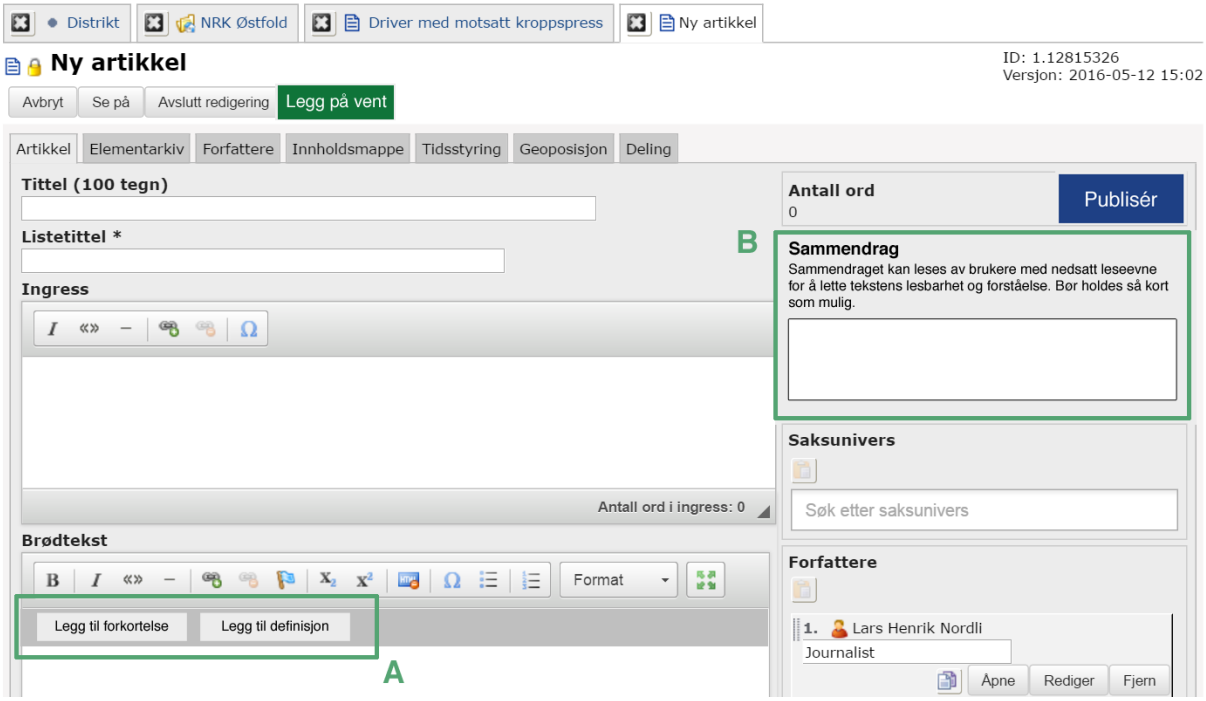


Figure 9.1 An example of implementations of a plain language summary input box (B) and possibility to add abbreviations, with unabbreviated version, and unusal words, with a definition.

9.2.1.8 Focus Visible (2.4.7)

All elements that are navigable should have a clear focus indicator, which can be provided through the CSS definitions of NRK's website.

9.2.1.9 Location (2.4.8)

A breadcrumb trail should be visible to the user at all times, unless the user is on a top level page, e.g., section home page. Breadcrumb trails has a long history of success with user satisfaction (Nielsen, 2007), and is in addition recommended as a technique to meet success criterion 2.4.8 by W3C (World Wide Web Consortium, 2012a). This is most applicable for articles' full-view. One can argue that there are both links to the front page, and the section in which the user is reading an article, but it is not in a breadcrumb trail fashion, and might therefore not be recognizable as a breadcrumb trail. Figure 9.2 illustrates recommended position of the breadcrumb trail. Programmatically, the breadcrumb should be rendered in a nav-element, with role-attribute navigation, and should occur as the first element in the content flow. Further, all elements in the breadcrumb trail should be implemented as links, except for the current page which should be implemented as plain text, through e.g. a span-element.

Figure 9.2 A suggested position and implementation of a breadcrumb trail to inform the user on its location at all times

9.2.1.10 Compatibility (4.1.1, 4.1.2)

This research in combination with previous research (Lazar et al., 2015), recommends to continuously evaluate NRK's website to be compatible with ATs through user testing, expert evaluation or automatic accessibility tests. A list of recommended accessibility checkers are provided through W3C's Accessibility Evaluation List (World Wide Web Consortium, 2016b).

9.2.1.11 General Findings

Blockquote elements that appear in the article text should use the cite-element in favor of the small-element. This will provide semantic HTML and correct syntax, which in turn assists ATs with interpreting textual elements correctly.

The fact box, mentioned in Section 7.1.1.9, should provide a link to the original content source, and should be contained in a cite-element. This enables the user to further explore what the fact box reports if the fact box does not provide sufficient information.

9.2.2 Resolving Non-compliance with ATAG 2.0

Although this research is unable to provide specific drivers and underlying technical reasons, and thus remedies, for PP not complying to ATAG 2.0, research presented in this research by Kessel et al. (2014) shows that PP fails on all ATAG 2.0 B criteria.

Therefore, this research recommends NRK to prioritize implementation and alterations of features in PP that will assist editorial employees in creating accessible content on NRK's website. W3C has a public document that provides a guide on how to meet the ATAG 2.0 success criteria (World wide Web Consortium) and is recommended to be read and understood by those who are responsible for development of PP, e.g. developers, testers and other applicable actors.

9.2.3 Resolving the Awareness Barriers

9.2.3.1 Increase Awareness and Knowledge with the Employees

This research shows that the editorial employees' claim to be familiar with universal design, although their definitions vary and some of them are incorrect. In addition to this, the editorial employees have not received any formal or informal training regarding accessibility or universal design. Lastly, the research shows that the editorial employees feel that accessibility and universal design is not their responsibility, but that technology and developers are the ones responsible.

This research recommends that all the editorial employees receive formal training regarding web accessibility and universal design, so that they will gain increased knowledge and familiarity. In addition to that, it is important that the editorial employees know that accessibility and universal design is every employees' responsibility, including the editorial employees. The distribution of knowledge and awareness can easily be layered onto existing processes, namely the compulsory PP

course that all editorial employees must be a part of. Representatives in the organization can be used to inform the employees of the concept, or UD advocate organizations, like Funka (Funka, 2016) can be hired to educate the editorial employees on responsibility and practice with the editorial employees. Alternatively, the UD unit, see 9.2.4.4, can in the future inform the employees in the PP course for a more cost-effective option. The responsibility for accessibility and universal design should also be reinforced through internal, formal policies, see Section 9.2.4.1.

9.2.4 Resolving the Organizational Barriers

9.2.4.1 Create and Enforce Internal Policies

This research shows that there are no internal documents, policies or guidelines that address accessibility and universal design. The policy that is the most closely related to these concepts is the NRK Policy Section 3 (NRK-plakaten, 2012), which has a very general goal and very few of the editorial employees are aware of this policy.

Therefore, this research recommends NRK to layer focus on accessibility and universal design onto the existing Blue Book document, which all of the editorial employees are aware of, and that all new employees are introduced to.

In addition to this, this research recommends NRK to create specific accessibility plans for the organization (Lazar et al., 2015), and specific accessibility policies for NRK's website and all future products (Harrison, 2010), thereby utilizing institutional conversion for institutional change.

9.2.4.2 Communication, Collaboration and Physical Structure

This research shows that the editorial employees experience barriers with communication, collaboration and physical structure.

9.2.4.2.1 Adopt "Facebook At Work" as Intranet System

It is evident that the existing tools for collaboration and communication work poorly or not at all. Even though an intranet system does exist in the organization, it is not used. However, it seems that communication and collaboration exist to some extent

through digital communication tools, like Lync, e-mail and through closed Facebook groups.

Therefore, this research recommends to drift away from Lync and the existing intranet system, to adopt a “Facebook at Work” solution. “Facebook At Work” includes user profiles, teams, closed groups, open groups, an integrated communication tool. Most importantly, Facebook is already familiar to and frequently used by the editorial employees. Other Norwegian organizations have reported success with this solution (E24, 2015).

9.2.4.2.2 Adopt a Task Management System

This research shows that the editorial employees often are not updated on the tasks of themselves, other editorial employees or future tasks. This results in multiple editorial employees on one task, or none at all on one task.

Therefore, this research recommends to adopt a project and task management tool, so all editorial employee know what others’ and their own tasks are to any given time, and in the future. Research support that digital project management tools increase team performance (Benson, Johnson, & Kuchinke, 2002; Loo, 1996). These tasks can, as a starting point, arise from the News Center that handles incoming tips and press releases from the public and other news agencies. The tasks can also come from high-level employees or the like. Shift managers or editors in chief, who currently have the responsibility for delegating tasks, should keep this responsibility and rather delegate tasks through this task management tool.

The editorial employees should have three main scopes for viewing tasks and employee responsibility: team scope, editorial office scope, and organizational scope. This ensures that the relevancy of the task management tool does not feel unorganized or difficult to get overview.

This project management tool will eliminate the need for group e-mails, that the editorial employees express is getting lost within the amount of other e-mails they receive during a work day. Unfortunately, there has not been conducted research into which specific task management tool would provide the best results in news

organizations. Some popular task management tools for software development teams are Atlassin Jira, Trello or Wrike, and may be useful in a news organization context as well.

A suggested location of the Task Management System and the News Center in the article publication process is illustrated in Figure 9.3.

9.2.4.3 Assign Area Responsibility to High-level Employees and Decision-Makers

This research shows that the editorial employees often do not know which top-level employees have responsibility on certain matters. This makes it difficult for the employees to eliminate uncertainties and questions that arise in the process of writing articles.

Therefore, this research recommends that top-level employees and decision-makers gets assigned responsibility to various matters as a combination of institutional displacement and layering. Further, this responsibility should be made clear towards the editorial employees, so that they can eliminate uncertainties and get “last-say” on the matters that requires this.

9.2.4.4 Assemble an Accessibility and Universal Design Unit

This research shows that the editorial employees are pressured by time and deliveries, which is a natural consequence on keeping the public updated on recent matters.

As expressed by one of the participants in this research, it may be effective to assign an employee, or a group of employees, responsibility of ensuring and advocating for accessibility and universal design in each editorial office. This unit can easily be layered onto the existing editorial offices. This unit may take responsibility for the remaining accessibility and universal design considerations that the original article authors are unable to take, either in the review stage, or the revision stage of articles. See Figure 9.3 for a proposed positioning of this unit. This unit may receive specialized and additional training in accessibility and UD. Also, the unit can perform ongoing compliance monitoring, accessibility evaluation (Lazar et al., 2015), and act

as contact persons for the editorial employees, or product developers where applicable. This unit can easily become a part of the already, ongoing, and successful Spear Head Project, see Section 7.5.1.1.

This unit will ensure that the editorial employees are not further pressured by time, especially in current, time-sensitive situations, i.e., breaking news, in addition to act as advocates and contact persons. It should be mentioned, that the editorial employees still must be aware of accessibility and universal design of their content. If not, the UD unit will receive too much work and will effectively defeat its own purpose.

A suggested position of this UD team should be placed in the article publication process is illustrated in Figure 9.3.

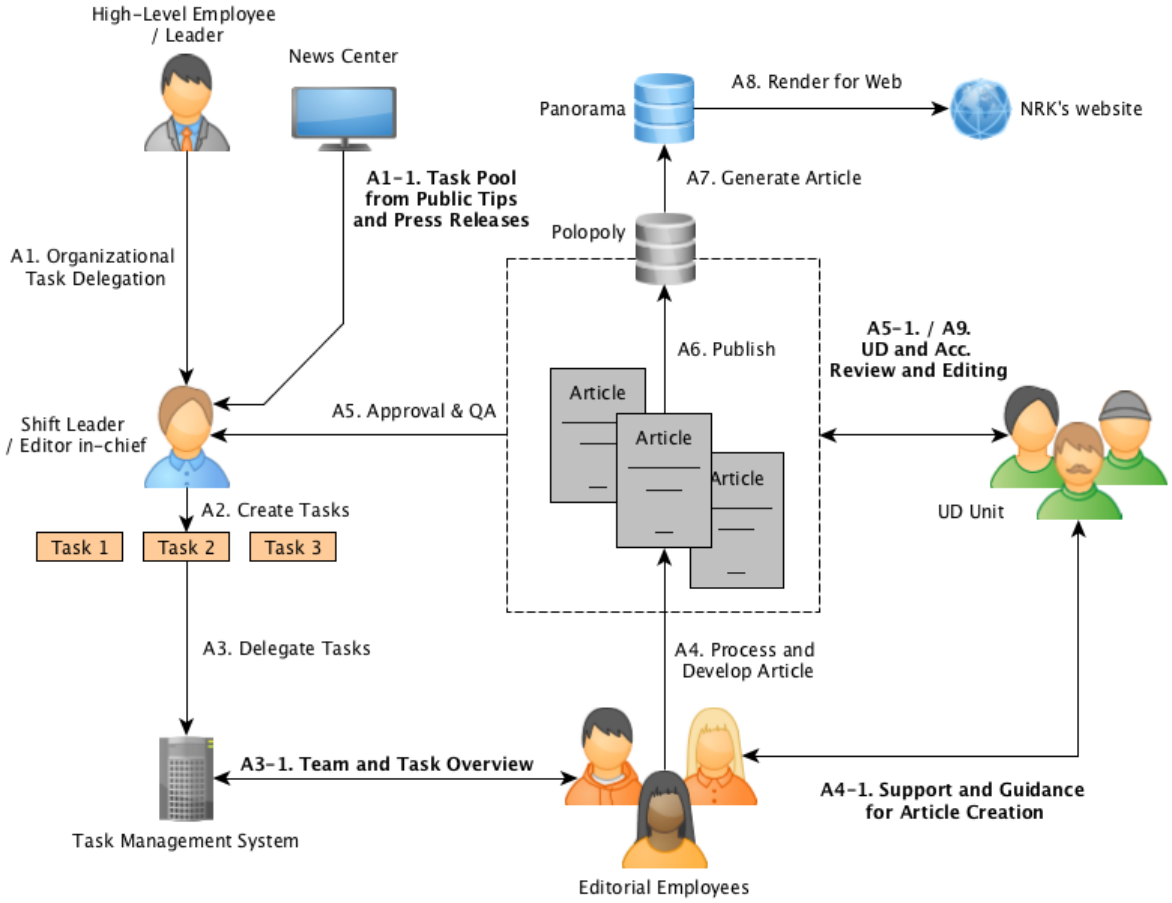


Figure 9.3 Modified Article Publication Process with recommended measures included. News Center, Task Management System, and the UD Unit is additions to original traced process.

9.2.5 Resolving the Technology Barriers

9.2.5.1 Comply with ATAG 2.0 Guidelines

See 9.2.2.

9.2.5.2 Remove Redundant Fields in PP GUI

It is evident that redundant fields in PP's GUI causes frustration and disturbances with the editorial employees. All fields that does not have a direct, visible or functional, consequence to the article should be removed from the editorial employees' GUI.

9.2.5.3 Improve Search function and Increase Search Results

Some of the reoccurring comments made by the participants regarding PP's search functionality is that the search function is slow, and that it lists too few results at a time. As a consequence of this, editorial employees are forced to perform context changes and switches to external tools. Therefore, this research recommends to increase the number of search results being presented to the user, regarding article search, image search, and other PP search functionality. Although the research can not provide how to increase the search speed, it is at least important that the editorial employees find what they are looking for in the first round of results. Technically, increasing the number of search results should not affect search speed, although it depends on search methods and algorithms being used.

9.2.5.4 Differentiate the On-hold Button with the Publish Button

It is evident that the functionality for putting articles on hold is too close to the actual publish button which results in articles being wrongly published, and carries with it several consequential operations like deactivation and recreation of the article. Therefore, this research recommends that the button controlling the article's on-hold functionality is clearly separated from the publish button. Figure 9.4 illustrates a proposed position and separation for this button.

Figure 9.4 The publish button is differentiated from the on-hold button through color, position and size. This distinction may prevent editorial employees to perform unintended actions

9.2.5.5 Disable Keyboard Shortcuts or Make PP Compatible

The fact that the editorial employees are not able to use commonly known and used keyboard shortcuts, results in loss of ongoing work on articles, creates distractions, and steals precious time from the editorial employee. Therefore, one of two things are recommended from this research: one option is to disable default events that occurs due to key combinations, another option is to implement the keyboard shortcut functionality into PP. The first option can be done by blocking default events through JavaScript programming through an event's preventDefault()-method (W3Schools, n.a.) when the editorial employee is not in a textarea or other textual input field, and is, according to the findings of this research, most crucial for the backspace key, which creates an event that goes back one page in the browser, causing current article progress to be deleted. An example of this option is illustrated in Code Block 9.7. The second option will in a way include the first, as this is not a commonly used shortcut and should be disables in any case so that article progress is not lost. It is important to clarify which keyboard shortcuts do not work in PP, for them to be implemented via for example JavaScript programming.

```
<script>
  if(NOT cursor_in_text_field()){
    var e = clickEvent();
    if(keyStroke = codeForBackSpace){
      e.preventDefault()
    }
  }
</script>
```

Code Block 9.7 An example of the use of the event.preventDefault()-function to prevent default behaviour in the browser. The code is not complete as shown, but is conceptual

Another way to ensure that work progress is not lost is to implement an auto-save functionality, as supported by a participant in this research. This functionality can for example simulate the on-hold functionality that is already present in PP.

9.2.5.6 Eliminate or Reduce Context Changes

This research shows that the editorial employees are forced to switch contexts often due to the barriers that they face in PP. Switching between external tools such as Google Search, Microsoft Word and other create distractions with the editorial employees and creates an adaptation interval where the employee are forced to re-focus on the current task (Segalowitz & Frenkiel-Fishman, 2005). Although a rectification of the technical barriers presented above may remove or decrease the need for external applications, it should be made a priority to reduce, or at best eliminate, the need for external applications so that the editorial employees are not forced to perform extensive context changes.

10 List of References

Aizpurua, A., Arrue, M., Harper, S., & Vigo, M. (2014). *Are users the gold standard for accessibility evaluation?* Paper presented at the Proceedings of the 11th Web for All Conference, Seoul, Korea. http://delivery.acm.org/10.1145/2600000/2596705/a13-aizpurua.pdf?ip=158.38.214.20&id=2596705&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432568807_f70ee504e444a83915ea527acadbb2d3

Alampay, E. (2006). Beyond access to ICTs: Measuring capabilities in the information society. *International journal of education and development using ICT, 2*(3).

Ali, S., Al Balushi, T., & Al-Badi, A. (2013). Conceptualization Approach for Accessibility-Aware Framework. *Communications of the IBIMA, 2013*, 1.

Alimadadi, S., Mesbah, A., & Pattabiraman, K. (2016). Understanding Asynchronous Interactions in Full-Stack JavaScript.

Barley, S. R., & Tolbert, P. S. (1997). Institutionalization and Structuration: Studying the Links between Action and Institution. *Organization Studies, 18*(1), 93-117. doi:10.1177/017084069701800106

Begeny, J. C., & Greene, D. J. (2014). Can readability formulas be used to successfully gauge difficulty of reading materials? *Psychology in the Schools, 51*(2), 198-215.

Bellotti, V., Ducheneaut, N., Howard, M., & Smith, I. (2003). *Taking email to task: the design and evaluation of a task management centered email tool.* Paper presented at the Proceedings of the SIGCHI conference on Human factors in computing systems.

Benjamin, R. G. (2012). Reconstructing readability: Recent developments and recommendations in the analysis of text difficulty. *Educational Psychology Review, 24*(1), 63-88.

Benson, A. D., Johnson, S. D., & Kuchinke, K. P. (2002). The use of technology in the digital workplace: A framework for human resource development. *Advances in Developing Human Resources, 4*(4), 392-404.

Berg, B. L., Lune, H., & Lune, H. (2004). *Qualitative research methods for the social sciences* (Vol. 5): Pearson Boston, MA.

Bittar, T. J., Amaral, L. A. d., Faria, F. B., & Fortes, R. P. d. M. (2012). *Supporting the developer in an accessible edition of web communications: a study of five desktop tools*. Paper presented at the Proceedings of the Workshop on Information Systems and Design of Communication, Lisbon, Portugal. http://delivery.acm.org/10.1145/2320000/2311919/p3-bittar.pdf?ip=158.38.214.20&id=2311919&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432393696_af6b33352aedccbda1b8d219f2d11803

Blanck, P. (2014). The struggle for web eQuality by persons with cognitive disabilities. *Behavioral Sciences & the Law, 32*(1), 4-32.

Boos, D., Grote, G., & Guenter, H. (2013). A toolbox for managing organisational issues in the early stage of the development of a ubiquitous computing application. *Personal Ubiquitous Comput., 17*(6), 1261-1279. doi:10.1007/s00779-012-0634-y

Brennan, A., Chugh, J. S., & Kline, T. (2002). Traditional versus open office design a longitudinal field study. *Environment and Behavior, 34*(3), 279-299.

British Broadcasting Corporation. (2015). *Freedom of Information Request - RFI20150047*. Retrieved from https://www.whatdotheyknow.com/request/247767/response/613905/attach/4/RFI20150047 response.pdf

Brown, J., & Hollier, S. (2015). The challenges of Web accessibility: The technical and social aspects of a truly universal Web. *First Monday, 20*(9).

Brydon-Miller, M., Greenwood, D., & Maguire, P. (2003). Why Action Research? *Action Research, 1*(1), 9-28. doi:10.1177/14767503030011002

Brynjolfsson, E., & Hitt, L. M. (2000). Beyond computation: Information technology, organizational transformation and business performance. *The Journal of Economic Perspectives, 14*(4), 23-48.

Burgstahler, S. (2004). Universal Design: Process, Principles, and Applications. Retrieved from http://www.washington.edu/doit/universal-design-process-principles-and-applications

Campbell, N., Elliott, A., Sharp, L., Ritchie, L., Cassidy, J., & Little, J. (2001). Rural and urban differences in stage at diagnosis of colorectal and lung cancers. *British Journal of Cancer, 84*(7), 910.

Carter, J., & Markel, M. (2001). Web accessibility for people with disabilities: An introduction for web developers. *Professional Communication, IEEE Transactions on, 44*(4), 225-233.

Ching, C. (2004). Gender Governance: An Empowering Tool for E-Communities? *MEDIA ASIA-SINGAPORE-, 31*(2), 95.

Chiu, S.-c. (2015). Can Internal Communication Drive Business? An Overview of Its Strategic Values and Practice Tips. In P. P. K. Ng & C. S. B. Ngai (Eds.), *Role of Language and Corporate Communication in Greater China* (pp. 203-222): Springer Berlin Heidelberg.

Chung, J.-W., Min, H.-J., Kim, J., & Park, J. C. (2013). *Enhancing readability of web documents by text augmentation for deaf people*. Paper presented at the Proceedings of the 3rd International Conference on Web Intelligence, Mining and Semantics, Madrid, Spain. http://delivery.acm.org/10.1145/2480000/2479808/a30-chung.pdf?ip=158.38.214.20&id=2479808&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432574287_f2457517083ee1a3aa7d0102751496e7

Collier, D. (2011). Understanding process tracing. *PS Political science and politics, 44*(4), 823.

Connell, B. R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., . . . Vanderheiden, G. (1997). The principles of universal design. *Retrieved January, 11*, 2005.

Cooper, M., Sloan, D., Kelly, B., & Lewthwaite, S. (2012). *A challenge to web accessibility metrics and guidelines: putting people and processes first*. Paper presented at the Proceedings of the International Cross-Disciplinary Conference on Web Accessibility, Lyon, France. http://dl.acm.org/citation.cfm?doid=2207016.2207028

Corbin, J., & Morse, J. M. (2003). The unstructured interactive interview: Issues of reciprocity and risks when dealing with sensitive topics. *Qualitative inquiry, 9*(3), 335-354.

Czerwinski, M., Horvitz, E., & Wilhite, S. (2004). *A diary study of task switching and interruptions.* Paper presented at the Proceedings of the SIGCHI conference on Human factors in computing systems.

Davis, J. J. (2003). Accesibility Divide: The Visually-Impaired and Access to Online News, The. *J. Broad. & Elec. Media, 47*, 474.

De Andrés, J., Lorca, P., & Martínez, A. B. (2010). Factors influencing web accessibility of big listed firms: an international study. *Online Information Review, 34*(1), 75-97.

Lov om forbud mot diskriminering på grunn av nedsatt funksjonsevne (diskriminerings- og tilgjengelighetsloven), (2013).

Dobransky, K., & Hargittai, E. (2006). The disability divide in Internet access and use. *Information, Communication & Society, 9*(3), 313-334.

Duncombe, R. A. (2002). *Information, Technology and Small, Medium and Micro Enterprise Development in Botswana*: University of Manchester.

E24. (2015). Norges største bank: - Vi skrur av intranett i januar. Retrieved from http://e24.no/digital/sosiale-medier/en-av-norges-stoerste-bedrifter-skal-bruke-facebook-som-intranett/23587358

Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*: Oxford university press.

Erkilic, M. (2011). Conceptual challenges between universal design and disability in relation to the body, impairment, and the environment. *METU J Fac Archit, 28*(2), 181-203.

Erlandson, R. F. (2007). *Universal and accessible design for products, services, and processes*: CRC Press.

Eshkevari, L., Antoniol, G., Cordy, J. R., & Penta, M. D. (2014). *Identifying and locating interference issues in PHP applications: the case of WordPress*. Paper presented at the Proceedings of the 22nd International Conference on Program Comprehension, Hyderabad, India. http://dl.acm.org/citation.cfm?doid=2597008.2597153

Fernandes, N., Batista, A. S., Costa, D., Duarte, C., & Carriço, L. (2013). *Three web accessibility evaluation perspectives for RIA*. Paper presented at the Proceedings of the 10th International Cross-Disciplinary Conference on Web Accessibility, Rio de Janeiro, Brazil. http://delivery.acm.org/10.1145/2470000/2461122/a12-fernandes.pdf?ip=158.38.214.20&id=2461122&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676366778&CFTOKEN=50884464&__acm__=1432381157_82b20d868a487febb6bff65b07a27b34

Ford, J. K., Schmitt, N., Schechtman, S. L., Hults, B. M., & Doherty, M. L. (1989). Process tracing methods: Contributions, problems, and neglected research questions. *Organizational Behavior and Human Decision Processes, 43*(1), 75-117.

Forskrift om universell utforming av IKT-løsninger. (2013). *Forskrift om universell utforming av informasjons- og kommunikasjonsteknologiske (IKT)-løsninger*. Retrieved from https://lovdata.no/dokument/SF/forskrift/2013-06-21-732.

Freire, A. P., Russo, C. M., & Fortes, R. P. M. (2008). *A survey on the accessibility awareness of people involved in web development projects in Brazil*. Paper presented at the Proceedings of the 2008 international cross-disciplinary conference on Web accessibility (W4A), Beijing, China. http://delivery.acm.org/10.1145/1370000/1368064/p87-freire.pdf?ip=158.38.214.20&id=1368064&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432394420_451c4748f742ad9f62fa96451fc64287

Funka. (2016). Utdanning. Retrieved from http://www.funka.com/no/funka-tilbyr/utdanning/

Glaser, B., & Strauss, A. (1967). The discovery grounded theory: strategies for qualitative inquiry. *Aldin, Chicago*.

Goldstein, A., & O'connor, D. (2000). *E-commerce for development: prospects and policy issues* (Vol. 2001): OECD Development Centre Paris.

Gómez, R., Hunt, P., & Lamoureux, E. (1999). *Enchanted by telecentres: a critical look at universal access to information technologies for international*

development. Paper presented at the conference “New IT and Inequality”, University of Maryland.

Graham, S. (1998). The end of geography or the explosion of place? Conceptualizing space, place and information technology. *Progress in human geography, 22*(2), 165-185.

Greif, A., & Laitin, D. D. (2004). A theory of endogenous institutional change. *American Political Science Review, 98*(04), 633-652.

Gwizdka, J. (2002). *Reinventing the inbox: supporting the management of pending tasks in email.* Paper presented at the CHI'02 Extended Abstracts on Human Factors in Computing Systems.

Harper, S., & Yesilada, Y. (2008). *Web accessibility: a foundation for research*: Springer Science & Business Media.

Harrison, N. (2010). BS 8878 Web accessibility-Code of practice.

Heeks, R. (1999). *Reinventing government in the information age: International practice in IT-enabled public sector reform* (Vol. 1): Psychology Press.

Helsper, E. (2008). *Digital inclusion: an analysis of social disadvantage and the information society*: Department for Communities and Local Government.

Henry, T. R., & LaFrance, J. (2006). Integrating role-play into software engineering courses. *J. Comput. Sci. Coll., 22*(2), 32-38.

Horton, S., Sloan, D., & Swan, H. (2015). *Complementing standards by demonstrating commitment and progress.* Paper presented at the Proceedings of the 12th Web for All Conference.

IBM. The Social Accessibility Project. Retrieved from http://www.research.ibm.com/social/projects_sap.shtml

Interessegruppe for synshemmede EDB-brukere (ISE). (2015). Endelig, NRKs valgomat tilgjengelig! Retrieved from http://www.ise.no/node/65

ISO. (2011). ISO 9999:2011 Assistive products for persons with disability -- Classification and terminology. Retrieved from http://www.iso.org/iso/catalogue_detail.htm?csnumber=50982

Iwarsson, S., & Ståhl, A. (2003). Accessibility, usability and universal design—positioning and definition of concepts describing person-environment relationships. *Disability and rehabilitation, 25*(2), 57-66.

Jenkins, H., Purushotma, R., Weigel, M., Clinton, K., & Robison, A. J. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century*: Mit Press.

Justis- og politidepartementet. (2005). NOU 2005: 8. Likeverd og tilgjengelighet — Rettslig vern mot diskriminering på grunnlag av nedsatt funksjonsevne. Bedret tilgjengelighet for alle. Retrieved from https://www.regjeringen.no/no/dokumenter/nou-2005-8/id390520/

Karger, J., & Lazar, J. (2014). Ensuring that Students with Text-Related Disabilities Have Access to Digital Learning Materials: A Policy Discussion. *Perspectives on Language and Literacy, 40*(1), 33.

Kelly, B., Sloan, D., Brown, S., Seale, J., Lauke, P., Ball, S., & Smith, S. (2009). Accessibility 2.0: Next steps for web accessibility. *Journal of access services, 6*(1-2), 265-294.

Kessel, S., Sanderson, N., & Chen, W. (2014). Public Media on the Web for Everyone – An Evaluation of the Norwegian Broadcasting Cooperation's Website. In C. Stephanidis (Ed.), *HCI International 2014 - Posters' Extended Abstracts* (Vol. 435, pp. 32-36): Springer International Publishing.

Kirkman, C. (2000). A model for the effective management of information and communications technology development in schools derived from six contrasting case studies. *Journal of Information Techology for Teacher Education, 9*(1), 37-52.

Klironomos, I., Antona, M., Basdekis, I., & Stephanidis, C. (2006). White paper: promoting Design for all and e-accessibility in Europe. *Universal Access in the Information Society, 5*(1), 105-119.

Koutsabasis, P., Vlachogiannis, E., & Darzentas, J. S. (2010). Beyond Specifications: Towards a Practical Methodology for Evaluating Web Accessibility. *J. Usability Studies, 5*(4), 157-171.

Lov om kringkasting og audiovisuelle bestillingstjenester (kringkastingsloven). (1992).

Law, C. M., Yi, J. S., Choi, Y. S., & Jacko, J. A. (2006). *Are disability-access guidelines designed for designers?: do they need to be?* Paper presented at the Proceedings of the 18th Australia conference on Computer-Human Interaction: Design: Activities, Artefacts and Environments, Sydney, Australia. http://dl.acm.org/citation.cfm?doid=1228175.1228244

Lazar, J., Feng, J. H., & Hochheiser, H. (2010). *Research methods in human-computer interaction*: John Wiley & Sons.

Lazar, J., Goldstein, D. F., & Taylor, A. (2015). *Ensuring digital accessibility through process and policy*: Morgan Kaufmann.

Lin, J., & Seepersad, C. C. (2007). *Empathic lead users: the effects of extraordinary user experiences on customer needs analysis and product redesign.* Paper presented at the ASME 2007 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference.

Loo, R. (1996). Training in project management: a powerful tool for improving individual and team performance. *Team Performance Management: An International Journal, 2*(3), 6-14.

López, J. M., Pascual, A., Menduiña, C., & Granollers, T. (2012). *Methodology for identifying and solving accessibility related issues in web content management system environments*. Paper presented at the Proceedings of the International Cross-Disciplinary Conference on Web Accessibility, Lyon, France. http://delivery.acm.org/10.1145/2210000/2207043/a32-lopez.pdf?ip=158.38.214.20&id=2207043&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432551482_1f5be97affc966078e9b07ce4ef000ae

http://dl.acm.org/citation.cfm?doid=2207016.2207043

Louise Barriball, K., & While, A. (1994). Collecting Data using a semi-structured interview: a discussion paper. *Journal of advanced nursing, 19*(2), 328-335.

Madhusudan, C. (2002). India's Hole in the Wall. *Key to Bridging the Digital Divide?'TechKnowlogia*, 38-40.

Mahoney, J., & Thelen, K. (2010). A theory of gradual institutional change. *Explaining institutional change: Ambiguity, agency, and power, 1*.

Maisel, J. L. (2010). *The State of the Science in Universal Design: Emerging Research and Developments*: Bentham Science Publishers.

March, J. G., & Olsen, J. P. (2006). Elaborating the “new institutionalism”. *The Oxford handbook of political institutions, 5*, 3-20.

Matthews, P., & Aston, J. (2013). Interactive multimedia ethnography: Archiving workflow, interface aesthetics and metadata. *J. Comput. Cult. Herit., 5*(4), 1-13. doi:10.1145/2399180.2399182

McNair, B. (2009). Journalism in the 21st century—evolution, not extinction. *Journalism, 10*(3), 347-349.

MedieNorge. (2009). Antall ansatte i TV 2, TV3 og TVNorge. Retrieved from http://www.medienorge.uib.no/statistikk/medium/tv/124

Molich, R., Chattratichart, J., Hinkle, V., Jensen, J. J., Kirakowski, J., Sauro, J., . . . Traynor, B. (2010). Rent a Car in Just 0, 60, 240 or 1,217 Seconds? - Comparative Usability Measurement, CUE-8. *J. Usability Studies, 6*(1), 8-24.

Mossberger, K., Tolbert, C. J., & McNeal, R. S. (2007). *Digital citizenship: The Internet, society, and participation*: MIt Press.

Mossberger, K., Tolbert, C. J., & Stansbury, M. (2003). *Virtual inequality: Beyond the digital divide*: Georgetown University Press.

Mpofu, E., & Oakland, T. (2009). *Rehabilitation and health assessment: applying ICF guidelines*: Springer Publishing Company.

Nguyen, H. V., Köstner, C., & Nguyen, T. N. (2014). *Exploring variability-aware execution for testing plugin-based web applications*. Paper presented at the Proceedings of the 36th International Conference on Software Engineering, Hyderabad, India. http://dl.acm.org/citation.cfm?doid=2568225.2568300

Nielsen, J. (2007). Breadcrumb Navigation Increasingly Useful. Retrieved from https://www.nngroup.com/articles/breadcrumb-navigation-useful/

Norsk samfunnsvitenskapelig datatjeneste. (2016). Når gjelder meldeplikten? Retrieved from http://www.nsd.uib.no/personvern/meldeplikt/meldeskjema

North, D. C. (1990). *Institutions, institutional change and economic performance*: Cambridge university press.

Norwegian Ministry of Children and Equality. (2009). *Norway Universally Designed by 2025*. Retrieved from https://www.regjeringen.no/globalassets/upload/bld/nedsatt-funksjonsevne/norway-universally-designed-by-2025-web.pdf.

Norwegian Ministry of Children Equality and Social Inclusion. (2015). The Government's Action Plan for Universal Design.

NRK. (2016a). Over 50 nettsteder fikset etter NRK-saker. Retrieved from http://www.nrk.no/dokumentar/over-50-nettsteder-fikset-etter-nrk-saker-1.12939125

NRK. (2016b). Usikkert nett. Retrieved from http://www.nrk.no/dokumentar/xl/usikkert-nett-1.12854582

NRK-plakaten. (2012). Retrieved from https://www.regjeringen.no/globalassets/upload/kud/medier/nrk/nrk-plakaten_per_18juni2012.pdf.

Nulens, G. (2000). Information Technology in Africa: The Policy of the World Bank'in Information Technology in Context. Studies from the perspective of developing countries, Avgerou, C. & Walsham, G: Ashgate. England.

O'Farrell, C. (2001). *Information flows in rural and urban communities: Access, processes and people.* Paper presented at the UDRSA Conference.

Odedra-Straub, M., & Straub, B. (1995). The Myth of the Global Village. *Information Technology and Globalisation: Implications for Developing Countries*, 36.

Oliver, C. (1992). The antecedents of deinstitutionalization. *Organization Studies, 13*(4), 563-588.

Organization, W. H. (2001). *International classification of functioning, disability and health: ICF*: World Health Organization.

Ostroff, E. (2011). Universal design: an evolving paradigm. *Preiser, W., Smith, HK, Universal Design Handbook, McGraw-Hill*, 3-11.

Oun, M. A., & Bach, C. (2014). Qualitative Research Method Summary. *Qualitative Research, 1*(5).

Pascual, A., Ribera, M., & Granollers, T. (2012). *Perception of accessibility errors to raise awareness among web 2.0 users*. Paper presented at the Proceedings of the 13th International Conference on Interacción Persona-Ordenador, Elche, Spain. http://dl.acm.org/citation.cfm?doid=2379636.2379652

Pascual, A., Ribera, M., & Granollers, T. (2014). *Impact of web accessibility barriers on users with hearing impairment*. Paper presented at the Proceedings of the XV International Conference on Human Computer Interaction, Puerto de la Cruz, Tenerife, Spain. http://delivery.acm.org/10.1145/2670000/2662261/a8-Pascual.pdf?ip=158.38.214.20&id=2662261&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35

%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432573095_d941ef4a8355d2ee1af57d0c57b40623

Pérez, J. E., Arrue, M., Valencia, X., & Moreno, L. (2014). *Exploratory study of web navigation strategies for users with physical disabilities*. Paper presented at the Proceedings of the 11th Web for All Conference, Seoul, Korea. http://delivery.acm.org/10.1145/2600000/2596715/a20-perez.pdf?ip=158.38.214.20&id=2596715&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432564906_5d1c0e850374ba5e3def9c51c4b02452

http://dl.acm.org/citation.cfm?doid=2596695.2596715

Persson, H., Åhman, H., Yngling, A. A., & Gulliksen, J. (2014). Universal design, inclusive design, accessible design, design for all: different concepts—one goal? On the concept of accessibility—historical, methodological and philosophical aspects. *Universal Access in the Information Society*.

Petrie, H., Savva, A., & Power, C. (2015). *Towards a unified definition of web accessibility.* Paper presented at the Proceedings of the 12th Web for All Conference.

Pilgrim, C. (2013). *An investigation of usability issues in AJAX based web sites*. Paper presented at the Proceedings of the Fourteenth Australasian User Interface Conference - Volume 139, Melbourne, Australia.

Polkinghorne, M., & Arnold, A. (2014). *A Six Step Guide to Using Recursive Abstraction Applied to the Qualitative Analysis of Interview Data* (978-1-85899-296-9). Retrieved from Poole, England: http://eprints.bournemouth.ac.uk/21367/

Poore-Pariseau, C. (2010). Online Learning: Designing for All Users. *J. Usability Studies, 5*(4), 147-156.

Power, C., Freire, A., Petrie, H., & Swallow, D. (2012). *Guidelines are only half of the story: accessibility problems encountered by blind users on the web*. Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Austin, Texas, USA. http://delivery.acm.org/10.1145/2210000/2207736/p433-power.pdf?ip=158.38.214.20&id=2207736&acc=ACTIVE

SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=514637104&CFTOKEN=39937494&__acm__=1432636256_61353d95152ba292b0967360df282dc9

http://dl.acm.org/citation.cfm?doid=2207676.2207736

Putnam, C., Wozniak, K., Zefeldt, M. J., Cheng, J., Caputo, M., & Duffield, C. (2012). *How do professionals who create computing technologies consider accessibility?* Paper presented at the Proceedings of the 14th international ACM SIGACCESS conference on Computers and accessibility, Boulder, Colorado, USA. http://delivery.acm.org/10.1145/2390000/2384932/p87-putnam.pdf?ip=158.38.214.20&id=2384932&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432575412_58410c05bb3a366f6e82832de5336bb2

Rahman, S., Rashid, N., Yadlapalli, A., & Yiqun, L. (2014). *Determining Factors of E-Government Implementation: a Multi-criteria Decision-Making Approach.* Paper presented at the PACIS.

Rello, L., & Baeza-Yates, R. (2014). *Evaluation of DysWebxia: a reading app designed for people with dyslexia*. Paper presented at the Proceedings of the 11th Web for All Conference, Seoul, Korea. http://delivery.acm.org/10.1145/2600000/2596697/a10-rello.pdf?ip=158.38.214.20&id=2596697&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432558259_d88164ae4a7cc3cff16b9c3b0107106f

Rello, L., Pielot, M., Marcos, M.-C., & Carlini, R. (2013). *Size matters (spacing not): 18 points for a dyslexic-friendly Wikipedia*. Paper presented at the Proceedings of the 10th International Cross-Disciplinary Conference on Web Accessibility, Rio de Janeiro, Brazil. http://delivery.acm.org/10.1145/2470000/2461125/a17-rello.pdf?ip=158.38.214.20&id=2461125&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=514637104&CFTOKEN=39937494&__acm__=1432633042_19c1a89f21c2a9cec3c73b7edb4e006d

Richardson, D., Ramirez, R., & Haq, M. (2000). Grameen Telecom's village phone programme in rural Bangladesh: a multi-media case study final report. *Consultado el, 21*.

Sanderson, N., Chen, W., & Kessel, S. (2015). The Accessibility of Web-Based Media Services – An Evaluation. In M. Antona & C. Stephanidis (Eds.), *Universal Access in Human-Computer Interaction. Access to Today's Technologies* (Vol. 9175, pp. 242-252): Springer International Publishing.

Santana, V. F. d., Oliveira, R. d., Almeida, L. D. A., & Ito, M. (2013). *Firefixia: an accessibility web browser customization toolbar for people with dyslexia*. Paper presented at the Proceedings of the 10th International Cross-Disciplinary Conference on Web Accessibility, Rio de Janeiro, Brazil. http://delivery.acm.org/10.1145/2470000/2461137/a16-de_santana.pdf?ip=158.38.214.20&id=2461137&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=514637104&CFTOKEN=39937494&__acm__=1432634512_0ea897d4720b97eac2df1e1454b05471

Scott, W. R. (2001). *Institutions and organizations* (2nd ed.). Thousand Oaks, CA: Sage.

Scott, W. R., & Davis, G. F. (2007). Organizations and organizing. *Rational, natural, and open system perspectives. Upper Sadle River: Pearson*.

Segalowitz, N., & Frenkiel-Fishman, S. (2005). Attention control and ability level in a complex cognitive skill: Attention shifting and second-language proficiency. *Memory & Cognition, 33*(4), 644-653.

Selznick, P. (1996). Institutionalism" old" and" new". *Administrative science quarterly*, 270-277.

Siebert, F. S., Peterson, T., & Schramm, W. (1963). The social responsibility theory of the press. *Four Theories of the Press, eds. Fred S. Siebert, Theodore Peterson and Wilbur Schramm, Schramm (Chicago, IL: University of Illinois Press: 1963), 41*.

Sloan, D., & Kelly, B. (2011). *Web accessibility metrics for a post digital world.* Paper presented at the RDWG Symposium on Website Accessibility Metrics.

Solomon, K. (2000). Disability divide. *The industry standard, 3*.

Souza, R., & Manning, H. (2000). The Web Accessibility Time bomb. *Forrester Research Tech Strategy Report. Available:* http://www. *forrester. com/Research/List*.

Splendiani, B., & Ribera, M. (2014). *How to textually describe images in medical academic publications*. Paper presented at the Proceedings of the XV International Conference on Human Computer Interaction, Puerto de la Cruz, Tenerife, Spain. http://delivery.acm.org/10.1145/2670000/2662320/a67_Splendiani.pdf?ip=158.38.214.20&id=2662320&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432578333_943cc609712e4627c4599e4a65a41a94

Stake, R. E. (1995). The Art of Case Study Research.

Steinfeld, E., & Maisel, J. (2012). *Universal design: Creating inclusive environments*: John Wiley & Sons.

Stephanidis, C., & Emiliani, P. L. (2002). Universal Access to Information Society Technologies: Opportunities for People with Disabilities *Computers Helping People with Special Needs* (pp. 8-10): Springer.

Stewart, E. (2014). Rethinking access to address the digital divide in news.

Streeck, W., & Thelen, K. A. (2005). Introduction: Institutional change in advanced political economies *Beyond continuity* (pp. 1-39): Oxford University Press.

Sullivan, T., & Matson, R. (2000). *Barriers to use: usability and content accessibility on the Web's most popular sites.* Paper presented at the Proceedings on the 2000 conference on Universal Usability.

Tellis, W. M. (1997). Application of a case study methodology. *The qualitative report, 3*(3), 1-19.

Tina Dacin, M., Goodstein, J., & Richard Scott, W. (2002). Institutional Theory and Institutional Change: Introduction to the Special Research Forum. *Academy of Management Journal, 45*(1), 45-56. doi:10.5465/amj.2002.6283388

Treviranus, J. (2008). Authoring tools *Web Accessibility* (pp. 127-138): Springer.

Trewin, S., Cragun, B., Swart, C., Brezin, J., & Richards, J. (2010). *Accessibility challenges and tool features: an IBM Web developer perspective.* Paper

presented at the Proceedings of the 2010 international cross disciplinary conference on web accessibility (W4A).

United Nations. (2001). *Human Development Report*. Retrieved from http://hdr.undp.org/sites/default/files/reports/262/hdr_2001_en.pdf

United Nations. (2007). *Convention on the Rights of Persons with Disabilities*. Retrieved from http://www.un.org/disabilities/default.asp?id=150.

Van der Heijden, J. (2011). Institutional layering: A review of the use of the concept. *Politics, 31*(1), 9-18.

Vedtekter for Norsk rikskringkasting AS. (1996). Retrieved from https://www.regjeringen.no/globalassets/upload/kud/medier/nrk/nrks_vedtekter_per_10juni_2014.pdf.

Verhoest, P., & Cammaerts, B. (2002). Universal service: a tool for social and economic development?

Vigo, M., Brown, J., & Conway, V. (2013). *Benchmarking web accessibility evaluation tools: measuring the harm of sole reliance on automated tests*. Paper presented at the Proceedings of the 10th International Cross-Disciplinary Conference on Web Accessibility, Rio de Janeiro, Brazil. http://delivery.acm.org/10.1145/2470000/2461124/a1-vigo.pdf?ip=158.38.214.20&id=2461124&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676366778&CFTOKEN=50884464&__acm__=1432378441_431d3bf825e9236db74fb96ccc786fde

Vigo, M., & Harper, S. (2013). *Evaluating accessibility-in-use*. Paper presented at the Proceedings of the 10th International Cross-Disciplinary Conference on Web Accessibility, Rio de Janeiro, Brazil. http://delivery.acm.org/10.1145/2470000/2461136/a7-vigo.pdf?ip=158.38.214.20&id=2461136&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432384354_f45539707d3cff429d4313264be1bd3f

W3Schools. (n.a.). preventDefault() Event Method. Retrieved from http://www.w3schools.com/jsref/event_preventdefault.asp

Warschauer, M. (2004). *Technology and social inclusion: Rethinking the digital divide*: MIT press.

Warschauer, M., & Newhart, V. A. (2015). Broadening our concepts of universal access. *Universal Access in the Information Society*, 1-6.

Watanabe, W. M., Geraldo, R. J., & Fortes, R. P. d. M. (2014). *Keyboard navigation mechanisms in tab widgets: an investigation on ARIA's conformance*. Paper presented at the Proceedings of the 29th Annual ACM Symposium on Applied Computing, Gyeongju, Republic of Korea. http://delivery.acm.org/10.1145/2560000/2554947/p721-watanabe.pdf?ip=158.38.214.20&id=2554947&acc=ACTIVE SERVICE&key=CDADA77FFDD8BE08%2E4CE6010CADF15ADE%2E4D4702B0C3E38B35%2E4D4702B0C3E38B35&CFID=676996007&CFTOKEN=16281173&__acm__=1432562743_c810b99601bfe9b0f76a2ee9f5299b60

http://dl.acm.org/citation.cfm?doid=2554850.2554947

We're here to address digital accessibility issues. Retrieved from http://www.fixtheweb.net/

Weaver, D. H. (2009). US journalism in the 21st century—what future? *Journalism, 10*(3), 396-397.

Webster, F. (2006). Theories of the Information Society.

Wentz, B., Jaeger, P. T., & Lazar, J. (2011). Retrofitting accessibility: The legal inequality of after-the-fact online access for persons with disabilities in the United States. *First Monday, 16*(11).

Wentz, B., & Lazar, J. (2011). Usability Evaluation of Email Applications by Blind Users. *J. Usability Studies, 6*(2), 75-89.

Wentz, B., & Lazar, J. (2016). Exploring the Impact of Inaccessible Redesign and Updates *Designing Around People* (pp. 3-12): Springer.

World Health Organization. (2003). *Gender, Health and Ageing*. Retrieved from http://whqlibdoc.who.int/gender/2003/a85586.pdf?ua=1

World Health Organization. (2011). *World Report on Disability 2011*. Retrieved from http://www.who.int: http://whqlibdoc.who.int/publications/2011/9789240685215_eng.pdf?ua=1

World wide Web Consortium. Implementing ATAG 2.0. *A guide to understanding and implementing Authoring Tool Accessibility Guidelines 2.0.* Retrieved from https://www.w3.org/TR/IMPLEMENTING-ATAG20/

World Wide Web Consortium. (2008). Web Content Accessibility Guidelines (WCAG) 2.0. Retrieved from http://www.w3.org/TR/WCAG20/

World Wide Web Consortium. (2011). HTML/Elements/dfn. Retrieved from https://www.w3.org/wiki/HTML/Elements/dfn

World Wide Web Consortium. (2012a). G65: Providing a breadcrumb trail. Retrieved from https://www.w3.org/WAI/GL/WCAG20-TECHS/general.html - G65

World Wide Web Consortium. (2012b). HTML/Elements/abbr. Retrieved from https://www.w3.org/wiki/HTML/Elements/abbr

World Wide Web Consortium. (2014). HTML5. Retrieved from https://www.w3.org/TR/html5/

World Wide Web Consortium. (2015). Authoring Tool Accessibility Guidelines (ATAG) Overview.

World Wide Web Consortium. (2016a). WAI-ARIA Overview. Retrieved from https://www.w3.org/WAI/intro/aria.php

World Wide Web Consortium. (2016b). Web Accessibility Evaluation Tools List. Retrieved from https://www.w3.org/WAI/ER/tools/

World Wide Web Consortium. (n.a.-a). 4.4.4. The blockquote element. Retrieved from https://w3c.github.io/html/grouping-content.html - the-blockquote-element

World Wide Web Consortium. (n.a.-b). ARIA14: Using aria-label to provide an invisible label where a visible label cannot be used. Retrieved from https://www.w3.org/TR/WCAG20-TECHS/ARIA14.html

Yin, R. (1994). Case study research: Design and methods . Beverly Hills: CA: Sage publishing.

Zero Project. (2014). Norway: Universal design in non-discrimination law. Retrieved from http://zeroproject.org/policy/norway/

11 Appendix A: Interview Guide

1. **What is your occupation at NRK (description of position)?**
    a. What responsibility comes with your position?
    b. What are the typical activities you do?
        i. Daily?
        ii. Less frequently?
    c. How would you explain your work environment? I.e. is it stressful, exciting, interesting, exhausting?
2. **How would you describe your use of Polopoly and Panorama as a content management system?**
    a. What are your main activities and/or tasks in these systems?
    b. Have you faced any sort of difficulty using these systems?
    c. What do you miss in Polopoly that would increase efficiency?
    d. How would you describe Polopoly's accessibility, considering your usual tasks?
3. **Are you familiar with the term Universal Design?**
    a. If yes,
        i. How would you describe the term?
        ii. How do you take universal design into account?
            1. Daily?
            2. Less frequently?
        iii. To what degree does the publication system accommodate your efforts for creating universally designed content?
        iv. Have you had training or similar in universal design, either facilitated by NRK or others?
        v. Are you familiar with WCAG 2.0 Guidelines?
            1. How understandable are these guidelines?
            2. Are you familiar with any other guidelines or standards?
    b. If no, continue to **question 4**
4. **Do you follow or use any (accessibility) guidelines for publishing content to nrk.no, either internally or externally?**
    a. How do you incorporate these guidelines? I.e. tasks, considerations, routines etc.

b. Have you experienced a situation where the guidelines were unclear or difficult to understand? Elaborate.
    i. Would you like to change anything in the guidelines?

5. What is your understanding of internal processes/workflow at NRK?

a. How do you typically create content (or other, depending on position) for nrk.no?
b. What would you like to change, process-wise?
c. What do you miss, process-wise, that could increase your efficiency?
    i. In terms of accessibility or universal design?
d. To what degree do processes and workflows (that you are involved with) accommodate your effort for creating universally designed content?

6. Are you familiar with the term plain language?

a. If yes,
    i. How would you describe the term?
    ii. How do you take plain language into account?
        1. Daily?
        2. Less frequently?

12 Appendix B: Consent Form (In Norwegian)

Bakgrunn og formål

Hensikten er å undersøke NRKs publiseringsverktøy, prosesser, rutiner, retningslinjer og arbeidsflyt basert på opplevelser og erfaringer fra redaksjonelt ansatte, for så å se etter problemer, barrierer, utfordringer, tanker, idéer og forbedringer med hensyn på universell utforming av innhold på nrk.no.

Dette er en masteroppgave fra Høgskolen i Oslo og Akershus (HiOA) i samarbeid med Norsk Rikskringkasting (NRK).

Du har blitt rekruttert etter avtale med oppgaveskriver og HiOAs kontaktperson hos NRK.

Hva innebærer deltakelse i studien?

Datainnsamling vil bestå av observasjon, kvalitative intervjuer og heuristisk evaluering av NRKs publiseringsverktøy.

I dette intervjuet vil du, deltakeren, bli stilt spørsmål som omhandler de tidligere nevnte temaene. Intervjuet fokuserer på din personlige oppfatning og erfaring med NRKs publiseringsverktøy og arbeidsflyt, og svarene du oppgir trenger ikke være representative for organisasjonen. Tanker, forslag og idéer tas vel i mot underveis.

Hva skjer med informasjonen om deg?

Alle personopplysninger vil bli behandlet konfidensielt.

Intervjueren vil ta notater underveis. Med din tillatelse vil intervjuet bli tatt opp med lydopptaker. Hvis du ikke ønsker å bli tatt opp, kan du fortsatt gjennomføre intervjuet. Lydopptaket vil bli transkribert kort tid etter intervjuet er fullført. Lydopptaket vil bli lagret på lydopptakeren i maksimalt én uke (7 dager) og vil så bli slettet.
Kun prosjektskriver vil ha tilgang til lydopptaket, prosjektveileder vil ha tilgang på transkribert intervju. Lydopptak blir ikke overført til andre enheter.

Du som deltaker vil ikke kunne gjenkjennes i publikasjon.

Prosjektet skal etter planen avsluttes juni 2016. Etter endt prosjekt vil all data anonymiseres.

Frivillig deltakelse

Det er frivillig å delta i intervjuet, og du kan når som helst trekke ditt samtykke uten å oppgi noen grunn. Dersom du trekker deg, vil alle opplysninger om deg bli anonymisert. Du kan velge å ikke svare på og/eller ytterligere forklare hvilke spørsmål som helst.

Dersom du har spørsmål til studien, ta kontakt med Lars Henrik Nordli på telefon 93264895.

Studien er meldt til Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste AS.

Samtykke til deltakelse i studien

☐ Jeg samtykker til at intervjuet kan tas opp med lydopptaker.

Jeg har lest og forstått informasjon om intervjuet, og er villig til å delta

---

(Signert av deltaker, dato)

13 Appendix C: Meeting Summary from Introductory Meeting

Laws and regulations

NRK states that they are involved and well-informed of the applicable laws. The laws act more as formalisations and guides more than rules. They play a somewhat different role than other news- and media services because they are facilitated and owned by the government in Norway. They especially follow Tilgjengelighetsloven and Kringkastingsloven, and the focus has been mainly with e.g. texting of television material - rather than web.

However, the latter law does not apply if a television programme is put in a web player. Further, if they are to write a transcript or an article about a television programme online, the law of broadcasting will overrule the accessibility law. NRK will hire Norway's first ever accessibility director this fall, who will act as a facilitator for accessibility across all branches and teams at NRK, namely television, radio and Internet. NRK states that they want to be standard-bearers when it comes to accessibility and universal design of their content and products, both product-specific and politically.

Project specifics

NRK's publication system and database, Polypoly , are to undergo an evaluation and identification of the output it produces in terms of universal design on NRK's web site, www.nrk.no , in addition to specific steps that could be taken to tackle the challenge. Some of the WCAG guidelines are the most applicable, namely those under Section 3 and some guidelines in Sections 1 and 2, although NRK informs that these are not exclusive. The publication system and database are in constant change and they state that approximately 250 articles are produced per day. The identified changes must be operationalized and should work in practice , as it is not a daily routine for the editors - who are already striving to get the articles out in time in a fast-paced environment and often outside the office.

Another challenge that was discussed was the clash between different work practices and product views of the editors and the user interface designers. This clash results in a daily discussion, and the changes identified should also consider the varied work practices and specialists at NRK.

The main team working with web publishing is the Media Development Team, which also designs and develops native apps, web players and digital storytelling. This will be the team most applicable to the thesis.

Thesis process and involvement

NRK will provide office space, resources, and specialists and contact persons at request. NRK wishes for the student to be involved in the company during the thesis. Specifically, they will provide access to the Polypoly system and its connected software (Panorama and the separate front-page system), in addition to editors and other people involved in the process. Whether this will be exclusive in-house access or external access was not discussed.