A Process Approach to Ensuring Universally Designed Web Content

A preliminary case study of the Norwegian Broadcasting Corporation

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Abstract—This work-in-progress article aims to identify and overcome procedural challenges that impede creation of universally designed content for the Norwegian Broadcasting Corporation's website. Universal design refers to the design of Web content for use by the widest possible population. This article presents initial results gathered from current policies, work practices and employee experiences. Preliminary results show that editorial employees are unfamiliar with internal and external guidelines regarding universal design of Web content, in addition to believing that they, as editors, are not responsible to ensure universally designed Web content. The lack of internal guidelines regarding universal design of Web content, and the employees' lack of knowledge about these, may act as a barrier to ensuring universal design in practice.

Keywords-universal design; accessibility; organizational processes; Web accessibility; Web content; WCAG; ATAG.

I. INTRODUCTION

This article investigates current practices and workflows regarding universal design of Web content and explores editorial employee's experiences at the Norwegian Broadcasting Corporation. Universal design refers to the design of Web content for use by the widest possible population. The research will identify organizational issues through investigating the editorial employees' workflow, experience and concerns regarding universal design when creating Web content. The goal of the research is to contribute to extend the findings of [9] and [17]. This article asks, "How do editorial employees utilize current processes and practices regarding universal design, and how can the Norwegian Broadcast Corporation's (NRK) publication systems help editorial employees to create universally designed content?" The result of the research will provide recommendations for ensuring universal design in organizational processes, policies and workflows.

The areas of protocols, metadata standards, individual work practices and the development and use of stable and reliable workflows are not exhaustively researched and remain somewhat unanswered. Research has not yet fully examined practices and workflows regarding accessibility [13]. In addition to this, research has yet to investigate how the editorial employees experience the content management system, and how the editorial employees take universal design into consideration when creating content for the Web.

The Norwegian Broadcasting Corporation (NRK) is a non-commercial, government-owned broadcasting organization that provides TV, radio and Internet content to the population of Norway. NRK is the largest media organization in Norway with approximately 3500 employees, distributed across fourteen district offices. NRK is authorized to engage in broadcasting activities under the Broadcasting Act [11]. The Statutes for the Norwegian Broadcasting Corporation [19] provides the purpose, activities, limits and structure of NRK. Chapter two outlines NRK's social mission [15]. Most notably, that

- NRK should support and strengthen democracy [19] (§12);
- NRK should provide sufficient information so that the public can actively participate in democratic processes [19] (§12a.);
- NRK should be accessible to the public [19] (§13); and that
- NRK's services should take into consideration people with disabilities [19] (§13c.).

All these statements can be interpreted to underline the importance of universal design of NRK's products, in this case Web content on NRK's website.

NRK's website is one of Norway's most visited websites [1] and is required to comply with the national regulations [8] (§4) concerning accessibility and universal design of websites and website content. The national regulations refer to the Web Content Accessibility Guidelines (WCAG) 2.0 [20] as a measurement of compliance. Researchers argue that these guidelines may not produce accessible Web content [16].

Section 2 presents previous work on the subject in addition to acting as a frame for the research. Section 3 states the current problem and the research's importance. Section 4 describes what methods will be used in the research, and why the methods have been chosen. Section 5 presents the preliminary results from current research. Section 6 presents a conclusion that can be drawn from the results and discusses future work that exceeds the scope of this research. Finally, Section 7 describes the next steps and plans for the future of this research.

II.   PREVIOUS WORK

Researchers argue that there are other factors besides technical properties and usability metrics involved making the Internet accessible, e.g., political, economical and social aspects [2], and states that people, both users and workers, and processes during development or creation of a product should play a larger role in Web accessibility [6]. The research of [6] suggests the British Standard BS8878 [3] as accessibility guidelines that focuses on processes and business.

III.   STATEMENT OF THE PROBLEM

NRK's website must adhere to the NRK policy [19], the Broadcasting Act and national regulations regarding universal design of ICT [8]. Norway has ratified the United Nations Convention on the Rights of Persons with Disabilities [18], which in Article 9 obligates the Norwegian government to ensure access to information and communications technology for people with disabilities.

The employees at NRK create digital print and multimedia content daily. The editorial employees are continuously revising news articles and pages on NRK's website, which makes content subject to constant change according to different work practices. In addition to this, the employees work in a fast-paced and dynamic environment. The editorial employees are likely to work on multiple tasks at once, and the cognitive effort of ensuring accessible content may not always be considered a priority for the editorial employees [12].

Content on NRK's website is created through the content management system **Polopoly** and rendering system **Panorama** as seen in Fig. 1. 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. Polopoly renders Web pages based on text content and metadata. The editorial employees do not control the rendering process.

However, these systems do not ensure universally designed Web content for the end-user: Polopoly does not inform about or aid the authors with creating accessible and universally designed content. There has been no investigation of the rendering tool, Panorama, and research suggests that it may have an impact on the accessibility of the content that is rendered [9]. Plug-ins for e.g., spell-check and multimedia management may play a part in the rendering process, suggested in research by [7] and [14].

Research shows that NRK's website does not comply with international accessibility guidelines WCAG 2.0 [20], their content management system does not comply with industry guidelines [21], and that consumers experience usability barriers with the Web content's structure, layout and design [17].

IV.   RESEARCH METHODOLOGY

It is important to first understand what current practices, policies and workflows the editorial employees base their content creation on, so that the research can inform relevant theory. After exploring and explaining the current state of content creation at NRK, the research can further inform or extend on theory to ultimately assist editorial employees create universally designed content for nrk.no.

In order to explore and explain the current state with sufficient depth, qualitative methods will be used for data collection. Qualitative methods are in addition suitable for informing theory. This stage of the research will focus on how the editorial employees interpret their environment and tasks related to content creation. Data will be collected through field studies/on-site observations and semi-structured interviews with the editorial employees. This can be identified as (participatory) action research, which is suggested to be effective to bridge theory and practice, as well as to consider and incorporate the editorial employees' view [4]. Editorial employees will be sampled purposively because it is only relevant to investigate the employees that create content for NRK's website.
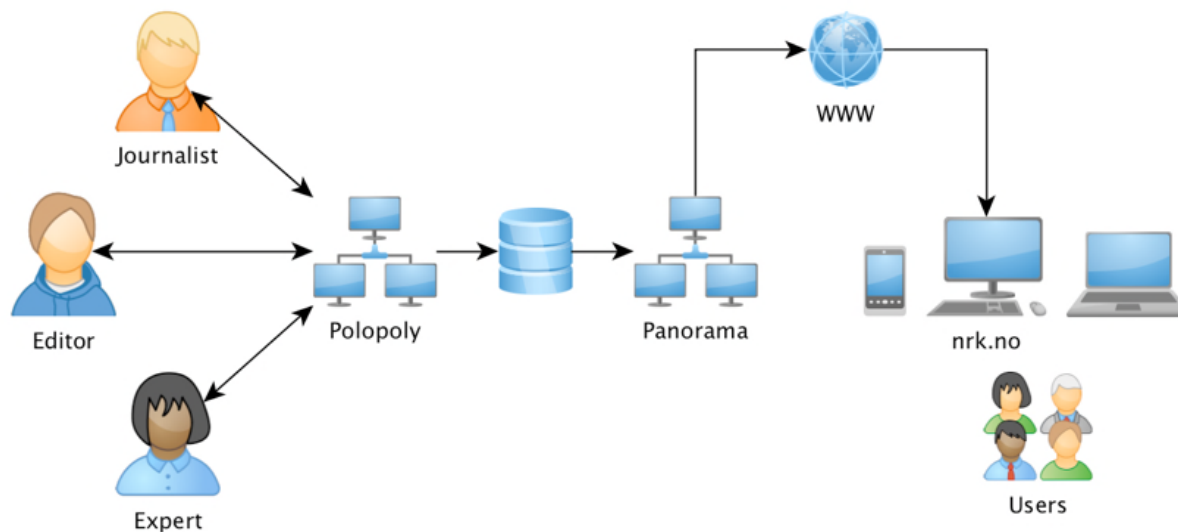

Figure 1.   A simplified model of how Polopoly and Panorama create content. Editorial employees create content in Polopoly content management system.

Some themes from the interview guide are responsibility and activities; interpretation of Polopoly as a Content Management System (CMS); experiences with Polopoly as a CMS; familiarity with Universal Design (UD); utilization of UD (when creating content); the employee's knowledge of internal or external accessibility guidelines; internal processes at NRK; and plain language.

The field study has been performed with one participant. One researcher sat at the participant's desk for the duration of a whole work day while observing the participant and co-workers involved while taking notes. The participant was free to comment or elaborate at any time.

A qualitative interview has been performed with one participant. The interview was audio recorded, transcribed and analyzed for themes from the interview guide. Information that came to attention, which was not a part of the interview guide, created its own theme.

V. PRELIMINARY RESULTS

A. Technical Introduction of Polopoly

A technical introduction of Polopoly with the Technical Team Leader for Development was conducted in order to gain domain knowledge and to better understand terminology and situations for the field studies and semi-structured interviews. This introduction revealed that there are numerous plug-ins connected to Polopoly, including spell-check and media content management in addition to the Panorama rendering engine.

B. Field Study

One field study has been conducted. An editor was observed for five hours while creating a news article in Polopoly. Relevant points and observation was collected. The editor also made some general comments throughout the session.

The field study identified that the environment was generally hectic, but communicative and team-friendly as the employees often walked up to other employees for advice or consultation on matters. However, on few occasions one editor's workflow was being interrupted while waiting for proofreading from another colleague. This caused delays and uncertainty on a matter that had to be handled quickly. In addition to this, NRK's intranet solution was not being used as intended – or at all. This has not proven to be relevant at this time, but intranets may promote internal communication [5] and might help tackle challenges with internal communication.

Regarding universal design, an editor expressed uncertainty of what a good alternative text to an image should be. The editor was familiar with the term, and entered a description on all images in the CMS. At the same time, the editor expressed that "journalists would never enter additional text content to multimedia content when creating a news article" [22], in addition to suggesting that descriptions could be used as alternative text to images, automatically by Polopoly.

Similar to a discovery in the technical introduction, there were numerous plug-ins connected to Panorama that editors

frequently used. As mentioned earlier, these systems may interfere with the universal design [7] of the content.

C. Preliminary Interview

One semi-structured interview has been conducted. The participant had no knowledge of internal NRK guidelines of policies regarding universal design or accessibility other than the NRK policy [19]. The participant also stated that "information flow and inter-department workflow was often time consuming and complicated" [22].

The qualitative interview revealed that the participant, an editor, was familiar with universal design as a term. However, it was explained exclusively as a requirement from the law, i.e., national regulations [8]. In particular, the editor did not know what WCAG 2.0 guidelines were or what the national regulations regarding universal design of ICT required [22]. Interestingly, the participant experienced universal design of Web content as "somebody else's problem" [22], referring to programmers as an example of employees that were in charge of legal compliance with universal design of content on NRK's website. Researchers argue that Web accessibility evaluation methods often require technical expertise or knowledge, which can result in unknowingness of when or how to use these evaluations [10]. This may be the case for the participant, considering the statement that other employees are responsible for universal design compliance.

VI. CONCLUSION AND FUTURE WORK

The preliminary results suggest that there are three main barriers hindering the creation of universally designed content on NRK's website. These are social barriers, organizational barriers, and technology barriers. More specifically, the lack of awareness about UD among the editorial employees, organizational communication challenges, and the lack of policies on UD of Web content may be opportunities for change to ensure a more accessible website.

Future work may include studying similar organizations in order to identify if differences in organizational structure has an affect on how editorial employees publish content online.

VII. NEXT STEPS

A minimum of five editorial employees will participate in the semi-structured interviews, and a minimum of two field studies/on-site observations will be conducted. Polopoly's plug-ins will be subject of evaluation regarding how they affect the universal design of Internet content. Data collection will be completed by the end of February 2016.

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