Awareness on web convenience for cognitive impaired people

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***Abstract*—The web is mainly focused on and accessible to people with no disabilities. The question in front of us is, how easy is it to access the web for cognitively impaired people? Cognitive disability is a condition whose functions such as reading, learning, memorization, speaking, etc., are impaired. This paper illustrates the survey conducted by web developers to get a better understanding of obstacles related to the accessibility of the web by cognitively impaired people.**

Keywords—cognitive impairment

I. INTRODUCTION (*HEADING 1*)

What is web accessibility? All of us have encountered problems such as navigating through unresponsive web applications, squinting at badly designed websites and the worst one is when it takes ages for an application to load and many more. These problems might be a bit inconvenient for us, but for people with disabilities, these slight inconveniences might be a huge barrier and restrict the use of the internet.

Web accessibility is the necessity for the web application to make use of the technology and develop to aid the recognition, understanding, navigation, and interaction of a person with a disability. This might seem daunting, but it is a core part of user experience. This means everyone should be able to access these web applications.

Cognitive web accessibility emerged as a research field that branched off from digital/web accessibility and inclusive design and was dedicated to studying interaction aspects that affect people with cognitive disabilities. Even though concerns about cognitive accessibility have grown in prominence in the last 15 years, cognitive disabilities are still the least addressed and discussed about web accessibility.

Research conducted by WebAIM in 2019 in understanding the top one million websites out of which 98.1% of the websites were reported to be lacking accessibility.

Because of stereotypes and misinformation, cognitive disabilities receive less attention than other disabilities. Furthermore, cognitive disabilities lack specific guidelines and technical orientations that consider the complexity of various conditions. Due to a knowledge gap, the absence of cognitive disabilities on accessibility guidelines may prevent professionals from approaching those conditions on their projects.

To identify hurdles that impede IT professionals from include persons with such impairments in their projects, a survey focusing on cognitive accessibility is required. Web developers confront many major challenges, including a lack of awareness, limited use and understanding of accessibility principles, organizational impediments, and misconceptions about individuals with disabilities.

II. COGNITIVE DISABILITIES AND THE WEB

It may be challenging for people with cognitive limitations to read instructions or navigate a website or application. This may impact their ability to comprehend instructions or navigational procedures, phrases, or perform activities. This audience's capacity to maintain concentration and participate in multi-step procedures may be hindered by an inaccessible solution.

People with cognitive impairments may encounter "invisible" challenges on the Internet since they are less linked to operational characteristics and more related to skills such as memory, attention, language, reading, and perception.

- People with memory impairments may have trouble remembering access codes and passwords. The process should not depend on the user's memory and should include autocomplete, interoperability with password managers, and alternate authentication methods.
- Metaphors should be avoided, and the user interface need to utilize clear and unambiguous language or give explanation to assist people grasp terminology and idioms making it accessible for people with impairments on social or communication skills.
- Complex activities may result in weariness and cognitive overload for individuals with a variety of cognitive disorders. The interface must give information such as completed steps, ongoing steps, and pending steps to assist users understand where they are in the process.
- People with arithmetic learning difficulties may not be able to comprehend percentages, distance, or computations. Supporting information for numerical material should include an explanation, graphical representation, conversion, or comparable idea.
- People with memory or attention deficits may be unable to finish a job on a website if alerts and moving adverts serve as distractions and interruptions. Avoid adjacent and background distractions or give a reading mode on the page to assist users concentrate on what is essential.

Tackling cognitive disorders is not simple, given that they are diverse, complicated, and difficult to recognize and identify. There are beliefs that online accessibility is a technical issue, difficult to achieve, or time-consuming, and that it should only be addressed when required. There are beliefs that online accessibility is a technical issue, difficult

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III. Related Work

Previous studies have mainly focused on understanding accessibility awareness of web developers in a broad context but have not done a deeper inquiry into cognitive disabilities.

Researchers performed a study of HCI experts of various nations in 2012. The purpose was to determine how these experts regard accessibility while developing computer technology. Although 87% of respondents identified accessibility as an essential or very important problem, the majority of respondents took little effort to include accessibility into their initiatives. The poll also revealed that respondents considered visual disabilities more than other impairments, suggesting a possible knowledge gap that may result in cognitive disorders being underrepresented.

Accessibility and its relevance to the user experience are seen favorably by HCI and UX specialists, according to this survey. Participants agreed that accessibility is directly tied to usability and user experience, and that it is an element of quality. There was no agreement on whether law is a more convincing reason to implement accessibility than commercial arguments.

Research done by the Association of Human Content Interaction Designers (AHID) and the Society for Human-Computer Interaction (SIDC) provides a glimpse of UX/HCI practitioners' perspectives on accessibility and inclusive design. Since the majority of respondents were already working with online accessibility and were from developed markets such as the United States and Europe, the results may not accurately reflect the industry.

Cognitive impairments are one of the least-addressed disabilities, as shown by prior research that provided pertinent indications about the perceptions of web development experts, demonstrating that cognitive disabilities are among the least-addressed disabilities. Cognitive disabilities are likely to get less attention from web development experts than visual or physical impairments. The challenges, incentives, and prejudices that impede IT professionals from including persons with cognitive impairments in their projects must be investigated in more depth. The purpose of this study is to acquire insights and close the knowledge gap on the topic.

IV. Methodology

This study comprises of an exploratory survey aimed at examining the challenges and motivations of web professionals regarding the accessibility of websites for individuals with cognitive disorders. The survey acted as a preliminary investigation aimed at gaining a deeper knowledge of an understudied aspect of online accessibility. The study was driven by the following research questions:

RQ1: How web development professionals understand accessibility for people with cognitive disabilities?
RQ2: Which are the challenges, barriers or motivation faced by these professionals to consider or not users with cognitive disabilities?
RQ3: Which content type or tools can help to increase their awareness on cognitive web accessibility?

Survey questions related to research.

Q1. Do you consider users with cognitive disabilities in your projects?
Q2. In your projects, how do you ensure the accessibility for people with cognitive disabilities?
Q3. What are the reasons to approach web accessibility for people with cognitive disabilities in your projects?
Q4. Which cognitive disabilities do you approach in your projects?
Q5. Optionally, please share with us your experience and challenges working with this audience
Q6. For what reasons do you not address web accessibility for people with cognitive disabilities in your projects?
Q7. What could motivate you to consider people with cognitive disabilities in your projects?
Q8. Optionally, please share with us your experience and the challenges that you faced when working with this audience
Q9. Inform the level of ease of understand about the guidelines, recommendations and techniques presented in each of the following materials

This survey is the first to study cognitive accessibility difficulties in detail since data on this topic is still sparse in both business and academia. Although the quantity of answers may be deemed small, this is the first poll to undertake an in-depth examination of these concerns

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V. Results

Considering the completion of the questionnaire until the last page and the confirmation that the answers were calculated, 105 of the replies from the 142 individuals who completed the survey were legitimate. Given that respondents may pick numerous answers, it is crucial to note that some questions may get replies that exceed 100%. In this part, we describe the survey's findings and the conclusions drawn from the gathered data.

In this research, researchers evaluated the amount of cognitive disability knowledge among IT workers and the reasons why they consider or do not consider cognitive impairments. Authors questioned respondents whether they include persons with cognitive impairments in their online

project, as opposed to asking at the conclusion of the survey if they consider any disability. Previously, the concept of cognitive impairments was defined.

The second research question (RQ2) investigated the obstacles that IT professionals may encounter when attempting to include individuals with cognitive disorders in a project. For 84% of respondents that either partly consider or do not consider users with cognitive deficits, the authors posed a second series of questions to determine the primary reasons for not considering this audience and the resources that may be used to close this gap. Therefore, asking the participants why they do not consider users with cognitive impairments.

Nearly 70% of persons with cognitive impairments report that their department, organization, or public bodies do not include them in their audience. This may contradict with public entities' legal responsibility to provide accessible for everyone. In the public sector, the primary explanation is a lack of cognitive disability understanding.

The third research question (RQ3) studied the types of information, tools, and resources that may be useful in raising IT workers' understanding of cognitive impairments. According to a survey, 79.8 percent of respondents felt that rules or suggestions might encourage them to include persons with cognitive impairments in their initiatives. This was followed by an improvement in understanding of the features of cognitive disorders and how to implement these suggestions in practice.

VI. Discussions

Authors could identify three biases that potentially prevent developers for people with cognitive disabilities from being considered for inclusion in their projects.

a) the inability to include persons with cognitive impairments as part of their target audience.

b) the lack of familiarity among professionals, particularly in the commercial sector, with established online accessibility criteria such as WCAG.

c) corporate culture hurdles - The second most prominent barrier preventing professionals from addressing people with cognitive disabilities is a lack of knowledge regarding cognitive impairments. This example exemplifies a pervasive misunderstanding in which businesses have difficulty viewing individuals with disabilities as customers and citizens with the same interests and needs as those without disabilities, and this stigma becomes increasingly apparent.

VII. Conclusion

Although cognitive accessibility knowledge has increased over the last several years, it is still insufficient when compared to awareness about visual or hearing impairment. On the other hand, web development experts lack essential understanding on how to build inclusive solutions for those with cognitive disability.

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