# Improving Software Developer Awareness of Web Accessibility via 'Accessibility Conversational Agents'

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## Abstract
Advancements in AI have made it possible to collect and synthesize large amounts of information from the internet. Tools such as OpenAI's chatGPT mimic human-like responses through training on a large corpus of conversational data and by considering the context of conversations to generate more relevant and consistent answers. Utilizing such AI models for education can be very beneficial as information is presented in a more conversational and relatable manner, making it more engaging and easier for people to understand. This position paper aims to investigate the advantages of using an advanced AI language model to improve software developers' understanding of Inclusive Design and Accessibility Guidelines in a more convenient manner. Our plan is to investigate if such 'accessibility conversational agents' can encourage software developers to prioritize web accessibility during software creation.

## Author Keywords
Advanced Conversational User Interfaces; Accessibility; empathy and education.

## CCS Concepts
•**Human-centered computing** → *Natural language interfaces;*

## Introduction

The creation of accessible software is vital for promoting an inclusive digital environment for individuals with disabilities. In Ontario, current software accessibility standards are mandated by the Accessibility for Ontarians with Disabilities Act (AODA), which requires private and non-profit organizations with 50 or more employees, as well as all public organizations, to comply with the Web Content Accessibility Guidelines (WCAG) 2.0 Level AA [5]. While legislation creates a sense of urgency for organizations to meet accessibility standards, it does not foster an understanding among software developers of the importance and impact of creating an inclusive digital space.

There are growing expectations placed on the importance of providing an inclusive digital environment for people with disabilities, but software developers are not meeting these expectations. These behaviors can be attributed to the lack of formal education that software developers have on web accessibility principles [7, 10] as, without formal academic experience, software developers feel less confident in their abilities and resort to quick fixes or none at all. The lack of experience, limited accessibility tools and constant pressure to meet deadlines makes it extremely difficult for software developers to find the time to recognize and implement web accessibility into their work [10].

We recognize the lack of background and minimal industry expectations [10] as major hurdles preventing software developers from consistently engaging in inclusive design practices. To help software developers recognize the importance of accessible design, this research aims to utilize advanced conversational agents to provide developers more familiar and relatable ways to understand accessibility guidelines. In this paper, we highlight a project-based learning method to teach accessibility, and then discuss how conversational user interfaces have already been used successfully as teaching agents. We then propose our method of using chatbots to teach developers about accessibility guidelines in a more approachable and immersive way.

## Project Based Learning for Web Accessibility

Project-Based Learning is a teaching method in which learners are taught using real-world problems and challenges [1]. Based on prior literature, project-based learning allows students to find meaning, increase their motivation, improve critical thinking, and lead to lifelong learning [2, 13]. Katsanos *et al.* [4] utilized this learning method, mediated by an educational tool, to teach web accessibility and increase awareness and motivation among students. Their analysis highlights the benefits of providing real-world scenarios, which make web accessibility concepts easier to break down and understand. However, they noted that students requested simpler language to describe web accessibility principles [4]. Our project is focused on exploring how relatable language, personalized conversations, and context specific examples can improve web accessibility adoption among software developers.

## CUIs as Teaching Agents

Conversational User Interfaces (CUIs) are a type of interface that enable users to interact with applications by mimicking human conversation. By presenting information in a conversational manner, either through text or voice, users are able to engage with the content in a way that feels more familiar to them. Naturally, many CUIs have been deployed as teaching agents to complement and enhance the learning experience for users [6]. Chatbots allow teachers to present personalized information to students, provide quick access to educational information, increase engagement and motivation, and offer immediate assistance [6, 8]. However, considerations as to when software developers will

engage with such a chatbot or how the interaction should be initiated increase the complexity of this medium of teaching. This uncertainty motivates us to understand the specific role that chatbots have as 'accessibility conversational agents' in educating and fostering meaningful change in software developers.

## Proposed Method

Our objective for this study is to determine whether advanced conversational agents encourage the incorporation of accessibility guidelines during software creation. In order to evaluate this objective, we propose the following steps:

1. Training an advanced AI language model by fine-tuning it with data on Web Content Accessibility Guidelines (WCAG) 2.0 and complementary real world examples.
2. Implementing and deploying the trained AI language model as a chat-based conversational agent knowledgeable in inclusivity and accessibility principles.
3. Using a technology probe research method to determine how software developers use and are influenced by a trained 'accessibility conversational agent'.
4. Utilizing the outcomes of our technology probe to make recommendations on the development, training, and deployment of future 'accessibility conversational agents'.

One of the key advantages of using a conversational agent is its ability to provide a more natural and intuitive interface, with personalized conversations for users. This has been evidenced in previous studies, which have found that participants save time and generally find obtaining information more comfortable [9]. Furthermore, conversational agents elicit users to disclose more information about themselves because they feel less judged [11]. For software developers, this could mean being able to ask questions about web accessibility or inclusivity without any fear of judgment.

Conversational agents are generally extremely versatile, as the data can be fine-tuned and updated to meet specific goals and changing needs of software developers. A valuable application for software developers could be using our tool as a knowledgeable assistant in team meetings on platforms such as Slack or Discord, to mediate conversations around accessibility and inclusivity during software creation. This can serve as a reminder for teams to keep accessibility in mind as they work through their tasks. Another potential application of our "Accessibility Conversational Agent" could be to create an "Accessibility" course to serve as onboarding training for new hires within development teams. This would establish an expectation and standard for development teams to prioritize accessibility at all times.

## Areas for Discussion at CUI@CHI'23 Workshop

Our hope in attending the CHI 2023 workshop is to receive valuable feedback that will help us improve our research goals and agenda. We are excited to connect with other researchers to gain insights from their experiences and develop a better understanding of CUIs. More specifically, we look forward to discussing the deeper implications of when an AI-based tool, such as the one we propose here, provides *incorrect* information to a software developer, as has been highlighted in recent headlines about Bing [12] and chatGPT [3]. In particular, we anticipate that one outcome of providing incorrect information is that it might still motivate software developers to improve the accessibility of their systems, regardless of truthfulness of the information provided. (e.g., keyboard navigation is still added to an interface, regardless of the truthfulness of any motivation provided by our tool). However, such occurrences could

lead to software developers distrusting the ‘accessibility conversational agent’ as they learn more and more about accessibility. Likewise, there is also the possibility of leading the software developer entirely astray, and we look forward to engaging with the other workshop attendees to discuss techniques for reducing the negative impact of such cases.

## Conclusion

In this paper, we discuss how software developers are failing to meet the growing expectations of creating accessible and inclusive digital spaces. Due to limited academic exposure to web accessibility and minimal industry expectations, software developers often lack the necessary education and environment to prioritize web accessibility. Specifically, software developers either lack awareness, confidence, or the necessary tools to implement accessibility principles correctly. We propose to use these gaps as opportunities to educate and inform software developers about accessibility principles by developing ’accessibility conversational agents’. We hope to start a conversation around using CUIs as more than personalized assistants, but rather as accessibility companions that allow software developers to recognize the vital importance of web accessibility.

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