Conversational AI Chat Bot: Siri Has Nothing on This

Presenter: Alexa Jones

Introduction to the Presenter

- Academic Background
  - In the year 2022, I received my Bachelors of Science Degree in Public Health at Wayne State University, Detroit MI.
  - Currently obtaining my Masters degree in Public health with a concentration in Health Behavior and Health Education with a specialized certificate in injury prevention sciences at the University of Michigan, Ann Arbor. My graduation year is in May 2024
    - I fell in love with injury and prevention my 1st MPH HBHE year in my Injury and Prevention: Special topics 710 class taught by my professor Justin Heinze
  - I eventually want to obtain my DrPH with a primary concentration in injury science
- Career Interests
  - Unintentional and Intentional injuries in Black and Brown communities as it relates to the criminal justice system (homicides, suicides, sex/forced labor trafficking, community and youth violence etc..)
  - Working for the violence and injury and prevention department at CDC, Atlanta Georgia primarily as an project officer, evaluator officer or public health advisor

What is a AI Chat Bot

- AI stands for Artificial Intelligence
- According to Microsoft, Power Virtual Agents, “An AI chatbot is a software application that engages in human conversation in a natural way. AI chatbots are commonly used across many different industries for many different purposes”.

Addressing Urgent Threats

- Adverse Childhood Experiences (ACEs)
- Drug Overdose
- Suicide Prevention

Preventing Violence

- Community Violence
- Firearm Violence
- Intimate Partner Violence Prevention
- Sexual Violence Prevention

Protecting Youth

- Child Abuse & Neglect Prevention
- Dating Matters
- Essentials for Childhood
- Youth Violence Prevention

Preventing Injury

- Drowning
- Transportation Safety
- Older Adult Falls Prevention
- Traumatic Brain Injury & Concussion

About the Injury Center
Read about the Center's approach, focus areas, and leadership.

Research & Science
Learn about our research priorities and Injury Control Research Centers.

Budget
View a breakdown of the Injury Center's fiscal year funding allocations.

Funded Programs
Learn how we collaborate with national organizations, state health agencies and other key groups.

Data, Statistics, and Reporting
Access our research and surveillance tools.

Newsroom
Read about our latest news and media resources.

Features

Project Overview

To create Data Visualization for different Disabilities primarily on the Injury and Prevention website for CDC

Interpretation of charts and data when it comes to indivduals who have a disability (hearing, vision, motor capabilities etc..)

Design Considerations for Disability Type

- Visual Disabilities

The **pinch-to-zoom feature** must not be disabled (avoid <meta name="viewport" content="user-scalable=no">).	When zooming is disabled on a web page, which the parameter user-scalable=no does, low vision users who use screen magnifiers to read content may be unable to properly see information on a web page.
All text must pass contrast guidelines against the background (verify using Deque's axe DevTools accessibility browser extension or a similar tool).	Some users who have low vision may see in low contrast. So, text, borders, and other elements may appear as the same or similar shades of brightness to them. Textual elements that are too close in brightness to background colors may be extremely difficult to read for these users.
Links, buttons, and controls must have a visible :focusstate and should have a **visible :hover state**.	Some low vision users may use a keyboard or a mouse, or both, as input methods. Having visible :focus and :hover states helps users to know where the keyboard/mouse focus is on a web page. The default browser :focus state is acceptable per the WCAG guidelines, but users with low vision benefit greatly from enhanced CSS :focus and :hover states.
The **user interface** should provide a **clear visual distinction between content (e.g., text) and controls (e.g., buttons, links, etc.)**.	Again, users who may see in low contrast may have difficulty distinguishing whether controls are actionable on a web page because these elements may blend together with surrounding text and background colors.

- Hearing-impaired Disabilities

All videos must have captions.	Without captions, people who are deaf may miss critical information communicated through dialog and narration, and may miss important sounds that give meaning to the video.
All audio-only content must have transcripts.	Transcripts are necessary to convey all of the information being communicated by audio, including dialogue (and identifying speakers), narration, musical cues, and sound effects.
Sign language interpretation of videos can be very helpful.	There are some people who are deaf whose primary means of communication is sign language. For this group, sign language interpretation may be preferred over captions and transcripts.

Design Considerations for Disability Type Cont..

- Reading Disabilities

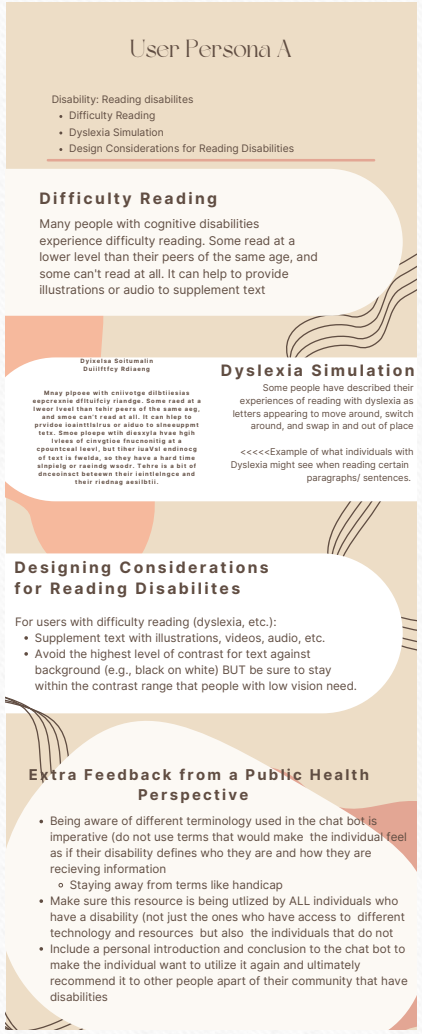
•For users with difficulty reading (dyslexia, etc.): **Supplement text with illustrations, videos, audio, etc.** •**Avoid the highest level of contrast** for text against background (e.g., black on white) **BUT be sure to stay within the contrast range that people with low vision need.**	People who have difficulty reading text will need the information conveyed in other formats like images, audio, and video. Using the highest contrast may also be difficult for people to read and hard on the eyes, so using colors that are a slight step down in contrast (e.g., dark grey against white or off-white) may make reading text a little easier.

- Dexterity/ Motor Disabilities

All functionality must be available using only the keyboard.	For sighted keyboard users or those who use devices that emulate keyboards, everything that can be done on a web page with a mouse should be able to be done using only a keyboard. People with motor disabilities may not have the fine motor skills required to use a mouse.
Links, buttons, and controls must have a visible :focusstate and should have a **visible :hover state**.	The only way sighted keyboard users are aware of the current location of the keyboard focus is by a visible :focus state. If focus is turned off, interaction on a web page for these users may be extremely difficult and nearly impossible. The default browser :focus state is acceptable per the WCAG guidelines, but like low vision users, sighted keyboard users can benefit greatly from enhanced CSS :focus and :hover states.
With session time-outs, **warn users before the time expires**(e.g., an accessible dialog or alert), and **give them the option to extend the session**. Ensure the warning itself allows for slow responses. A recommended minimum response time is 2 minutes.	People who have motor disabilities need more time to enter information into a web page. So, it is important that they are given sufficient time and options to extend time limits.
Provide large click targets (links, buttons, controls) for users who have movements that are difficult to control.	People who may have tremors or spasms need to be able to activate targets on a web page. Increasing the target area for these users can help maximize their chances of accurately selecting the target on the web page.

My User-Centered Design Example

- My supervisors wanted me to to create a persona (vision-impaired, hearing impaired, reading disabilities etc.) and wanted me to surround my perspective around my public health passion and expertise
- The persona-centered design included all of the following:
  - An individual with a reading disability
  - A stimulation of what certain text might look like for an individual with a reading disability
  - Different considerations needed to be noted when creating different data visualization within a CDC website
  - A public health perspective



Charle's Journey:

Charles is a PhD student who is researching online the rate of suicides by states for a possible dissertation topic. Charles has low vision, is color-blind, and was recently diagnosed with ADHD

Identifies Information Needed

Charles uses a screen reader to access research information online regarding suicide

Looks for Information

1. Turns on computer and Googles Facts about Suicide from CDC. When he opens a new website, his screen reader will start automatically.

From here the screen reader will:

1. First read the name of the web browser and the title of the web page. This is the title that shows up in the browser title bar or in tabs in the browser, and when the page gets bookmarked.
2. Then, his screen reader reads from left to right on the page, which, depending on the content on the page, may read through content like a logo and a tagline, possibly some introductory information, a search field, navigation area like a menu, and then the main page content. listens to this the first time he arrives at a website, but then when he goes to another page, he does not want to hear it all over again. So, he uses keyboard shortcuts so he can go straight to the content for that page. He sometimes navigates by headings, landmarks, and links.

2. Upon arriving at the following page: Suicide Prevention | Suicide | CDC. Using his screen reader and keyboard navigation, Charles navigates the Suicide web page to determine the content of the page. Not sure what content to select from the page, Charles selects the Chat Bot for assistance. The screen reader will read a button on the web page that will inform Charles of the Chat Bot options. Upon Charles's selection of the Chat Bot option via keyboard navigation, the Chat Bot option will pop up. He will receive notification of the pop up via his screen reader. ***See Chat Bot Accessibility Best Practice Document for how to make user aware of Chat Bot and helpful tips concerning keyboard navigation.***

Interations with Chat Bot.. Design Features of Chat Bot

a. **Input Analysis**
   i. Upon receiving an input from the user, the AI Chat Bot will begin to process the input using Natural Language Processing (NLP). It breaks down the sentence into individual words or phrases to understand the user's intent.
b. **Intent Recognition**
   i. AI Chat Bot then matches the understood intent with an appropriate response. Machine Learning algorithms help to recognize the user's input into an intent based on what the chat bot has learned from previous interactions
c. **Response Generation**
   i. Chat Bot formulas a response based on its understanding. If Chat Bot is a rule-based system, it will choose from pre-programmed responses. If self-learning Chat Bot, it uses Machine Learning algorithms to generate an appropriate response. ***See Chat Bot Accessibility Best Practice Document for how to make user aware of Chat Bot responses.***
d. **User Output:**
   i. Chat Bot then represents its response to the user, The user can then respond to the Chat Bot, and then cycles again. See Chat Bot Accessibility Best Practice Document for how to assist users with their Chat Bot responses.

My responsibilities

- Including my public health expertise to experts in informatics
  - Providing them with a different perspective other than a technological one
- Creating user-centered personas surrounding the different disabilities
- Included attending meetings
  - Taking notes on 501 compliance, what it meant, how to include it within the Chat Bot
- Learning all that I can when it came to the chat bot and asking questions surrounding it at each meeting

Results, Recommendations, Final Thoughts

- Key Findings? We are still working on them :)

Acknowledgements

Pauline Hunter

Taylor Hautala

Danny Wade

Angela Banks

Resources

- https://powervirtualagents.microsoft.com/en-us/ai-chatbot/
- https://dequeuniversity.com/class/ux/design-considerations#low_vision