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Voices from Industry

Inclusive Design Thinking for Health Messaging in American Sign Language during the COVID-19 Pandemic: A Case Study Brief

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ABSTRACT

Health information needs to be accessible to all people, especially in emergencies and critical times of need such as the COVID-19 pandemic. Health information needs to be designed to meet the needs of a broad range of people, including Deaf and hard of hearing people who use American Sign Language.

An Inclusive Design Thinking framework provides the process and structure for collaborative teams to work together to produce solutions that meet the needs of diverse audiences, including people with disabilities. Design Thinking is a human-centered problem-solving method that puts users at the center of the design process. Inclusive Design Thinking includes the end users throughout the design process, considers barriers users may face when accessing information, and seeks to remove these barriers through information design that is accessible to the intended audience.

This case study provides the details of a collaborative effort by Centers for Disease Control and Prevention (CDC), Georgia Tech Center for Inclusive Design and Innovation (CIDI), ASL interpreters, Deaf and hard of hearing community members and advocates, and other community members to design and disseminate health information during the COVID-19 pandemic while addressing health literacy and digital accessibility best practices.

Keywords: American Sign Language, emergency management, risk communications, health education, health literacy, Design Thinking, Inclusive Design, Inclusive Design Thinking

INCLUSIVE DESIGN THINKING FOR HEALTH MESSAGING IN AMERICAN SIGN LANGUAGE DURING THE COVID-19 PANDEMIC: A CASE STUDY BRIEF

In times of a public health emergency, such as COVID-19, public health messaging is of critical importance to the general public and must be communicated in ways that are accessible to the diverse members of the public, including people with disabilities. Centers for Disease Control and Prevention (CDC) needed to communicate health information on COVID-19 pandemic to all members of the community, including Deaf community members who use American Sign Language (ASL). Health information is designed not only to inform but also so that the audience understands why and how to take action. In the case of COVID-19, this meant taking action to protect oneself from contracting COVID-19 and understanding the measures to take if one did contract the virus. To ensure barrier-free access to the written content provided on the CDC website, messaging needed to be in a language that was fully accessible to the Deaf and hard of hearing population (Möbus, 2010). The health information needed to be accurate, accessible, actionable, culturally relevant, and available in the native language of the intended audience.

In partnership with the Center for Inclusive Design and Innovation at Georgia Tech (CIDI), an Inclusive Design Thinking framework was used to develop accessible and understandable COVID-19 materials for users of ASL. An Inclusive Design Thinking framework is a human-centered approach that recognizes that there will always be a diversity of users in an audience and provides a structure for designing and testing materials to meet the needs of diverse users, including people with disabilities. An Inclusive Design Thinking framework includes five phases or stages that provide the map for understanding the needs of the audience, while designing communication materials and testing their effectiveness (Dam & Siang, n. d.).

Inclusive Design Thinking Framework

An Inclusive Design Thinking framework includes the following five phases, although they are not necessarily completed in a linear fashion and may be repeated throughout a project:

- **Empathize and Understand** the audience and the problem or challenge; Identify cultural considerations and needs. Empathy involves codesign. Codesign is a collaborative process that

actively seeks knowledge and ideas from end users (Ku & Lupton, 2020). Empathy, understanding, and codesign occur throughout the process.

- **Define** stakeholders, community members, end users, and team members. In this phase also define best practices and guidelines for developing the health messages and identify which messages will be translated into ASL.
- **Ideate:** Explore and identify possible solutions. The team explored the use of ASL gloss in initial message design.
- **Prototype:** Develop draft messages and record videos in ASL.
- **Test:** Identify community members and user groups to provide feedback and suggestions on the message content and design. Refine and revise messages as needed.

Empathize and Understand Part 1

CDC identified the need to create accessible and culturally relevant messages on COVID-19 guidance for users of ASL. Although CDC had created a number of ASL COVID-19 videos, they wanted to better meet the needs of the ASL community with their message creation and dissemination. CDC conducted stakeholder meetings to gather feedback and recommendations from the Deaf community and subject matter experts, who determined the following:

- Existing videos were at too high of a health literacy level for this population. U.S. Department of Health and Human Services (HHS) has historically defined health literacy as an “individual’s capacity to obtain, process, and understand basic health information needed to make appropriate health decisions.” (U.S. Department of Health and Human Services, 2010). However more recent definitions developed by the Secretary of Health and Human Services Advisory Panel for Healthy People 2030, places the responsibility on society to provide “accurate health information and services that people can easily find, understand, and use to inform their decisions and actions.” Healthy People 2030 now provides both personal health literacy and organizational health literacy definitions:
 - Personal health literacy is the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.
 - Organizational health literacy is the degree to which organizations equitably enable individuals to find, understand, and use information and services to inform health-related decisions and actions for themselves and others (U.S. Department of Health and Human Services, Healthy People 2030).
- It was clear that the ASL interpreter was hearing and the Deaf community preferred the use of Certified Deaf ASL Interpreters.
- The syntax used in the videos leaned toward English syntax, rather than ASL syntax. ASL has its own unique syntax that differs from that of spoken or written English.
- Effective captioning needed to be included with correct timing, responsive text size, and synchronization with the video. Responsive text or font size can be controlled and customized by the end user, for example the color, font, and size of the text can be changed.
- There was the need to indicate or label that the video is in ASL so users could locate the videos.

Define the Problem Statement and the Process for Message Creation

Teams from CDC, the CDC Foundation, the Center for Inclusive Design and Innovation, and a number of members of the accessibility community identified which CDC COVID-19 resources posted on the CDC website received the most views and would be most helpful to the intended audience when translated into the appropriate accessible medium. For the Deaf community, the CDC guidance would be translated into American Sign Language, videotaped, and posted on the CDC's YouTube channel, while videos would also be posted on the Center for Inclusive Design and Innovation's COVID-19 Accessible Materials Website. The materials were also disseminated through online channels such as Twitter and Facebook.

To translate and disseminate CDC guidance on COVID-19 for users of ASL, there was a need to simplify and compress the CDC guidance so that it could more easily be translated into ASL, could be used to create transcripts and closed captions that would be more readable by a Deaf audience, would be better suited for a video format posted on YouTube, and would meet health literacy needs. Culturally Deaf ASL users may learn ASL at a very young age, and English is often acquired as a second language.

Deaf language learners typically experience limited exposure to English print and English phonology, which may contribute to a general lack of access to health information (Villwock et al., 2021). ASL is a fully fledged natural language with formal linguistic structure at all levels (phonological, morphological, and syntactic), and ASL's organization is supported by a similar neural architecture as found in spoken languages (Perniss et al., 2015).

Effective health information must be crafted and presented so that people can easily find, understand, and act on it. CDC (2021) identifies the three As of health literacy. Effective health information should be:

- **accurate:** the information should be both accurate and easy to understand;
- **accessible:** the intended audience needs to be able to find the information and use the information in a format that works for them; and
- **actionable:** the information should be presented in a way that the intended audience can take action on it.

Guided by these health literacy guidelines and others, including the United States Department of Health and Human Services (HHS) National Action Plan to Improve Health Literacy (U.S. Department of Health and Human Services, 2010), HHS Health Literacy Online (U.S. Department of Health and Human Services, 2015), the Federal Plain Language Guidelines (PLAIN, 2011), and W3C Writing for Web Accessibility Recommendations (Web Accessibility Initiative W3C. (n.d.)), a process was developed to review and revise the CDC COVID-19 guidelines from the text content on the CDC website so that the guidelines could be translated and reformatted as ASL videos accessible to Deaf audiences. The first step was to revise the complex CDC source health guidance from the website into clarified and simplified text phrases suitable for ASL interpreting in short videos while also ensuring that the message was accurate and approved by CDC. In addition to the CDC guidance, it was also important to include important information that may be specific to people with disabilities and culturally relevant information for people who are Deaf or hard of hearing. For example, it was important to include information regarding

face masks with a clear window that would allow a Deaf person to see the lips and facial movements of the person wearing the mask—a family member or teacher for example. Another example included face masks that could be tied behind the head rather than attached to the ears that could be better worn by a person wearing a hearing aid.

The CIDI team, with feedback and approval from the CDC team, used the following process to revise the COVID-19 guidance from the CDC website for ASL translation:

- **Provide one clear main message.** Define what you want the audience to know and be able to do after engaging with your content. If there are several topics, break them into separate documents, webpages, or videos.
- **Put the most important information first.** The audience may not spend much time with the information and may give up if they don't find what they are looking for or see relevant information.
- **Make the content action-oriented.** Tell the audience what to do and how to do it. Write actionable content that focuses on health behavior. Tell users what you want them to do and give them steps to do it.
- **Keep the content focused on one message.** Move related but different content to a new section, document, or video.
- **Use literal, concrete language and words.** Replace abstract words with concrete, specific words. Provide specific examples.
- **Use common easy-to-understand words that are familiar to the audience.** The audience may give up on the content if they are not familiar with or are intimidated by its complexity. Define complex terms in context. When using medical terminology, clearly define the word the first time you use it.
- **Keep sentences and paragraphs short and to the point.** Each section of the message should have only one theme or idea. If you introduce a new idea, start a new paragraph and pause between sections in the video.
- **Separate chunks of information to improve readability.** The information needs to look readable. Large blocks of text can look overwhelming. Use of whitespace can help reduce cognitive load. This idea also applies to organizing ASL concepts that are presented in a video.
- **Use a readable font for any text used on the webpage or in the ASL video.** Font size should be least 12 points or 16 pixels. Use common sans serif fonts, like Verdana, Calibri, or Open Sans. Don't use more than 3 fonts on a page.
- **Make headings meaningful, short, and as specific as possible.** Headings should support the content and aid in navigation and support wayfinding. Headings can be used to help introduce different topics in the video.
- **Divide or break instructions into individual steps.** Complex actions can benefit from an If/Then approach, e.g., If you feel very sick, then you need to call the doctor.
- **Provide multiple means or methods of accessing the content.** Some audience members may prefer to watch a video rather than read text. Provide options.
- **Use simple visuals to support written text.** Use images that help people learn. Visuals can help users with limited literacy skills find, understand, communicate, and use health information. Providing different modes of communication can reinforce the message.

As a next step, the CIDI team provided simplified text for ASL translation to a team of certified ASL interpreters to create an ASL gloss version. The ASL gloss version was next approved by the CDC team and used by ASL interpreters when videotaping the message. The ASL interpreter is seen as a competent bilingual who possesses knowledge of the two languages, English and American Sign Language, and knowledge about the ways of speaking in both languages (Roy, 1992). ASL glossing is a written notation system devised to represent ASL (Supalla & Cripps, 2011).

In the field of teaching ASL, glossing is widespread (Supalla et al., 2017). The focus of glossing in ASL is as a bridge to the English meaning (Supalla & Cripps, 2011). Ensuring the ASL meaning matched the English meaning in the CDC guidelines was important. Providing the ASL gloss to the interpreters who were signing the message for videos meant the interpreters were relaying the message as intended in the guidelines. The process of using ASL glossing also provided the means for script approval by the CDC professionals who were not proficient in ASL. The ASL gloss was also implemented in an effort to limit finger spelling in ASL videos to proper nouns and other acronyms. Figure 1 shows an example of text from the revised information with the corresponding ASL gloss.

Figure 1: Revised Text from Script for ASL Translation in Column 1, with the Corresponding ASL Gloss in Column 2

Text from Script to ASL Translation	ASL Gloss
Washing your hands is an important step to protect yourself and others from COVID-19.	COVID-19 SPREAD TO PROTECT SELF, PROTECT OTHER PEOPLE, IMPORTANT DO-DO? WASH-HANDS.
COVID-19 is spread between people who are in close contact with one another, within 6 feet.	COVID-19 SPREAD HOW? HAPPEN PEOPLE 6 FEET CL-2-person-SET-APART, CL-2 Person-MOVE-TOGETHER
COVID-19 spreads when someone who has the virus coughs, sneezes, or talks and spreads it by air droplets.	PERSON SELF INSIDE HAVE FS-VIRUS, COUGH, SNEEZE, TALK SPREAD-AROUND

Empathize and Understand Part 2

The Design Thinking process is not typically a linear process and empathizing and understanding frequently takes place multiple times throughout a project. For a better understanding of user needs, and codesign opportunities, CIDI conducted a needs assessment with members of the Deaf community through remote (online) focus groups with communication facilitation by certified ASL interpreters and hosted on a secure video platform (BlueJeans). During these focus groups, a moderator questioned the participants about what resources they used to find information about COVID-19 and demonstrated the CDC YouTube channel to the participants. Even though there were ASL videos present, participants could not identify them as being ASL interpreted videos as listed in the indexed list of videos. From this needs assessment, recommendations were made to improve the visibility and findability of the ASL videos, including the following:

- a. Incorporate the ASL symbol for interpret when presenting links from the website to the YouTube channel, in the #COVID-19 playlist title, as images in the thumbnail for each ASL resource, and in the title of each ASL resource.
- b. In ASL video thumbnails, include an image of the ASL interpreter dressed in clothing that contrasts with their skin tone and the video background.
- c. Identify ASL video titles in ASL in the video animation GIF.

Providing public health information during the pandemic in the native language of the intended audience whenever possible was of critical importance as is providing ASL interpreters who are community members and trusted resources. During the COVID-19 pandemic, public appearances and broadcast events of state officials with an ASL interpreter on camera was used in many major cities. Health information must reach Deaf and hard of hearing individuals whose primary language is ASL. As an example, in Georgia, during the COVID-19 pandemic, David Cowan, a Deaf interpreter with native ASL, provided ASL interpretation during briefings given by Governor Brian Kemp. During the briefings, Cowan received information from a hearing certified interpreter, who interpreted the briefings given by the Governor and provided the information to Cowan in ASL. According to Cowan, he reads the ASL signs and changes them to the most accessible form for the Deaf. Cowan is viewed as a trusted resource and community member (Stanfield, 2021). Ensuring crucial health information is communicated in the most understood language by trusted resources is important. Involving the Deaf community in the needs assessment and codesign of messages, and using Deaf ASL interpreters, when possible, helped establish trust between the organization and members of the Deaf community.

Ideate and Prototype

The CIDI and CDC collaborative team developed materials incorporating the recommendations from the needs assessment sessions.

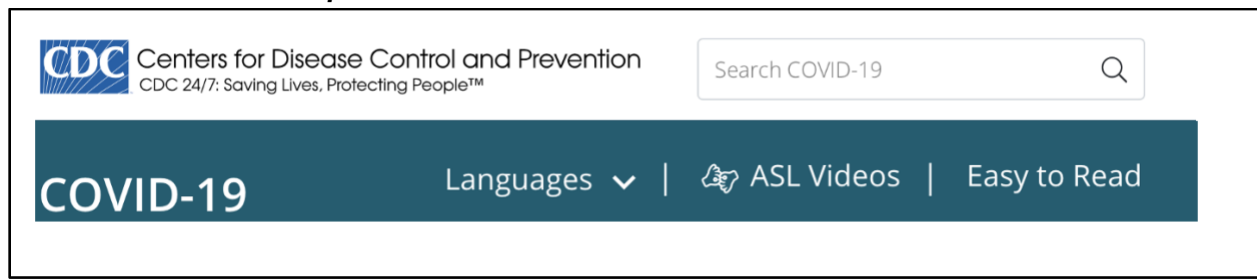
Figure 2: Graphic Icon of the ASL Sign for “Interpret”



Figure 3: Title Slide of ASL Video with Graphic Icon of the ASL Sign for Interpret, Interpreter Dressed in Contrasting Color, and Video Capture Showing Animated GIF of the Video Title Signed in ASL



Figure 4: Banner Image from CDC COVID-19 Website, Including Graphic Icon of the ASL Sign for Interpret with the Menu Header to Link to “ASL Videos”



To further improve findability and accessibility, the ASL videos were also posted on the CIDI microsite which was developed as an accessible hub for access and dissemination providing COVID-19 resources in alternative formats based upon CDC’s guidance, <https://cidi.gatech.edu/covid>.

The CIDI team, with CDC collaboration and feedback, worked with members of the Georgia Deaf community to produce an ASL video introducing the ASL video series. Several shorter videos were also created to post on social media sites.

Figure 5: Screenshot of ASL Video Series Introduction on cidi.gatech.edu ASL Homepage



Closed captions, an accessibility requirement, were created by the CIDI professional captioning team following best practices from the Described and Captioned Media Program (Described and Captioned Media Program (n.d.)), including responsive text size. Responsive text size was an improvement requested in initial stakeholder feedback.

During the COVID-19 pandemic, as many ASL interpreters worked and filmed remotely from home, it was also important to review the ASL videos to ensure that production values including appropriate lighting, background color, and shot framing and composition, were appropriate and consistent. The CIDI team provided this feedback.

Feedback and Testing

Feedback from the Deaf community was positive. Many of the ASL videos were shared widely and reposted on numerous websites that reach a large Deaf community audience. Additional testing with Deaf community members and focus groups will be forthcoming as part of a follow-up project on accessible health and emergency communication.

As the project continued, the need for additional content arose as the COVID-19 pandemic is an ongoing public health emergency. Additional ASL videos on vaccine topics were developed and posted to the CDC YouTube channel and the CIDI Accessible Materials microsite. An additional feature of the ASL vaccine videos was to add the audio content of voiceover narration.

As the pandemic progressed and the Delta variant spread, especially in communities where vaccination rates were low, there was a need to hear from members of the Deaf community who got vaccinated and to hear their reasons for getting vaccinated. An additional ASL Vaccine Testimonial video was produced with ASL users sharing their reasons for getting vaccinated and a call to action asking others to find their reason and to get vaccinated.

In total, over 30 ASL videos were developed. The team recommends this process as useful for other Federal, State and Community groups who need to communicate using American Sign Language during a critical health crisis, emergency situations, and also during the important work of disseminating ongoing health information for the public good, especially in situations in which the agency has little or no knowledge of American Sign Language.

OUTCOMES AND BENEFITS

This article describes the framework of Inclusive Design Thinking as applied to messaging, specifically health messaging in ASL. The Inclusive Design Thinking framework helps teams work together to understand the needs of the intended audience and provides a process for improved team communication and collaboration, which proved to be a successful model when applied to developing messaging in ASL during the COVID-19 pandemic. Although some health messaging in ASL videos was available, they were not being utilized by the Deaf community. Through a needs assessment conducted with members from the Deaf community, we learned that there was a paucity of health guidance in ASL

that could be easily found and understood. Although there were previous videos that included sign language, they were not well identified. Information from the message testing providing guidance for adding visual icons and animated gifs to help users of ASL identify and find the health messaging available in appropriate communication medium of ASL. The message cannot be utilized if it cannot be found. Further, the syntax used in the original videos leaned toward English syntax, rather than ASL syntax. The benefits of applying Inclusive Design Thinking framework allowed for empathizing with and understanding the needs of the intended audience as well as providing the framework that guided collaboration and communication between teams.

This information is foundational in techniques and outcomes to information sharing for a unique population, such as individuals who are Deaf and hard of hearing. These techniques and outcomes may be replicated in other messaging or informational settings that have similar constraints. Through our collaborative efforts, ASL videos of CDC guidance for COVID-19 and COVID-19 vaccinations have currently been viewed more than a million times.

Future efforts to create messaging for individuals who are Deaf and hard of hearing may adopt this foundation of applying Inclusive Design Thinking framework. The framework, as applied, has proven to be successful and served an extremely important task. This could enhance accessibility for Deaf and hard of hearing individuals and create inclusive messaging and information for all future public health messaging, governmental information, or other essential information.

Although the ASL portion of this collaborative project between CIDI and CDC has been completed, the CDC has continued to implement the practices recommended and developed as a result of this collaboration. Strategies and practices from this project also correspond with key recommendations for policy makers regarding Effective Communication from the National Council on Disability 2021 Progress Report: The Impact of COVID-19 on People with Disabilities.

“All federal entities involved in public health, emergency management, and the provision of public announcements or briefings of broad public importance should prepare and disseminate information related to any pandemic or public health emergency in accessible formats, including providing sign language interpretation and/or captions during live and prerecorded video briefings; making all written materials available in alternative formats; and making all online materials accessible (2021 Progress Report: The Impact of COVID-19 on People with Disabilities, 2021). This project provides an Inclusive Design Thinking framework and a case study that other organizations can use as a model to better implement health messaging that is inclusive and accessible to all diverse members of the public including Deaf and hard of hearing people who use ASL as their primary means of communication.

DECLARATIONS

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