Reimagining Video Communication: A Participatory Design Approach to Enhancing User Experience for Deaf ASL Signers

By

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Abstract

This research explores the reimagining of UI/UX design in digital communication tools to better serve the Deaf community, addressing challenges posed by Audism—the discrimination against individuals who cannot hear. Despite the importance of Sign Language (SL) as a primary mode of communication for many Deaf individuals, most digital communication platforms are designed with spoken language interactions in mind, inherently creating barriers for Deaf users. Through participatory design methods and direct engagement with Deaf community members, this study investigates specific challenges Deaf users face when using current video chat applications and identifies design interventions that can significantly improve their user experience. Utilizing focus groups conducted in American Sign Language (ASL) with certified interpreters, this research uncovered six major themes: Platform Preferences and Evolution, Visual Space and Interface Design Challenges, Visual-Centric vs. Audio-Centric Design, Multilingual and Multicultural Needs, Participatory Design and Ownership, and Economic and Social Considerations. Building on these findings, an interactive prototype was developed and tested with members of the Deaf community. Results suggest that effective communication platforms for Deaf users should prioritize visual communication, incorporate cultural elements such as sign names, offer customizable interfaces, and address economic barriers to technology access. This research contributes to more inclusive digital communication design practices that prioritize Deaf users' needs rather than treating them as an afterthought in accessibility compliance.

Keywords: Deafness, user experience (UX), user interface (UI), deaf culture, inclusive design, participatory design (PD), American Sign Language (ASL), digital accessibility

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1. Introduction

In an increasingly digital world, communication technologies play a vital role in connecting people across distances and contexts. However, the design of these technologies often reflects implicit biases and assumptions about how people communicate, particularly privileging spoken language over visual forms of communication. This research examines the intersection of digital design, Deaf culture, and inclusive technology through a critical examination of video communication platforms.

The predominance of audio-centric design in digital communication represents more than just a technical oversight; it reflects deeper societal attitudes toward deafness and communication. Humphries (1975) coined the term "Audism" to describe the belief that one is superior based on their ability to hear or behave in ways that reflect those of hearing society. This concept has evolved to encompass systemic discrimination and design practices that privilege hearing ways of being while marginalizing Deaf perspectives and experiences.

Digital communication platforms, even those centred around video, often embed Audist assumptions in their design. Features such as microphone prominence, audio-triggered interface reactions, and the relegation of visual communication features to secondary status reflect an underlying assumption that "normal" communication is spoken rather than signed. This bias manifests not just in feature prioritization but in the fundamental architecture of these platforms, where video quality—essential for Sign Language communication—may be sacrificed for audio clarity.

The consequences of these design choices extend beyond mere inconvenience. When Deaf users encounter platforms designed primarily for hearing users, they experience a form of digital exclusion that reinforces broader patterns of marginalization. While accessibility standards like the Web Content Accessibility Guidelines (WCAG) have made progress in addressing some aspects of digital inclusion, they often position Sign Language accommodation as a lower-tier priority compared to text-based alternatives for audio content (Bianchini et al., 2018). This hierarchical approach to accessibility reflects and reinforces assumptions about whose communication needs are central and whose are peripheral.

This research aims to challenge these hierarchies by reimagining video communication platforms from a Deaf-centred perspective. Rather than approaching accessibility as an add-on feature to be implemented after core design decisions are made, this study explores how communication tools might function if Deaf users' needs and preferences were prioritized from the outset. This approach aligns with broader movements in disability studies that advocate shifting from medical models of disability (focused on "fixing" individuals) to social models that examine how environments and technologies can be redesigned to accommodate human diversity (Oliver, 1990).

By engaging directly with Deaf community members through participatory design methods, this research acknowledges that expertise about Deaf experiences resides primarily within the Deaf community itself. This participatory approach responds to calls from disability activists and scholars for research that centers marginalized perspectives and recognizes users not as subjects of study but as co-creators of knowledge and design solutions (Hamraie & Fritsch, 2019).

To address these challenges, this research poses the following questions. The main research question asks: How can we reimagine the design of video chat applications to better serve the communication needs of Deaf users while addressing the challenges posed by Audism and promoting inclusive user experiences? Additionally, the research explores two secondary questions: What are the specific challenges and preferences of Deaf users when using current video chat applications? What are the optimal design interventions and features that can significantly improve the user experience for Deaf individuals in online video communication contexts?

Through focus groups, prototype development, and user testing, this research seeks not only to identify specific design features that better serve Deaf users but also to contribute to broader conversations about how centring marginalized perspectives in design can lead to innovation that benefits diverse users. By challenging normative assumptions about communication embedded in current technologies, this work aims to contribute to more inclusive digital futures that recognize and celebrate the richness of human communication in all its forms.

2. Backgrounds

2.1. Deaf Culture and American Sign Language (ASL)

The Deaf community is a rich and vibrant community characterized by its unique language, social norms, and shared experiences. American Sign Language (ASL) serves as the primary mode of communication for many Deaf individuals in the United States and Canada. ASL is a fully developed language with its own grammar, syntax, and vocabulary, distinct from English. It is expressed through hand signs, facial expressions, and body language, enabling nuanced and expressive communication among its users (Pollard & Barnett, 2009). The use of ASL not only facilitates communication but also fosters a sense of identity and belonging within the Deaf community.

The Deaf community is often defined by the capitalized term "Deaf," which signifies a cultural identity rather than merely a medical condition. This distinction emphasizes that Deaf individuals share a common linguistic and cultural heritage, which includes values, traditions, and social practices that are integral to their identity (Meador & Zazove, 2005). Many Deaf individuals view their deafness as a cultural feature rather than a disability, leading to a strong sense of pride in their identity and community (Withrow et al., 2008). This perspective is supported by research indicating that Deaf individuals often prefer to interact with others who share their cultural background, reinforcing the importance of community and shared experiences (Hoang et al., 2010).

This understanding of Deaf culture—its distinct language, strong cultural identity, and community values—is fundamental to this research. Rather than simply removing audio features from existing platforms, we must reimagine video communication tools that authentically embrace Deaf cultural practices and communication preferences. Our research builds upon these cultural insights to create solutions that actively support and celebrate Deaf identity in digital spaces.

2.2. Sign Language Accessibility

In the late 1990s, the generalization of the Internet prompted the development of best practices for accessibility, most notably by the World Wide Web Consortium (W3C) through the Web Content Accessibility Guidelines (WCAG). Initially, WCAG 1.0 focused on labelling and transcribing audio content, suggesting the use of subtitles and text alternatives for audio content. However, this approach failed to recognize that written text is not always a suitable substitute for deaf users who are more proficient in SLs than in written VLs. (Bianchini et al., 2018)

WCAG 2.0, introduced in 2008, marked a significant improvement by better addressing the needs of deaf users. It introduced success criteria such as providing sign language interpretation for pre-recorded audio content. Despite these advancements, these guidelines are still insufficient to fully address the needs of deaf users, highlighting the need for more comprehensive and nuanced solutions that go beyond mere text substitutions (Bianchini et al., 2018).

This research addresses this gap by reimagining video communication design from the ground up, with Deaf users' needs and preferences as the starting point rather than an afterthought in accessibility compliance.

2.3. Participatory Design

Participatory Design (PD) is a user-centered design approach that emphasizes the active involvement of end-users throughout the design process. Originating from the fields of architecture and industrial design in the 1970s, PD has evolved to encompass a wide range of applications, particularly in technology and digital solutions. The core principle of PD is to democratize the design process by empowering users to contribute their insights, experiences, and preferences, thereby ensuring that the final product aligns with their needs and values (Roper & Skeat, 2022). This approach is grounded in the belief that users are not merely passive recipients of technology but are active participants who can significantly influence

design outcomes. The participatory design methodology is characterized by collaborative practices that involve users in various stages of the design process, from identifying needs to developing and testing design solutions (Clemensen et al., 2016). This engagement fosters a sense of ownership among users, as they become co-designers rather than mere subjects of research.

Moreover, PD is particularly relevant in addressing issues of accessibility and inclusivity. By involving diverse stakeholders, including those from marginalized communities, PD can help identify barriers and facilitate the design of solutions that are more equitable and user-friendly (Henni et al., 2022).

3. Related Work

3.1. Video Communication Platforms for Deaf and Hard-of-Hearing Users

The landscape of video communication for Deaf and Hard-of-Hearing (DHH) users has evolved significantly, driven by a growing recognition of the need for inclusive design and the increasing need for videoconferencing during and after the COVID-19 pandemic.

Customizable interface options are another vital feature that can significantly enhance the user experience for DHH individuals. Chong's study on the Deaf in Touch Everywhere (DITE) mobile application emphasizes the importance of tailoring user interfaces to meet the specific needs of Deaf users, including options for adjusting video layouts and accessibility features (Chong, 2024). Customizability allows users to create an environment that best suits their communication preferences, thereby fostering a more engaging and effective interaction.

Mittal's examination of the Jod platform suggested that introducing prominent visual cues for attention-getting, such as flashing video borders or animated icons, can help DHH users effectively interject in ongoing conversations (Mittal et.al., 2023). Providing haptic feedback mechanisms (e.g., vibrations) to notify users of incoming messages or requests can also

improve communication flow. Integrating clear turn-taking management procedures and guidelines can further facilitate smoother interactions in mixed hearing groups. Jod's implementation of preset messages and gesture recognition features enables DHH users to easily get attention or request adjustments in communication style.

To address Audism biases, shifting the focus from audio to visual cues for speaker identification is crucial for creating more inclusive video chat platforms. Notably, the Jod platform developed features that automatically detect and highlight the video tile of the active signer, prioritizing the video tiles of signers and interpreters in default layouts and when speaker view is activated, and incorporating sign language recognition and interpretation features to facilitate communication between signers and non-signers.

Although the solutions posed by these studies are great references for this research when it comes to the usability for DHH users, their main focus is on bridging mixed hearing groups rather than communication among Deaf signers. While some of the solutions are applicable to Deaf signers, this research will continue to explore users' preferences for communication using ASL and take the cultural nuances into consideration to improve Deaf culture inclusivity in the digital world.

3.2. Interface Preferences of Deaf Signers

The authors of "Bridging the Digital Divide for Deaf Signer Users" conducted a series of experiments under the Cogniweb project to address the challenges deaf signers face in navigating the web. The experiments involved deaf signer users performing web navigation tasks, such as finding news headlines, categorizing items, and locating goods in an online shop. Higher reading proficiency correlated with better search performance, highlighting the importance of reading skills for web navigation (Fajardo et al., 2008). Deaf signers exhibited lower efficiency in verbal categorization tasks, affecting their ability to navigate hierarchical websites (Fajardo et al., 2007).

The research team further explored the impact of different menu structures on user experience. Comparing wide (few layers) and deep (many layers) menu structures, wide structures initially

overloaded deaf users but improved with practice, while deep structures were preferable for occasional use, reducing initial overload (Fajardo et al., 2008).

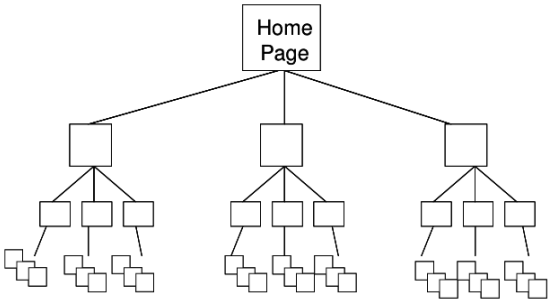


Figure 1. Sketch of the Deep Web structure (8x3x3x3) used in Fajardo et al. (2008).

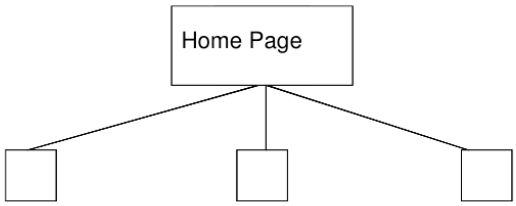


Figure 2. Sketch of the Wide Web structure (62x3) used in Fajardo et al. (2008).

To improve the web readability for Deaf signer users, the authors also tested different hyperlink formats, including textual, graphical (icons), and SL video links. Graphical hyperlinks improved performance in shallow structures but were less effective in deeper ones unless the icons were highly familiar. Clickable SL video links significantly enhanced navigation efficiency and reduced disorientation compared to text-only links (Fajardo et al., 2007).

While these findings from the Cogniweb project focus on web navigation, their insights about language proficiency, interface preferences, and the effectiveness of Sign Language video elements remain valuable for our research. Building upon their demonstrated principles, particularly regarding user interface structure and Sign Language integration, this research aims to develop more inclusive video communication tools that better serve the Deaf community's specific needs.

3.3. Deaf-friendly User Testing

Traditional usability testing methods often overlook the unique communication preferences and challenges faced by Deaf individuals, who predominantly use SLs rather than spoken or written

languages. This oversight has prompted researchers to adapt existing methodologies to better accommodate Deaf participants.

One significant adaptation is the modification of the Think-Aloud Protocol (TAP) for Deaf users. The TAP, a widely used usability testing method, relies on participants verbalizing their thoughts as they interact with a system. However, since Deaf individuals primarily communicate through sign language, adaptations such as the "Think by Signs" protocol have been developed. This bilingual approach allows participants to express their thoughts in SL, thereby providing insights that are more reflective of their experiences and preferences (Bianchini et al., 2018).

Additionally, remote usability testing has emerged as a viable alternative to traditional face-to-face methods. This approach offers several advantages, including increased convenience and the ability to recruit participants from diverse geographic locations (Schnepp & Shiver, 2011). However, it also presents challenges, as many remote testing technologies still compel Deaf participants to use English rather than their preferred language, ASL. Recent advancements in remote testing technologies aim to address this issue by enabling studies conducted exclusively in ASL, thus promoting a more authentic and accessible testing environment (Schnepp & Shiver, 2011; Unger et al., 2021).

Building on these insights, this research employs participatory design methods that prioritize Sign Language communication and Deaf cultural perspectives in the development of video communication tools. The research will be conducted in ASL through certificated interpreters to ensure that both our research methodology and the resulting design solutions authentically reflect the needs and preferences of the Deaf community.

4. Study Design

4.1. Participant Recruitment

Participants in the study are recruited mainly through Facebook groups (Toronto in ASL and Deaf Community Toronto) and snowball recruiting through participants and their connections,

with a poster approved by the Research Ethics Board (REB). The participants were required to fill out a screening form to make sure they met the participant criteria, which included:
Inclusion Criteria:

- Adults aged 18-65
- Self-identify as Deaf
- Primary users of ASL for communication
- Regular users of video chat applications

Exclusion Criteria:

- Individuals with severe visual impairments that significantly impact their ability to use video chat applications
- Individuals whose preferred language is not ASL

In the study, 7 participants were recruited, including 4 aged between 36 and 45, 1 between 18 and 25, 1 between 26 and 35, and 1 between 46 and 55. They were all provided with the Consent Form with an ASL translated video, stating their rights in the research procedure.

4.2. Study Procedure

The study employed a multi-phase design to explore, analyze, and validate findings:

Phase 1: Focus Groups

Two focus group sessions were conducted with the seven participants, with four participants in the first group and three in the second. These sessions were facilitated entirely in ASL with certified interpreters present. The focus groups employed a semi-structured format, allowing for both guided discussion of key topics and spontaneous exploration of emerging themes. This approach created space for participants to discuss their experiences, preferences, and challenges with current video communication platforms in depth while ensuring core research questions were addressed.

Each focus group lasted approximately 120 minutes and covered topics including:

- Current platform usage and preferences
- Specific challenges encountered in video communication

- Features participants found helpful or problematic
- Cultural considerations in digital communication
- Desired improvements or innovations

The sessions were video recorded with permission and later transcribed for analysis, with careful attention to preserving the meaning and nuance of ASL expressions.

Phase 2: Analysis and Prototype Development

Following the focus groups, transcripts were analyzed using thematic analysis (Braun & Clarke, 2006) to identify patterns and key themes. This analysis informed the development of an interactive prototype designed to address the challenges and preferences identified by participants. The prototype focused on creating a more visually-oriented interface that incorporated Deaf cultural elements and communication preferences.

Phase 3: Prototype Testing

In the final phase, individual testing sessions were conducted with four participants from the original focus groups. Each participant engaged in a one-on-one session where they interacted with the prototype and provided feedback on its features, usability, and cultural appropriateness. These sessions were also conducted in ASL with certified interpreters and followed a think-aloud protocol adapted for sign language users. Feedback from these sessions was documented and analyzed to identify strengths, weaknesses, and potential refinements to the prototype.

4.3. Data Analysis Approach

The focus group transcripts were analyzed using thematic analysis (Braun & Clarke, 2006), which involved a systematic process of coding and theme development. After familiarization with the data, initial codes were generated to capture key concepts related to video communication experiences. These codes were then collated into potential themes, which were reviewed and refined to ensure they accurately represented the data. The final themes were named and defined to capture the essence of participants' experiences and perspectives.

4.4. Author's Positionality

This research is informed by my positionality as a hearing researcher working with Deaf participants. As someone who has experienced temporary disability and understands the isolation that can accompany marginalization, I approach this work with empathy while recognizing that my experience differs fundamentally from the lived experiences of culturally Deaf individuals. This awareness shaped my methodological choices in several key ways.

First, I prioritized participatory methods that positioned Deaf participants as co-creators of knowledge rather than subjects of study, acknowledging that my hearing status creates limitations in my understanding of Deaf experiences with video communication platforms. This approach aligns with my belief that knowledge is co-created through meaningful engagement, particularly when working across cultural and linguistic differences.

Second, my background in inclusive design and experience researching across diverse cultural contexts informed my decision to conduct focus groups in American Sign Language with certified interpreters, rather than requiring participants to adapt to written or spoken English formats. This choice recognizes ASL as a complete language and essential component of Deaf cultural identity, not merely an accommodation.

Throughout the research process, I remained conscious of power dynamics that could emerge between a hearing researcher and Deaf participants, particularly in a society where audism remains prevalent in digital design. To address this, I worked with a Deaf consultant to review my research design before implementation and incorporated regular reflection on how my hearing status might influence data collection and analysis.

My positionality has ultimately reinforced my commitment to designing with rather than for marginalized communities, and to challenging assumptions about accessibility that position Deaf needs as supplementary rather than central to the design process.

5. Findings

5.1. Thematic Map

After generating over 120 initial codes, these were collated into potential themes based on patterns of meaning. The themes were then reviewed to ensure they accurately represented both the coded extracts and the entire dataset. The final thematic structure, illustrated in Figure 3, consists of six major themes, each with multiple subthemes that capture the richness and complexity of participants' experiences.

The frequency distribution of codes across these themes (Figure 4) further illustrates their relative prominence in the focus group discussions, with Accessibility Issues and Platform Preferences emerging as the most frequently discussed topics.

Thematic Analysis: Video Communication Experiences of Deaf Users

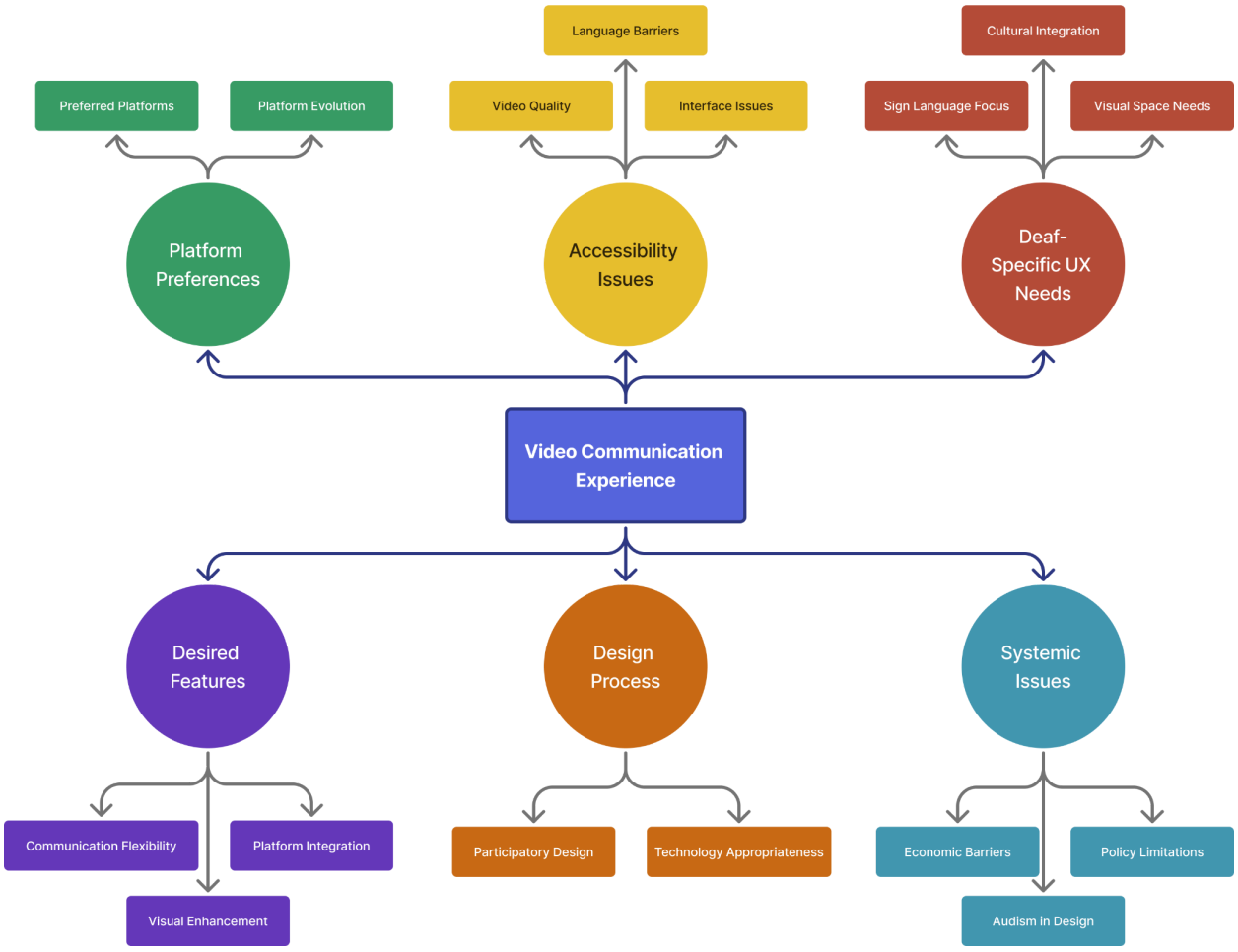
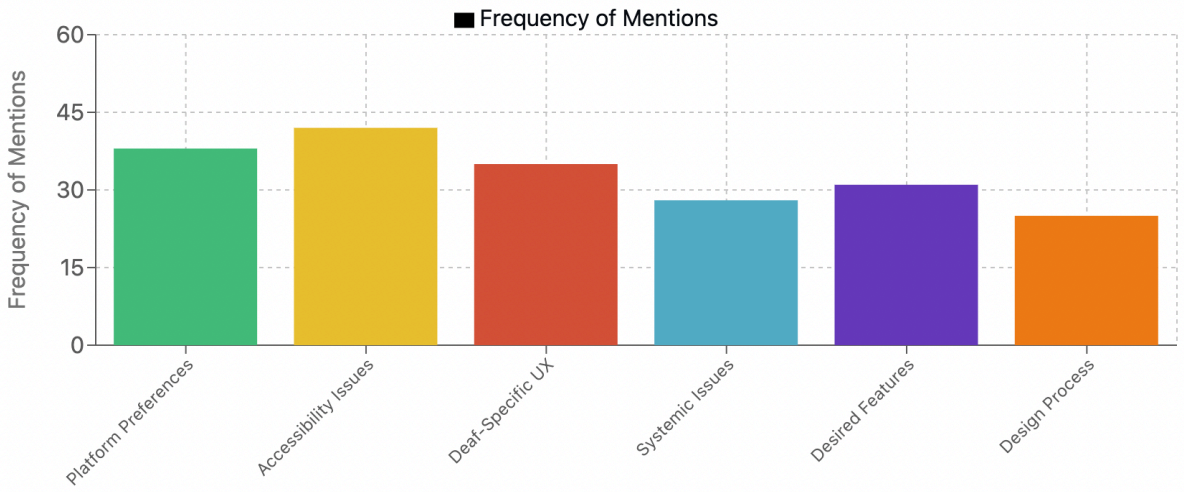


Figure 3

Frequency of Thematic Codes in Focus Group Data



Note: Frequency represents the number of distinct references to each theme across both focus groups

Figure 4

5.2. Key Themes

Theme 1: Platform Preferences and Evolution

Participants described a clear evolution in their platform usage, moving from Deaf-specific applications to more mainstream options due to various factors including cost, usability, and social network effects. While early platforms like Glide and Marco Polo were designed with Deaf users in mind, many participants have transitioned to more widely-used applications:

> 'Glide has been very, very popular, and then they started adding more cost to the various features. And so sort of as a collective community, the deaf folks moved over to using Marco Polo.' (P6, FG#2)

This migration pattern reflects broader challenges in sustaining accessible technology specifically designed for the Deaf community. Currently, WhatsApp emerged as a preferred platform for many participants due to its cross-device compatibility and support for both text and video communication:

> 'For me, WhatsApp is my preference... it's diverse and many different people can use it. Whether you've moved here from another country, most people are familiar with it.' (P5, FG#2)"

Theme 2: Visual Space and Interface Design Challenges

Participants consistently identified challenges related to visual space management in video communication platforms. The fixed layouts and limited customization options in current platforms create significant barriers for sign language communication:

> 'The videos end up so small depending on how many people you have in the meeting, and it's very uncomfortable on the eyes to watch it for any period of time.' (P7, FG#2)

Screen sharing functionality, particularly in platforms like Microsoft Teams, presents additional challenges:

> 'Microsoft Teams doesn't allow that. It takes over. It consumes all the real estate on the screen. So you end up seeing all the participants, all the participants in tiny little boxes, and then you can see the screen share.' (P2, FG#1)

These interface limitations reflect a fundamental design orientation toward spoken rather than visual language, reinforcing audio-centric assumptions about communication.

Theme 3: Visual-Centric vs. Audio-Centric Design

A recurring theme throughout both focus groups was the persistent audio-centricity of current platforms, reflecting Audism in design. Several participants noted that platform features remain optimized for spoken communication despite the visual nature of sign language:

> 'If you're having a meeting with all deaf people, the pin function ceases to be very helpful, because you need to be able to see everyone.' (P7, FG#2)

Even accessibility features often prioritize audio interactions:

> 'I find that frustrating is the microphone. Obviously, this is a hearing based app, because it's on the bottom right. This the speaker, the microphone, and I click it all

> the time by accident. I mean, I don't tend to, I don't have no intentions of speaking.' (P5, FG#2)

Participants expressed a desire for platforms that prioritize visual interaction models:

> 'It would be nice if there was a feature that as soon as someone picks up their hands and starts signing, then that comes to the the main screen.' (P5, FG#2)"

Theme 4: Multilingual and Multicultural Needs

Participants highlighted significant gaps in language support across platforms. For many Deaf individuals, the inability to access content in their preferred languages creates substantial barriers:

> 'My fourth language is English, my FOURTH language, so my preference, I mean, is to speak in my my preferred language, Farsi, not English.' (P3, FG#1)

The need for multilingual support extends beyond text to include sign language representation and multiple caption options:

> 'I would like to see... to have two boxes on the bottom. Here's the captions in English, and here's the captions in Korean, supporting that language.' (P2, FG#1)

These observations reflect how current 'universal design' approaches often fail to accommodate linguistic diversity within the Deaf community:

> 'The universal design in general is not deaf friendly, and that there needs to be more of a shift to deaf friendly.' (P4, FG#1)"

Theme 5: Participatory Design and Ownership

Participants strongly emphasized the critical importance of involving Deaf individuals throughout the design process. They expressed frustration with technologies developed without meaningful Deaf input:

> 'Any apps that are developed for the deaf community should be done WITH Deaf people, not FOR them... If it's going to be accessible for Deaf people, you need to

> include deaf people, or you're just, you know, repeating the same inaccessible apps that we already see.' (P2, FG#1)

This sentiment was echoed across multiple participants, who cited examples of failed technologies developed without Deaf involvement:

> 'Whoever designed those [signing gloves] did not include deaf people... They just came up with this idea and ran with it and decided they're going to do this FOR deaf people.' (P4, FG#1)

The principle of 'nothing about us without us' emerged as essential for creating genuinely accessible and culturally appropriate communication platforms.

6. Prototyping and Testing

6.1. Prototype Development Process

Based on the themes and insights identified in the focus groups, a mid-fidelity prototype of a messaging and video communication application was developed to address the specific needs of Deaf users. The prototype was designed using Figma, a collaborative interface design tool that allowed for interactive testing without requiring full development. The design process was guided by the principle of creating a visually-centric communication tool that integrated cultural elements important to the Deaf community while addressing the practical challenges identified by participants.

The prototype development focused on several key areas:

1. **Reimagining interface priorities**: Unlike mainstream apps that prioritize audio communication elements, the prototype emphasized visual communication by placing video recording options prominently in the interface while relegating audio options to secondary menus.
2. **Integrating cultural elements**: Features like sign name integration were incorporated to honour Deaf cultural practices and facilitate identity expression in digital spaces.
3. **Optimizing visual space**: Interface layouts were designed to maximize visual clarity for signing, with consideration given to different screen orientations and multi-person conversations.

4. **Addressing economic barriers**: The prototype was designed with consideration for data usage and server requirements, informed by participants' concerns about access and affordability.

The resulting prototype included messaging, video calling, and profile features with special attention to Deaf users' specific needs, such as the ability to move or hide self-view to avoid obscuring others' signing.

6.2. Prototype Features

The prototype incorporated several innovative features specifically designed to address the needs identified in the focus groups:

6.2.1. Messaging Interface (Figures 5, 6, 7, 8, 9)

- Prominent video recording button for easy access to visual communication
- Text-based messaging with standard keyboard functionality
- Secondary menu for less frequently used features (audio, location, files)
- Video preview with options to retake or send

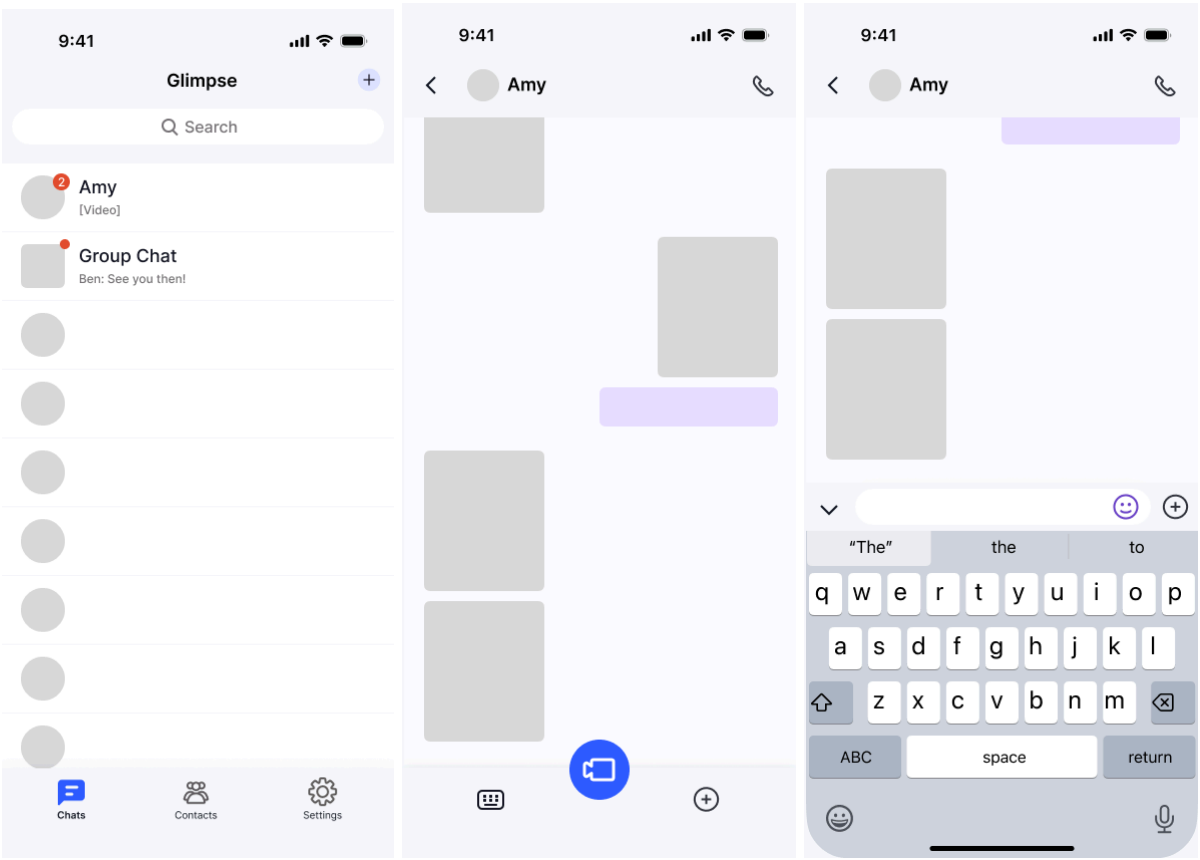
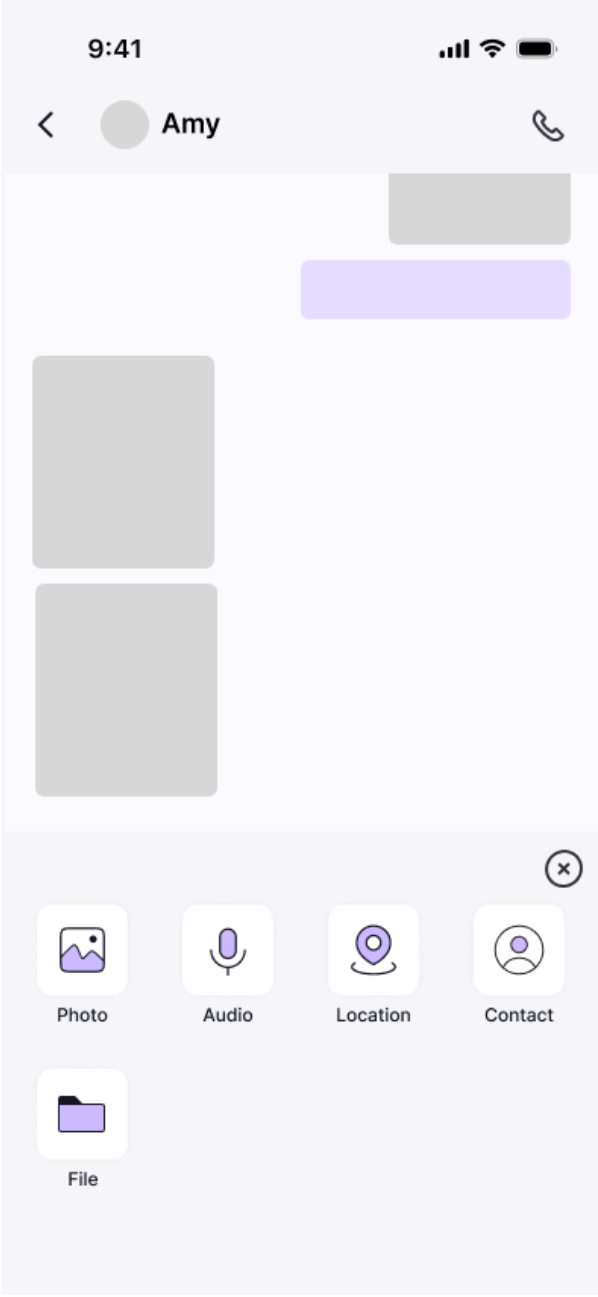


Figure 5. Home page with chats

Figure 6. Personal chat window

Figure 7. Personal chat with keyboard enabled



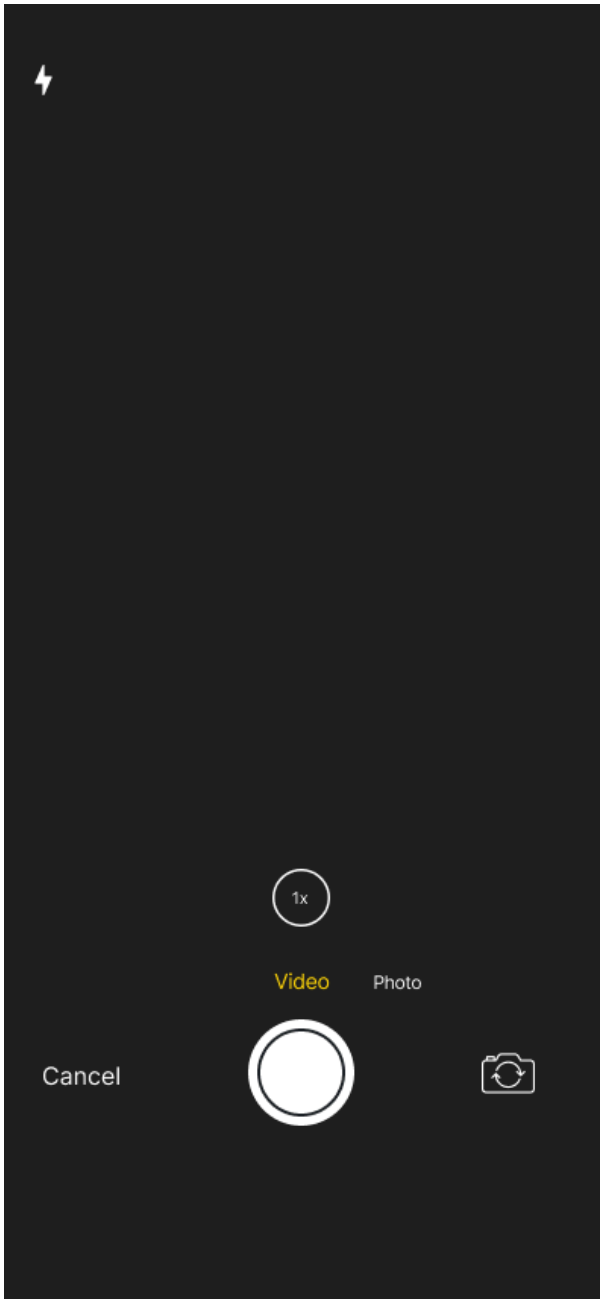


Figure 8. “Plus” button enabled

Figure 9. Video recording interface

6.2.2. Video Calling (Figures 10, 11, 12)

- Customizable video layouts to optimize signing visibility
- Options to move self-view or hide it entirely
- Landscape mode optimization for better signing visibility
- Intelligent layout for group calls that prioritizes active signers

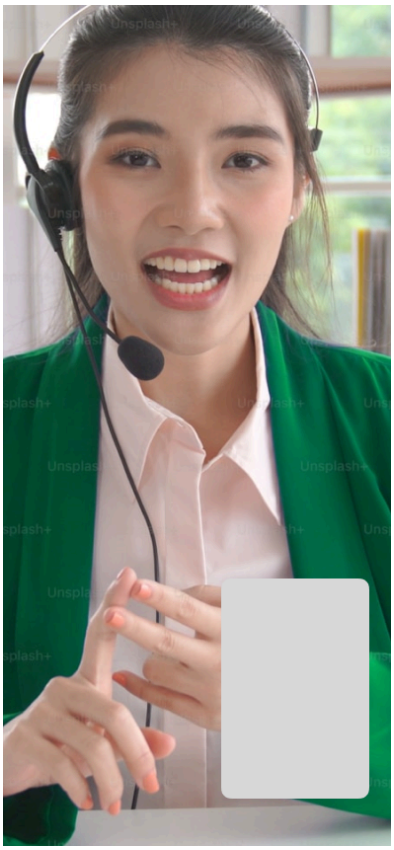


Figure 10. Video call interface

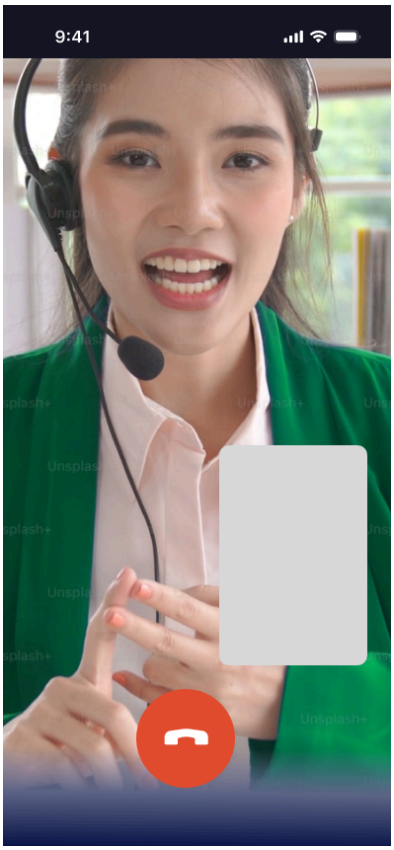


Figure 11. Video call interface after tapping on the screen

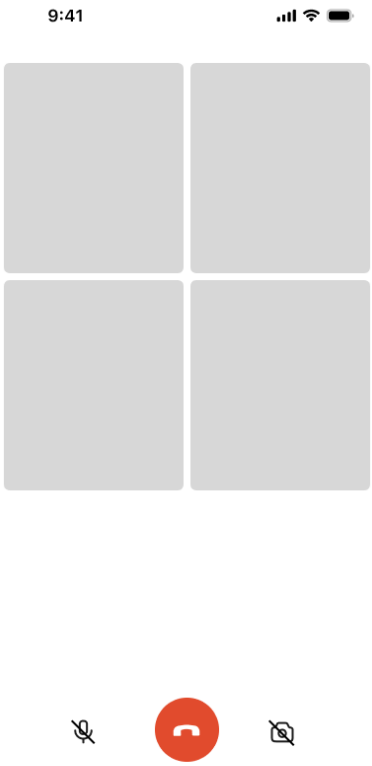


Figure 12. Group video call interface

6.2.3. Cultural Integration (Figures 13, 14)

- Sign name feature allowing users to record and share their sign names
- Profile customization with video integration
- ID-based contacts to reduce reliance on phone numbers

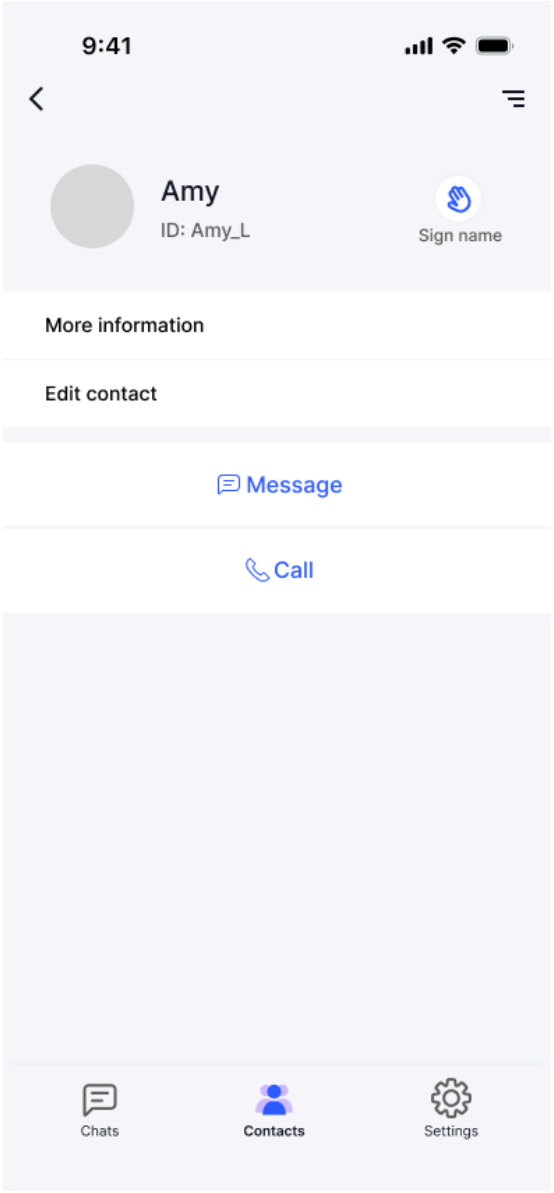


Figure 13. Contact detail

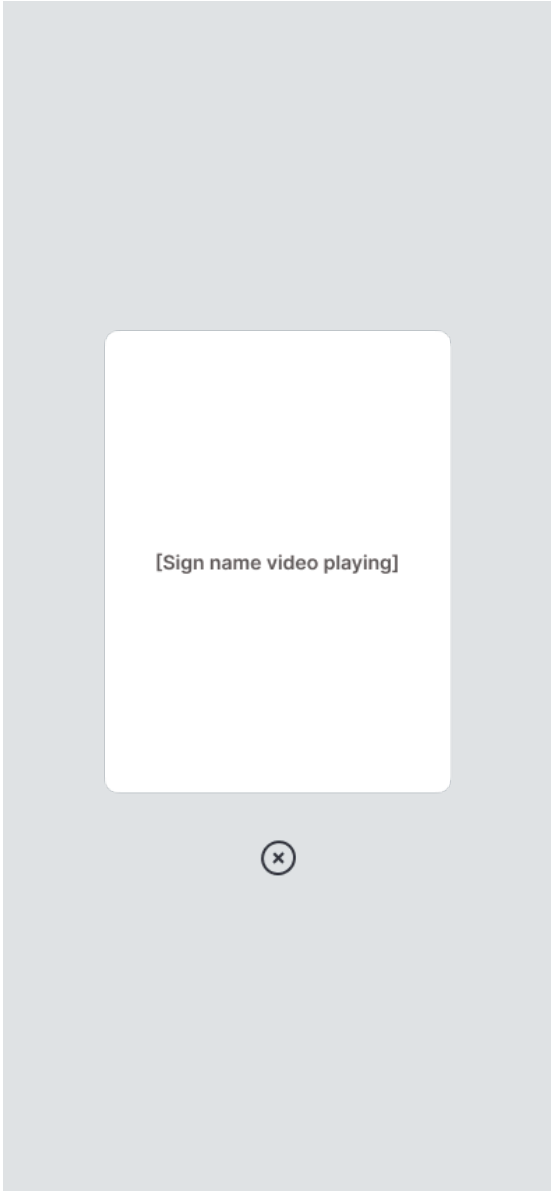


Figure 14. Sign name video pop-up window

6.2.4. Accessibility Features

- Dark mode option to accommodate diverse visual needs
- Captions for any audio content

6.3. Testing Methodology

The prototype was tested with four participants from the original focus groups in one-on-one sessions conducted in ASL with certified interpreters. These sessions lasted approximately 60 minutes each and employed an adapted think-aloud protocol suitable for sign language users. Participants were asked to:

1. Explore the prototype independently
2. Attempt specific tasks (sending messages, making calls, accessing profiles)
3. Provide feedback on features, layout, and overall experience
4. Suggest improvements or additional features

Sessions were video recorded with permission and later transcribed and analyzed to identify common themes in feedback and specific recommendations for improvement.

6.4. Testing Results

Participant feedback on the prototype revealed several consistent themes and insights that will inform further development.

6.4.1. Positive Feedback

Interface Priorities: Participants appreciated the prominence of video communication options and the de-emphasis of audio features.

> "I like what you've done with putting the audio option on the little plus button next to the video recording... it's nice to have that option too." (P1)

Sign Name Feature: The integration of sign names into user profiles was particularly well-received, with participants noting its cultural significance.

> "That's really cool. I think it'd be nice. It could be like embedded... I could see the contact picture, like Amy's picture, and then beside that, it'd be nice if I could have her sign name right there as well." (P3)

Visual Layout Considerations: Participants appreciated the attention to visual space management, particularly for group calls.

> "It works nicely. It's a good size. I can see everyone. It's easy to point to what I'm referring to." (P4)

ID-Based Contacts: The option to connect via ID rather than phone number was valued for privacy and convenience.

> "It's nice to be able to use an ID to contact someone, because then you don't have to give out your personal number." (P1)

6.4.2. Constructive Feedback and Suggestions

Video Layout Improvements: Participants suggested refinements to the video calling interface, particularly regarding how users view themselves and others.

> "It's better to separate the two video boxes, like one bigger on the top, and like the other smaller, rather than overlapping so it like the box, the box of ourselves doesn't block the like any view of the other one." (P2)

Landscape Mode Preference: Multiple participants emphasized the importance of landscape orientation for signing.

> "If it's the way it's set up right now, you don't see... sometimes you only get 75 to 90% of their visual. For deaf people, it's very important to be able to see face, eyebrows." (P3)

Group Call Management: Participants suggested advanced features for group calls, such as automatic highlighting of active signers.

> "It would be nice if there was a feature that as soon as someone picks up their hands and starts signing, then that comes to the main screen." (P2)

GIF and Sticker Integration: Several participants requested robust support for ASL GIFs and customizable sticker galleries.

> "For the audio option, honestly, I don't care where you put that in the app... It's nice to have a photo and a filter included as well." (P4)

Accessibility Considerations: Some participants highlighted the need for features that would make the app accessible to Deaf-Blind users.

> "I've got some... three or four deaf-blind friends, and they prefer like dark mode. It's better for presentations and just being online in general." (P4)

6.4.3. Implementation Concerns

Participants raised important considerations about the practical implementation of the app:

Server Capacity and Cost: Concerns about video quality versus data usage and potential subscription costs were frequently mentioned.

> "The video quality has to be good. Can't be freezing or blurry... at the same time, not consuming a lot of data for high quality video." (P1)

App Proliferation: Some participants expressed concern about adding yet another app to their digital ecosystem.

> "I've got about seven different apps... I'm just not sure why... I'm getting a whole new app." (P4)

6.5. Key Insights from Testing

The prototype testing yielded several key insights that have significant implications for creating more inclusive video communication platforms for Deaf users:

1. **Visual primacy is essential**: The interface should prioritize visual elements and de-emphasize audio-centric features without removing them entirely.
2. **Cultural integration enhances experience**: Features like sign name integration are not merely "nice to have" but fundamentally important for cultural inclusivity.
3. **Customization supports diverse needs**: Different users within the Deaf community have varying preferences and needs, making customizable interfaces essential.
4. **Economic considerations impact adoption**: Concerns about data usage, server costs, and potential fees are significant factors in platform adoption and retention.
5. **Cross-platform integration matters**: Participants value tools that work within their existing digital ecosystems rather than creating isolated experiences.

7. Next Steps and Conclusion

7.1. Next Steps for Design Refinement

The insights gained from this study point to several key areas for further refinement and development:

7.1.1. Prototype Enhancement

The mid-fidelity prototype tested in this study provides a solid foundation for future development. The next phase should focus on:

- **Creating a high-fidelity prototype**: Developing a more detailed interface with refined visual elements, complete user flows, and enhanced interactions based on participant feedback.
- **Implementing dark mode**: Incorporating a fully realized dark mode to accommodate the needs of Deaf-Blind users and others with visual preferences.

- **Refining video layouts**: Further developing the video interface to optimize for both portrait and landscape orientations, with special attention to self-view positioning and group call arrangements.
- **Expanding customization options**: Adding more user-controlled settings for interface layout, notification preferences, and visual customization.

7.1.2. Feature Development Priorities

Based on participant feedback, the following features should be prioritized in future development:

- **Enhanced sign name integration**: Developing a more prominent and flexible sign name feature that allows users to include video-based sign names alongside profile images.
- **Automated signer detection**: Researching and implementing technology to detect when a user is actively signing to enable automatic focus shifting in group calls.
- **GIF and sticker gallery**: Creating a robust library of ASL-specific GIFs and stickers, with the ability for users to create and save their own.
- **Language translation integration**: Adding built-in translation features to support multilingual communication without requiring users to leave the app.
- **Cross-platform compatibility**: Ensuring seamless operation across devices (mobile, tablet, desktop) with adapted interfaces for each form factor.

7.1.3. Technical and Business Considerations

Several technical and business challenges must be addressed for successful implementation:

- **Server capacity and video quality**: Researching optimal compression algorithms and server architectures to maintain high video quality while minimizing data usage.
- **Sustainable business model**: Exploring funding models that would allow for free or low-cost access to the app while sustaining the necessary infrastructure, potentially including grants, partnerships, or non-intrusive advertising.
- **Privacy and security**: Developing robust data protection and user privacy features, particularly important given the visual nature of sign language communication.
- **Integration with existing ecosystems**: Exploring potential for API integration with widely used platforms to reduce app proliferation concerns.

7.2. Future Research Directions

This study points to several promising avenues for future research:

- **Longitudinal studies**: Tracking the evolution of Deaf users' preferences and practices in digital communication over time.

- **Cross-cultural comparison**: Expanding research to include Deaf communities that use sign languages other than ASL to identify universal versus culturally-specific design needs.
- **Deaf-Blind accessibility**: Conducting dedicated research into the specific needs and preferences of Deaf-Blind users for digital communication platforms.
- **Machine learning applications**: Investigating how AI and machine learning might enhance video communication for Deaf users, including sign language recognition, automatic captioning of sign language, and other assistive features.
- **Economic accessibility**: Further exploring the relationship between economic factors and technology adoption within the Deaf community, with attention to global and regional differences.

7.3. Broader Implications

The findings of this research have implications beyond the specific application prototype:

7.3.1. For Design Practice

- This research challenges the "one size fits all" approach to accessibility, demonstrating the need for culturally-informed, user-centered design that goes beyond minimum compliance standards.
- The participatory methods employed illustrate the value of including marginalized communities not just as subjects of research but as co-creators of design solutions.
- The findings highlight the importance of considering economic and social factors alongside technical and usability concerns in inclusive design.

7.3.2. For Technology Development

- Platform developers should reconsider default prioritization of audio-centric features and explore more flexible, multimodal interaction paradigms.
- The concept of "accessibility" should be expanded to include cultural appropriateness and preference, not merely functional access.
- Developers should consider modular approaches that allow users to customize their experience based on communication preferences and abilities.

7.3.3. For Policy and Standards

- Web and mobile accessibility guidelines should elevate the importance of Sign Language integration and visual communication optimization.
- Digital inclusion initiatives should address both technical access and cultural appropriateness of technology.
- Funding bodies should prioritize development of technologies that center marginalized communities rather than merely accommodating them.

7.4. Conclusion

This research began with a fundamental question: How can we reimagine the design of video chat applications to better serve the communication needs of Deaf users while addressing the challenges posed by Audism and promoting inclusive user experiences?

Through focus groups, prototype development, and testing with Deaf participants, this study has demonstrated that truly inclusive communication technology must go beyond simply removing audio elements or adding captions. Instead, it must fundamentally recenter design priorities around the visual communication practices and cultural elements that are central to Deaf users' experiences.

The findings highlight six major themes that should inform future development: Platform Preferences and Evolution, Visual Space and Interface Design Challenges, Visual-Centric vs. Audio-Centric Design, Multilingual and Multicultural Needs, Participatory Design and Ownership, and Economic and Social Considerations. Together, these themes reveal both the technical and social dimensions of creating more inclusive digital communication platforms.

Perhaps most significantly, this research underscores the importance of the principle expressed by several participants: "Nothing about us without us." Meaningful inclusion requires not just accommodating Deaf users within primarily audio-centric designs, but engaging Deaf individuals as co-creators throughout the design process to develop solutions that authentically embrace Deaf cultural practices and communication preferences.

By reimagining digital communication platforms from a Deaf-centred perspective, this research contributes to a broader movement toward more inclusive technology design—one that recognizes and celebrates human diversity rather than designing for a presumed "average" user. The prototype developed through this research represents not an endpoint but a starting point for continued exploration and development of more inclusive, culturally appropriate, and visually optimized communication technologies.

8. Limitation

This research, while offering valuable insights into the design of more inclusive video communication platforms for Deaf users, has several limitations that should be acknowledged:

8.1. Sample Limitations

The study's sample size of seven participants, while appropriate for qualitative exploratory research, limits the generalizability of findings to the broader Deaf community. Additionally, participants were recruited primarily from Toronto-based Deaf communities, which may not represent the diversity of experiences and preferences across different geographic regions, cultural contexts, and socioeconomic backgrounds.

The requirement that participants be primary users of ASL also means that the study does not capture the experiences of Deaf individuals who prefer other sign languages or communication methods. This is particularly significant given the global diversity of sign languages and the varying communication preferences within Deaf communities internationally.

8.2. Methodological Limitations

Despite efforts to conduct the research in ASL with certified interpreters, working across languages introduces potential for meaning to be lost or altered in translation. The interpretation process, while essential for communication between the hearing researcher and Deaf participants, may have influenced the nuance and depth of participants' expressions and the researcher's understanding.

The focus group format, while beneficial for generating discussion, may have also introduced social dynamics that influenced participants' willingness to share certain perspectives or experiences. Additionally, the prototype testing sessions, conducted with a subset of the original participants, may have been influenced by participants' prior involvement in the focus groups and their desire to provide positive feedback.

8.3. Technical and Prototype Limitations

The mid-fidelity prototype used for testing had significant technical limitations that may have affected participants' ability to fully evaluate the proposed design. As a non-functional mockup, participants had to imagine certain interactions rather than experiencing them directly, potentially limiting the depth and accuracy of their feedback.

The prototype focused primarily on smartphone interface design and did not fully explore cross-device compatibility or functionality, which may be important for Deaf users who utilize multiple devices for communication. Additionally, the prototype did not implement all suggested

features due to time and resource constraints, meaning that some potentially valuable elements were not tested.

8.4. Researcher Positionality

As acknowledged in the positionality statement, the researcher's status as a hearing individual researching Deaf experiences introduces limitations. Despite efforts to engage Deaf consultants and use participatory methods, the research ultimately reflects the perspective and interpretations of a hearing researcher, which may differ from how a Deaf researcher would approach or interpret the same questions.

The research was also conducted within academic and design frameworks that have historically marginalized Deaf perspectives, potentially influencing the methodological choices and analytical approach in ways that may not fully align with Deaf epistemologies or ways of knowing.

8.5. Implementation Feasibility

The research identified several desired features and design approaches that, while valuable from a user perspective, may face significant technical, financial, or practical implementation challenges. The study did not include a comprehensive technical feasibility assessment or business model development, leaving questions about how such a platform could be sustainably developed and maintained.

Concerns about server capacity, data costs, and economic accessibility, while acknowledged, were not fully resolved in the current research, limiting the immediate applicability of findings to commercial platform development.

8.6. Temporal Context

The research reflects user needs and technological capabilities at a specific point in time. The rapidly evolving nature of digital communication technologies means that some findings may become less relevant as new platforms, features, and interaction paradigms emerge.

Additionally, shifts in Deaf community preferences and practices over time may impact the longevity of specific recommendations.

8.7. Broader Applicability

While the research focused specifically on video communication platforms for Deaf users, the extent to which findings might apply to other technologies or user groups remains unexplored. The potential for universal design principles derived from this research to benefit a wider range of users was not comprehensively investigated.

Despite these limitations, the research provides valuable insights into the experiences, preferences, and needs of Deaf users of video communication platforms and offers a foundation for future research and development that more fully centers Deaf perspectives in technology design.

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