Virtual Communications Research Project:

A Report for Accessibility Standards Canada

Prepared by

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Table of Contents

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Plain Language Summary

PLS.1 Who undertook the project

Wavefront Centre for Communication Accessibility in partnership with the University of British Columbia, with support of an Advisory Committee, the Canadian Hard of Hearing Association, British Columbia Chapter; and the Deaf, Hard of Hearing, and DeafBlind Well-Being Program undertook the project. It was funded by Accessibility Standards Canada.

PLS.2 What this summary says

Virtual sign language interpreting and captioning can improve access. They work best when technology, training, and support are in place.

PLS.3 Why we did this project

Many Deaf, DeafBlind and Hard of Hearing people face barriers when they need communication access. These barriers can affect health care, work, legal services, public services, and daily life.

Online sign language interpreting and captioning services can help. But these services do not always work well. This project looks at what supports good access and what gets in the way.

PLS.4 What the project asked

- What does existing research say about barriers, supports, and good practice in virtual communication?
- What do service users, sign language interpreters, captioners, and communication partners say is happening now and what should happen instead?
- How well do on-demand virtual sign language interpreting services work in real settings such as workplaces and service environments?

PLS.5 How we did this project

- A review of research and practice documents published from 2013 to 2023.
- Interviews and group discussions about lived experience and service needs.
- Real-world field testing of on-demand virtual sign language interpreting services.

The project team also worked with an advisory committee. This helped keep the work grounded in community experience.

PLS.6 What the project found

PLS.6.1. Virtual communication can improve access

Virtual communication services can reduce wait times and help people in places where in-person services are harder to get. They can also help with quick and unplanned interactions.

PLS.6.2. Good access depends on basic conditions

- Reliable internet.
- Clear audio and video.
- Good lighting and camera placement.
- Enough screen space to see sign language interpreters, captions, and other visual information.
- Platforms that let users pin or spotlight interpreters and control views of captions.

PLS.6.3. People and practices matter too

- Qualified sign language interpreters and captioners improve trust and accuracy.
- Working with known service providers can improve comfort and communication.
- Preparation helps. This includes sharing materials in advance and doing technical checks before a session.
- Users and staff both need training on setup, roles, and troubleshooting.

PLS.6.4. Virtual service is not right for every situation

Some situations need in-person or hybrid support instead. Clear guidance is needed so people can choose the right option for the setting and the person's needs.

PLS.7 What needs to change

- Set minimum technical requirements for virtual sign language interpreting and captioning services.
- Make sure platforms are accessible by default and give users control over what stays visible.
- Provide real-time technical support and clear backup plans when something fails.
- Use clear pre-session routines, including role clarification and equipment checks.
- Set rules for when virtual, in-person, or hybrid service is the best choice.
- Support worker quality and sustainability through training, feedback, and fair scheduling.
- Reduce barriers to devices and internet access, especially for DeafBlind and low vision users.

PLS.8 Concluding main message

Virtual communication access works best when it is treated as an essential accessibility support, not as an extra or optional feature. When the right conditions are put in place, virtual communication services can improve access, reduce delays, and support fuller participation of Deaf, DeafBlind, and Hard or Hearing persons in all of society.

Executive Summary

ES.1 Background and project overview

Deaf, DeafBlind and Hard of Hearing people in Canada face barriers to timely, reliable sign language interpreting and real time captioning in all spheres, including accessing health care, government services, financial services, legal settings, workplaces, and community services. These barriers limit their full and equal participation, safety, and access to opportunities. Virtual (online) delivery of sign language interpreting and captioning services has become an important way to expand access. However, virtual services are not consistently accessible or reliable, and there has been a lack of clear, community informed guidance about when virtual services are appropriate and what minimum conditions must be in place for them to work well.

Wavefront Centre for Communication Accessibility undertook a three-year project in partnership with the University of British Columbia, with the support an Advisory Committee, the Canadian Hard of Hearing Association BC Chapter and the Deaf, Hard of Hearing and DeafBlind Well-Being Program. The project goal was to identify barriers and facilitators to virtual sign language and captioning experienced by Deaf, DeafBlind and Hard of Hearing persons.

The work was funded by Accessibility Standards Canada and supported their mandate to advance a barrier free Canada by 2040. The project translated evidence into practical recommendations that can be embedded in future accessibility standards and guidance for the delivery of virtual communications.

ES.2 Research questions and approach

The project used a multi-method approach that triangulated evidence from published research and guidance, lived experience, and practice-based field testing to explore three questions:

- What is currently known from academic and grey literature about barriers, facilitators, and best practices for virtual sign language interpreting and real time captioning?
- What do Deaf, DeafBlind and Hard of Hearing people, sign language interpreters, captioners, and communication partners describe as the current gaps and the ideal conditions for accessible virtual communication services?
- How do on-demand virtual sign language interpreting services perform in real-world service and workplace environments, and what helps or hinders successful implementation?

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ES.3 Methodology

A rapid scoping literature review mapped peer-reviewed and grey literature (English language, 2013–2023) on virtual delivery of sign language interpreting and real time captioning across service contexts. A qualitative needs assessment used semi structured individual and group interviews to identify gaps between current and ideal conditions for virtual communication access. Field tests were undertaken in two organizations to understand usability, communication quality, and implementation requirements for on demand virtual sign language interpreting.

ES.4 Key findings and results

ES.4.1 Scoping literature review

The literature consistently showed that virtual communication can expand access, but only when minimum technical, environmental, and practice conditions are met. Barriers and facilitators are multi-level and interact with each other. Most common barriers reported related to training and competency; interpersonal and relational factors (fatigue, reduced cues, rapport); technology reliability and audio/video quality; environmental constraints (privacy, lighting, space); and gaps in policy and procedures. Best practice categories clustered into: (1) technology and technical practices, (2) professional practices, (3) situational decision making (virtual vs in person), and (4) preparation and procedural practices.

ES.4.2 Needs assessment

Thirty persons were interviewed one-on-one or participated in focus groups for their views on virtual service delivery. They described a clear gap between what is happening now and what is needed for reliable access.

Best experiences occurred when there was a strong technical and visual setup: reliable internet, clear audio, adequate screen size, good camera placement and lighting, and platforms that allow users to pin/spotlight interpreters or captions. Also important was that services were delivered by qualified interpreters/captioners and when there was continuity with known providers as well as access to preparation materials. Users wanted shared responsibility and practical training on how to set up for virtual communication and how to troubleshoot if any problems arose.

ES.4.3 Field testing

Field testing undertaken in two organizations and using different delivery platforms showed that on-demand virtual sign language interpreting services can be a practical, valued tool for quick, spontaneous workplace and customer service interactions. It also highlighted specific platform and implementation requirements that can be translated into standards and procurement expectations.

ES.5 Recommendations and impact

Across all components, recommendations converged on a simple message: virtual communication access works when it is treated as essential accessibility infrastructure, not an add on. The recommendations below highlight standards-ready actions that can reduce preventable barriers and variability and improve equity.

ES.5.1 Recommendations to inform standards and implementation

- Define minimum technical performance requirements for virtual sign language interpreting and captioning services and require redundancy plans for interruptions or breakdowns/failures.
- Require accessible default platform configurations and user controls so sign language interpreters, captions, and essential visual information can be kept visible.
- Embed real-time technical support and clear escalation pathways in service delivery and contracts.
- Standardize preparation routines and point-of-use guidance: pre-session technical checks, role clarification, and sharing materials in advance.
- Set clear criteria for when virtual service delivery is appropriate, and when in-person or hybrid supports are required.
- Invest in workforce sustainability and quality: hire only qualified professionals, provide training for virtual service specific competencies, ensure quality assurance and feedback loops, and arrange a schedule that prevents worker fatigue.
- Support equitable access to devices and connectivity required for effective virtual communication, especially for DeafBlind and low vision users, so access is not determined by personal finances.

ES.6 Conclusion

This project met its objectives by producing a triangulated evidence base that links real-world experiences and field testing to actionable, standards-relevant recommendations. The findings show that virtual sign language interpreting and captioning services can expand communication access and reduce wait times and geographic barriers, but only when minimum conditions for technology performance, user control, training, organizational readiness, and situational appropriateness are in place. The project's contribution is a clear, community-informed set of requirements and recommendations that can strengthen future accessibility standards and support the practical implementation of virtual communication services as Canada works toward a barrier-free society by 2040.

List of Terms

A

Accessibility features

Built-in platform functions and layout options that help keep interpreters, captions, and other essential visual information visible, controllable, and usable during virtual communication.

B

Barriers

Conditions that made virtual communication harder to access or use effectively. In the report, barriers included technical, interpersonal, environmental, policy, and procedural problems.

Best practices

Recommended techniques, strategies, procedures, or conditions that support effective and accessible virtual communication services.

C

Captioning

The practice of converting spoken audio and important sound information into on-screen text so people can understand what's being said and what's happening without needing to hear the audio.

Captioner

A professional who provides live text access during communication. In the report, captioners are discussed alongside interpreters as key providers of communication access.

Communication access

The ability to participate fully in communication through needed supports such as sign language interpreting, captioning, accessible platforms, and appropriate service arrangements.

Communication Access Realtime Translation (CART)

A live captioning service or system used to convert spoken content into text in real time. In the report, CART is discussed as a support that can improve comprehension and follow-up.

Communication partner

The other person or people involved in an interaction with a Deaf, DeafBlind, or Hard of Hearing person.

E

Evidence mapping

The process of organizing extracted literature and practice guidance into a structured map of practices, barriers, facilitators, and recommendations.

F

Facilitators

Factors that supported or improved virtual communication access.

Field testing

Real-world testing of virtual sign language interpreting services in workplace or service settings.

G

Grey literature

Non-journal sources used in the scoping review, such as reports, policy papers, manuals, handbooks, guides, dissertations, and government documents.

H

Hybrid support

A service arrangement that combines virtual communication with in-person supports when needed.

I

Information and Communication Technologies (ICT)

Digital communication technologies covered under one of Accessibility Standards Canada's priority areas. This category includes the platforms, tools, and technical systems used to support virtual communication.

Intervener

A support person referenced in the report in relation to DeafBlind communication access. Interveners may help make communication and information access workable in real settings.

M

Multi-view

A meeting layout where participants can see multiple participants' video feeds at the same time in a grid or gallery, instead of only seeing the current speaker (speaker view) or a screen share.

O

On-demand virtual sign language interpreting

A form of remote interpreting that can be accessed quickly for immediate or unplanned interactions.

Organizational readiness

The degree to which an organization has the training, workflows, equipment, technical support, and procedures needed to make virtual communication access work reliably.

Owl camera

A 360-degree video conferencing camera (typically a tabletop device) used in meeting rooms. It combines a wide-angle camera and microphones and a speaker so remote participants can see and hear everyone. It often auto-focuses on whoever is speaking by switching/zooming the view.

P

Pinning and spotlighting

Platform controls that keep an interpreter, communication participant, or other visual element prominent on screen.

Population, Concept, Context (PCC)

The framework used in the scoping review to define the review's scope by specifying the population of interest, the key concept, and the service or practice context.

Procurement

The process of selecting and purchasing platforms, hardware, tools, and related services.

R

Real-time captioning

Captioning delivered live during an interaction so spoken content can be read as it happens.

Redundancy

A backup arrangement put in place in case a platform, device, or connection fails.

S

Scoping review

A literature review approach used to map the range and nature of existing evidence and practice guidance on a topic.

Semi-structured interviews

Conversational interviews guided by a common set of topics or questions while still allowing flexibility in how participants respond.

Situational appropriateness

Whether virtual, hybrid, or in-person service is the right fit for a particular person, setting, task, and communication need.

Standards-relevant evidence

Evidence that can be translated into practical requirements, guidance, or recommendations to support accessibility standards development and implementation.

T

Triangulation

The use of multiple sources or types of evidence to compare findings and strengthen confidence in the conclusions.

U

Universal design

An approach to design that builds accessibility from the start so features work for as many people as possible.

V

Video Relay Service (VRS)

A telecommunications service where Deaf people who use sign language make and receive phone calls with hearing people through a remote sign language interpreter over video.

Virtual communication services

Virtual or online access to remote sign language interpreters or real-time captioners via network connected devices.

Virtual sign language interpreting

Sign language interpreting delivered remotely through online or video-based platforms rather than in person.

W

Wi-Fi hotspot

A device or feature that creates a small wireless network (Wi-Fi) so other devices (phone, laptop, tablet, game console) can connect to the internet through it. Most hotspots work by taking an internet connection from a cellular network (or sometimes a wired connection) and sharing it over Wi-Fi.

1. Introduction

1.1 Background and Rationale

The Virtual Communications Research Project is a multi-year initiative funded by Accessibility Standards Canada and led by Wavefront Centre, in partnership with the University of British Columbia, and guided by an advisory committee representing Deaf, DeafBlind and Hard of Hearing community members, sign language interpreters and captioners, and service providers.

This project arose from observations that Deaf, DeafBlind and Hard of Hearing persons in Canada experience barriers to accessing timely captioning and sign language interpreting services. Inequities in communication access in service and workplace settings common to day-to-day living, such as healthcare, government, business, hospitality, and community, limit persons who are Deaf, DeafBlind and Hard of Hearing from fully reaching and using services and gaining employment in these environments. Lack of availability of timely sign language interpreting and captioning services persist as barriers contributing to these inequities. Shortages in highly trained sign language interpreter and captioning personnel greatly outweigh the numbers of persons with needs for accessible communication services.

Virtual or online access to remote sign language interpreters or real-time captioners via video, hereafter referred to as ‘virtual communication services,’ offers a viable alternative to a prevailing service delivery model that relies heavily on in-person interpretation and captioning. Virtual communication services widen the range of available communication access options and leverage from the current capacity of a small, specialized group of qualified captioning and sign language interpreting personnel.

Although there has been expanded availability of virtual communication access options, particularly during and after the COVID-19 period, Deaf, DeafBlind and Hard of Hearing people continue to face communication access barriers, including unreliable connectivity, numerous platforms with varying attention to accessibility features or supports, lack of staff training and support, inconsistent service provision, and differing levels of proficiency of professional sign language interpreters and real-time captioners with virtual service delivery. A core motivation for the project was the lack of comprehensive, community-informed guidance and standards for when and how virtual

communication supports should be used, and what minimum conditions must be in place for virtual communication to be accessible, reliable, and equitable.

1.2 Overarching purpose

The overarching purpose of the project was to generate actionable, standards-relevant evidence about communication access in virtual settings by integrating of the following sources of data: (1) reviewing the literature to map what was known from the existing evidence base and practice-oriented resources; (2) documenting the experiences, barriers, facilitators, and needs identified by service users and service providers; and (3) field testing virtual communication platforms in real-world environments to understand how virtual communication worked in practice, what supported ease of use and quality access, and what contributed to barriers or inequities. Together, these data sources were intended to inform evidence-based recommendations and best practices to support barrier prevention and barrier removal and to contribute to the next generation of accessibility standards and implementation guidance.

1.3 Primary objectives

The three primary objectives that guided the project were:

1. Identify barriers and facilitators that shape the quality, reliability, and accessibility of communication access through virtual modalities for Deaf, DeafBlind and Hard of Hearing people.
2. Pilot test and evaluate virtual communication technologies in real-world contexts to generate lessons learned about implementation, usability, and service quality for both service users and providers.
3. Synthesize findings into a cohesive set of recommendations and best practices to prevent and address known barriers, and to inform accessibility standards development and implementation guidance.

1.4 Project approach and components

The project used an integrated, multi-method data collection approach where each component informed the others and contributed a distinct evidence type (published and practice guidance evidence, experiential qualitative evidence, and practice-based implementation evidence).

The scoping literature review identified what is currently known, where evidence is strong or limited, and what guidance exists across contexts (e.g., health, policing, legal,

financial, employment, and community services). The needs assessment provided experiential evidence about real-world barriers, facilitators, and expectations across groups that use and provide virtual communication services. Finally, field testing (pilot implementations) provided practice-based evidence about how platform features, connectivity, onboarding/orientation supports, and service practices influence the quality of communication access in everyday settings. Together, these components supported triangulation across evidence types and strengthen the validity and utility of recommendations.

Across components, the project was community-informed through an advisory committee that supported design of instruments, interpretation of findings, and validation of recommendations and knowledge mobilization outputs.

1.5 Overall analytic strategy

The project's approach involved analysis and interpretation of information acquired from each of the diverse data sources needs assessment interviews, pilot field testing feedback, and the scoping review to identify recurrent barriers, facilitators, and best practices. Findings from each source provided insights about barriers to virtual communication accessibility and recommended practices to help prevent or remove them. After our team compared and contrasted the findings across data sources, areas of convergence (where multiple sources point to the same issues) and gaps (where additional guidance or standards-oriented detail is needed but evidence is limited or fragmented) were identified and used to develop a set of cross-cutting recommendations. Advisory meetings were used as an iterative validation and sense-making space as themes and recommendations emerged.

Analyses were designed to be standards-relevant: they connected concrete experience conditions (what happens, in what context, with what supports) to broader effects on communication access, and translated these connections into actionable recommendations.

1.6 Organization of the report

Our research approaches and findings from the scoping literature review are described in Section 2; the needs assessment in Section 3; and the field test in Section 4. Based on our synthesis of findings across research components, we present a summary of cross-cutting recommendations to inform standards development in Section 5 and concluding comments in Section 6. Appendix A provides an overview of the scoping

review literature sources. Practical guidance that service organizations and providers can use to plan and implement virtual communication services are summarized as general principles in Appendix B and best practices in Appendix C.

2. Scoping Review of the Literature

2.1 Purpose and objectives

The scoping literature review was designed to provide a comprehensive, transparent map of current evidence and practice guidance surrounding virtual communication service access and use. It aimed to identify documented barriers and facilitators, summarize existing best practices and guidance, and identify evidence gaps where additional standards-oriented detail is needed. The review question addressed in the scoping review asked, 'what is known from existing literature about the practices used in the delivery of professional sign language interpreting and captioning services provided in a virtual way (in a range of settings) to promote communication access for Deaf, DeafBlind and Hard of Hearing persons and their communication partners?'

The scoping review objectives were two-fold:

1. To **identify types of practices (techniques, strategies, procedures)** used and recommended when sign language interpreting and captioning services are delivered in a virtual way to promote communication access for Deaf, DeafBlind and Hard of Hearing persons; and,
2. To **summarize facilitators and barriers** to communication access when these services are used by Deaf, DeafBlind and Hard of Hearing persons and their communication partners.

2.2 Methodological approach

This rapid review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement and the PRISMA extension for scoping reviews (Tricco et al., 2018). The methodology was guided by established scoping review guidance (Arksey & O'Malley, 2005; Peters et al., 2020; Tricco et al., 2018). The review was protocol-driven and multi-stage, stressing the need for breadth and transparency. The team utilized the Population, Concept, Context (PCC) framework, recommended by the Joanna Briggs Institute (JBI), to define scope (Peters et al., 2020; Peters et al., 2015; Pollock et al., 2021; Tricco et al., 2018):

- Population: Deaf, DeafBlind and Hard of Hearing people (all ages) and their communication partners;

- Concept: focus on practices used when sign language interpreting or captioning services are delivered in a virtual way; and
- Context: spans a range of service or employment settings (e.g., health, community, socio-legal, government) in any geographical location where sign language interpreting and captioning services are delivered virtually.

A comprehensive search strategy, developed to capture a broad range of literature relevant to the project's focus areas, was developed in consultation with a research librarian and refined iteratively through the pilot screening phase of the review process. The search strategy includes database searches (Medline, Scopus Science Direct, Web of Science, Academic Search Complete), citation chaining, targeted grey literature searching (Open Grey, Public Library of Science), and expert consultation.

Evidence sources for the scoping review included peer-reviewed literature and grey literature (e.g., reports, working or policy papers, books, book chapters, research or government reports, manuals, handbooks, guides, or dissertations) where they provided substantive, original insights or recommendations relevant to virtual communication service delivery. Materials were English language publications published between 2013-2023.

Sources excluded from consideration were those that did not pertain directly to service use or delivery and those with content or studies focused on: in-person sign language interpreting or captioning service delivery; development or testing of technology; reviews, assessments or comments on law or policy; persons under the age of 18; professional captioning via video that did not involve real-time communication in the receipt or delivery of services; or the use of technology within educational environments not connected to the provision or receipt of virtual services.

2.3 Screening, extraction, and synthesis process

There was ongoing dialogue amongst research team members regarding refinement of the tools (e.g., search and retrieval protocol, extraction template), feedback mechanisms, and ensuring accessibility and clarity in all project materials.

The scoping review process involved the following steps:

1. Review question(s) clarification and definition of scope.
2. Search strategy development and refinement.
3. Source screening and selection.

4. Data extraction.
5. Structuring of extracted content into an evidence map.
6. Use an agreed upon coding framework and codebook to support consistent analysis and reporting; stabilize the codebook once finalized to maintain consistency.

Screening, extraction and synthesis processes were highly collaborative, with team members sharing extraction files, reviewing each other's work, and planning for high-level analysis and write-up. Title and abstract screening were conducted collaboratively, with team members reviewing and classifying sources as "yes," "no," or "maybe." Redundancies and non-relevant content were identified and omitted as needed. For extraction, each source was treated as unique, with extracted content coded, using an extraction template, into predefined categories (e.g., barriers, facilitators, practices, and best practices). The extraction process involved dual review, with each reviewer coding materials independently and then discussing mismatches. Disagreements in screening, extraction, or coding were flagged and discussed in team meetings. The team aimed for consensus, with only a few cases requiring further review. All resolutions were documented for transparency.

The coding process was designed to support both quantitative (e.g., frequency of references) and qualitative (e.g., thematic) analysis. The team used Mirosoft Excel® to organize extracted data, which was then imported into Lumivero NVivo® for coding. The coding process included auto-coding of attributes such as publication type, country of origin, study design, and sampling procedure, allowing for flexible queries and organization. Dense textual extracted material was thematically coded under main or parent codes (barriers, facilitators, practices and best practices) and further broken down into sub-themes and child codes. This coding approach allowed for easy identification of items needing discussion or resolution. The team discussed the need to collapse similar, overlapping, or thinly populated codes into broader categories for analysis.

2.4 Scoping review synthesis approach

- Extracted evidence and guidance were organized into a structured map of practices, barriers, facilitators, and recommendations.
- Areas of convergence and divergence across empirical and practice-oriented sources were identified and evidence gaps clearly documented.
- Evidence mapping was used to inform the design of the needs assessment instruments, pilot field test priorities, and the development of key recommendations.

2.4. Key Findings

After the screening and selection process, 31 literature sources were included in the scoping review (see Appendix A). Once the relevant data were extracted, we began to map the evidence into key thematic areas. In this section we summarize the key themes and subthemes that emerged as well as their corresponding frequencies, which refer to the extent that each theme/subtheme was evident within the reviewed data sources. Frequencies are provided in parentheses as a number ('n') and percentage (%) of sources that captured thematic content related to each of the focal concepts for the review (i.e., barriers, facilitators, practices).

2.4.1 Barriers

This section summarizes barriers to communication access reported in the academic and grey literature on the virtual (online) delivery of sign language interpreting and real-time captioning. Across the sources included in our scoping review, 26 contained content describing barriers associated with virtual communication. Reported barriers clustered into five broad thematic categories: (1) training and competency, (2) personal, interpersonal and relational factors, (3) technology and technical issues, (4) environmental and situational constraints, and (5) policy and procedural gaps. Within each category, multiple sub-themes described the specific ways that virtual delivery can undermine communication quality, efficiency, and equity of access.

2.4.1.1 Training and competency

Training and competency barriers (n=23; 88.5%) reflected the skills, experience, and preparedness of Deaf, DeafBlind and Hard of Hearing people, their hearing communication partners, and service providers for effective virtual communication. Overall, the literature emphasized that virtual delivery is not simply an in-person service delivered online. Instead, it introduces distinct interactional and technical demands that require additional knowledge, practice, and role clarity to prevent breakdowns in communication.

Digital literacy (n=17; 64.5%): Limitations in general digital literacy can impede access to, use of, and troubleshooting of virtual communications platforms. Low familiarity with platform functions and controls (for example, screen pinning or caption-pane management) and with device settings contributes to delays, reliance on ad hoc workarounds, and diversion of attention away from the content of the interaction.

Interpreter and captioner training and competency (n=10; 38.5%): Sources noted that virtual interpreting and captioning require competencies that extend beyond those typically emphasized in in-person settings. These include managing multi-screen dynamics, coordinating turn-taking, optimizing framing and lighting, supporting appropriate environmental setup, and using platform tools to maintain visibility and clarity. When training does not address these virtual-specific demands, negative impacts on the communication dynamic are more likely.

Linguistic, cultural, and context matching (n=9; 34.6%): Mismatch between regional sign language varieties, cultural or region-specific terminology, and the specialized context or domain of the encounter (e.g., health, legal, or financial contexts) was described within some of the literature as a barrier that can hinder communication quality and effectiveness in virtual environments.

Provider competence and attitude (n=3; 11.5%): A smaller set of sources emphasized the role of hearing communication partners and organizational staff (e.g., clinicians, legal actors, or administrative personnel). Limited ability to operate communication technologies, lack of familiarity with accessibility requirements, or negative attitudes toward accommodations were reported to create additional obstacles to effective virtual communication.

2.4.1.2 Personal, interpersonal, and relational factors:

Personal, interpersonal, and relational barriers (n=21; 80.8%) arise from cognitive, emotional, and interactional factors shaping communication between individuals. The literature consistently suggests that virtual settings alter how effort is distributed during communication, change the way participants coordinate interaction, and can weaken the interpersonal connection that supports mutual understanding.

Cognitive load, fatigue, and reduced comprehension (n=14; 53.8%): Effective virtual communication often requires sustained visual attention and continuous multitasking (e.g., tracking the signer, interpreter or captioner, slides, chat, and device controls). Interpreters, captioners, and Deaf, DeafBlind and Hard of Hearing people can experience higher cognitive load, rapid fatigue, and reduced comprehension in virtual settings, especially during longer or information-dense sessions.

Reduced contextual and non-verbal cues (n=14; 53.8%): Several sources maintained that **c**ommunication in virtual settings is often hampered by two-dimensional representation, reduced visual or spatial awareness, and limited access to contextual or

non-verbal cues. These constraints can make it more difficult to infer intent, follow interactional subtleties, and maintain shared situational understanding.

Diminished rapport and human connection (n=14; 53.8%): Many sources reported that virtual communication users frequently experience diminished rapport because it can be harder to develop an emotional or human connection through virtual interfaces. The reduced ability to build relationships and connection was described in the literature as undermining communication effectiveness.

Lack of structured support, feedback, and troubleshooting channels (n=9; 34.6%): Many virtual communication settings lack on-site assistance or structured mechanisms for providing feedback and responding to technical or environmental complications. Without clear support channels, minor issues could escalate into significant obstacles to communication.

Turn-taking and interaction problems (n=7; 26.9%): Overlaps, interruptions, and delayed handovers were reported to result from turn-taking and interaction challenges. These disruptions can make communication feel fragmented and reduce conversational flow.

Insufficient preparation time and advance materials (n=6; 23.1%): Insufficient preparation time, opportunity, or materials prior to a session reduced interpreter or captioner familiarity with the setting, terminology, participant relationships, and communication goals. The absence of advance materials was described as increasing interpretation effort (cognitive load) and the likelihood of communication errors.

Muted or missing paralinguistic signals (n=4; 15.4%): Muted or missing paralinguistic signals (e.g., body language and micro-expressions) made it harder to gauge comprehension, agreement, or distress, further constraining mutual understanding and clarity.

2.4.1.3 Technology and technical issues

Technology and technical barriers (n=21; 80.8%) originate in the tools, equipment, and systems used for virtual communication. Across the literature, technical reliability, audiovisual quality, and usable accessibility features were described as foundational prerequisites for effective virtual communication. When these prerequisites are not met, the consequences can include interruptions, reduced intelligibility, and early termination of sessions.

System instability, limited technology, and lack of backup options (n=15; 57.7%): System glitches, crashes, downtime, and the absence of backup options were reported to force pauses and, in some cases, lead to premature termination of communication sessions.

Variable network performance (n=14; 53.8%): Variable network speed, reliability, and latency were described as producing choppy signing, desynchronized captions, and disrupted pacing, undermining intelligibility and the flow of interaction.

Degraded video and audio quality (n=11; 42.3%): Video pixelation, motion blur, and low frame rates, along with muffled, echoing, or clipped audio, impaired the ability of all parties to communicate effectively.

Device and equipment limitations (n=10; 38.5%): Limitations such as lack of an external microphone, an adjustable camera, or sufficient processing power and memory were described as preventing effective access to, or use of, virtual communication platforms and software.

Insufficient or unusable accessibility features (n=4; 15.4%): Accessibility features embedded within platforms or software were frequently described as insufficient or unusable. Examples included interfaces that did not allow users to adjust layout or control visibility, or that lacked specialized features required for Deaf, DeafBlind and Hard of Hearing communication.

Sub-optimal setup and positioning (n=4; 15.4%): Camera placement, distance, and angle were noted as factors that can reduce visibility of signing and the usable communication space when setup is sub-optimal.

Captioning system quality and access (n=2; 7.7%): Limitations in captioning system quality (e.g., accuracy, speed and visibility) and access were reported to constrain comprehension and follow-up.

2.4.1.4 Environmental and situational constraints

Environmental and situational barriers (n=15; 57.7%) relate to the physical environments and situational contexts in which virtual communication takes place. These barriers shape what is feasible in practice, particularly when participants have limited control over space, lighting, noise, or privacy. In settings such as health care, environmental constraints can interact with workflow realities (e.g., fixed workstations or

small rooms), reducing the effectiveness of virtual communication access even when services are available.

Spatial orientation and ergonomics (n=11; 42.3%): Room layout and mobility constraints were described as limiting optimal seating, sightlines, and contextual awareness. In medical environments, fixed workstations or cramped spaces (e.g., exam rooms) impeded camera placement and angling and negatively affected user comfort.

Privacy constraints and third-party presence (n=8; 30.8%): A lack of private rooms and the presence of third parties were reported to reduce willingness and ability to disclose sensitive information and to conflict with confidentiality requirements.

Ambient noise and audio distractions (n=5; 19.2%): Ambient noise and audio distractions in the physical space diverted attention and diminished comprehension.

Lighting, contrast, shadows, and framing (n=3; 11.5%): Backlighting, low contrast, shadows, and poor framing were reported to obscure handshape, reduce visibility of signing, and make lip movements or captions harder to perceive.

2.4.1.5 Policy and procedural gaps

Policy and procedural barriers (n=5; 19.2%) reflect the absence, ambiguity, or inconsistency of standards, guidelines, and organizational procedures governing virtual communication. Although reported less frequently than other themes, these barriers have system-level implications because they shape when and how virtual services are selected, implemented, and assessed across settings and jurisdictions.

Absence or ambiguity of standards or regulation (n=4; 15.4%): Sources described a lack of clear standards governing when to use virtual versus in-person communication services and how to ensure effective communication. This absence can contribute to inconsistent or inappropriate use of communication technologies across settings.

Lack of organizational policy and procedural protocols (n=2; 7.7%): The absence of clear organizational protocols for requesting, using, and evaluating virtual communication services was described as negatively affecting accessibility and service quality.

Discrepancies in certification expectations and requirements (n=1; 3.8%): Differences in certification expectations and requirements for interpreters and

captioners across jurisdictions and organizations were identified as a barrier that can hinder access to communication.

Taken together, these findings indicate that barriers to effective virtual communication are multi-level and interdependent. Barriers linked to skills and preparedness often interact with platform reliability and audiovisual quality, while interpersonal challenges (such as fatigue, reduced contextual cues, and weakened rapport) are frequently intensified when technical or environmental conditions are sub-optimal. At the system level, gaps in standards and organizational procedures can leave participants without consistent expectations or safeguards, contributing to variability in the quality and appropriateness of virtual communication access.

2.4.2 Facilitators

This section summarizes facilitators to communication access reported in the academic and grey literature on the virtual (online) delivery of sign language interpreting and real-time captioning services. In our scoping review, 16 of the sources contained extractable content describing facilitators associated with virtual communication. Facilitators clustered into thematic categories that address: accessibility, technology and technical factors, interpersonal and relational dynamics, policy and procedural supports, and situational or environmental conditions. Together, these findings describe the features, practices, and enabling conditions that help virtual communication work well for Deaf, DeafBlind and Hard of Hearing participants and their communication partners.

2.4.2.1 Accessibility

Accessibility facilitators (n=13; 81.2%) make virtual communication easier to reach, use, and sustain for diverse participants. Based on the scoping review, accessibility benefits were most commonly described in terms of expanding service availability and reducing the practical burdens that can prevent people from obtaining sign language interpreting or captioning supports.

Increased access and availability through reduced geographic and temporal barriers (n=13; 81.2%): Virtual communication services were frequently described as increasing access by removing distance and timing constraints. On-demand or short-notice access, improved reach for rural and remote users, and easier coordination across sites were noted as mechanisms that can help more people secure communication supports when needed.

Reduced travel time and travel-related costs (n=8; 50%): Virtual service delivery, in comparison to in-person service, can reduce or eliminate travel costs and time away from work or care responsibilities for sign language interpreters, captioners, Deaf, DeafBlind and Hard of Hearing users, and their communication partners.

More flexible and efficient scheduling (n=8; 50%): Scheduling in virtual settings was often described as easier, faster, and more adaptable. Sources emphasized shorter wait times, fewer cancellations due to travel, greater efficiency, and improved alignment with participant needs and schedules.

More consistent access to qualified professionals in rural or remote contexts (n=1; 6.2%): In some contexts, virtual communication services were described as supporting more consistent access to qualified professionals and reducing gaps between sessions, which can improve the overall communication experience.

2.4.2.2 Technology and technical

Technology and technical facilitators (n=10; 62.5%) reflect the quality, reliability, and usability of the tools and infrastructure supporting virtual communication. Across sources, high-performing audiovisual systems and stable connectivity were described as prerequisites for access to clear sign language interpreting, accurate captioning, and steady conversational pacing between communication partners.

High-quality video and clear audio (n=7; 43.8%): High-quality video and clear audio were described as supporting accurate perception of manual and non-manual sign language features and improving caption legibility. Stable audiovisual quality reduces lag and interrupted communication and helps maintain a steady pace of interaction.

Reliable devices, equipment, and platforms (n=5; 31.2%): Devices, equipment, and platforms that support clear communication and operate reliably were described as enhancing the success of virtual communication sessions.

Sufficient and stable connectivity and bandwidth (n=4; 25%): Stable network performance (including speed, reliability, and latency) was described as reducing pixelation, motion blur, audio interruptions, and caption lag, making communication smoother and comprehension easier.

On-site availability of communication technologies and redundancies (n=2; 12.5%): Having needed technologies available on site (e.g., monitors, tablets, or Communication Access Realtime Translation/CART systems), along with redundancies

such as backup systems, alternative connection options, or secondary platforms/devices, and reliable operational time/uptime, were described as ways to help ensure access and limit interruptions.

2.4.2.3 Tech setup, positioning, and visibility

A small subset of sources (n=2; 12.5%) highlighted practical setup and interface factors that can materially improve visibility, reduce strain, and make communication more accessible. These facilitators emphasize that even when core technology is available, usability can hinge on how it is configured and how well it supports user control.

Simple setup and positioning adjustments (n=2; 12.5%): Adjustments such as camera distance and angle, device placement, maintaining an unobstructed signing space, and other visibility improvements were described as reducing strain and enhancing accessibility and efficacy of virtual communication.

Ease-of-use and accessibility features in software/platforms (n=2; 12.5%): Ease-of-use features and accessible interface options, including the ability to adjust layout, controls, and visibility, were described as supporting clear and accessible communication.

High-quality real-time captions, CART, and transcripts (n=1; 6.2%): High-quality live captions or CART and access to transcripts were described as supporting comprehension and follow-up, especially in information-dense or multi-participant situations.

2.4.2.4 Interpersonal and relational

Interpersonal and relational facilitators (n=8; 50.0%) capture the social and communicative dynamics that support relationship-building and mutual understanding in virtual settings. Across sources, stronger matching between participants and service providers, along with rapport-building practices and interactional supports, were described as making virtual communication feel more effective and less transactional.

Closer matching of sign language interpreter/captioner experience and knowledge to user needs and context (n=6; 37.5%): Closer matches between interpreter/captioner experience and the user's language, regional language variety, user needs or preferences, and domain-specific requirements (e.g., medical or legal contexts) were described as leading to clearer communication, fewer misunderstandings, and more satisfying outcomes.

Rapport- and trust-building practices (n=4; 25%): Practices that build rapport, trust, emotional awareness, and empathy, such as brief pre-meeting connection, steady eye contact, and responsive pacing were described as making communication feel more personal and enhancing overall quality and effectiveness.

Supports for orderly turn-taking and conversational flow (n=1; 6.2%): Structures, platform features, or communication practices that support orderly turn-taking were described as helping communication feel fluid and improving conversational flow.

Supports for perceiving spatial or non-verbal cues (n=1; 6.2%): Features or practices that help communication partners perceive spatial or non-verbal signals were described as improving understanding and enhancing effectiveness in virtual environments.

2.4.2.5 Policy and procedural

Policy and procedural facilitators (n=7; 43.8%) describe the formal rules, training, standards, and guidance that govern virtual communication practices. Across sources, these facilitators were framed as creating consistency, clarifying expectations, and supporting appropriate and effective use of virtual communication services across settings.

Ongoing training and digital literacy development (n=5; 31.2%): Ongoing training and digital literacy development for service staff, interpreters/captioners, and Deaf, DeafBlind and Hard of Hearing users were described as ways of improving the overall quality of virtual communication.

Clear, accessible policies and actionable procedural guidance (n=2; 12.5%): Clear, accessible, comprehensive policies and practical procedural guidance were described as supporting access and appropriate, effective use of virtual communication services.

Certification and qualification standards (n=1; 6.2%): Certification and qualification requirements were described as helpful for ensuring services meet minimum standards for communication in virtual contexts.

Governance commitments to accessible virtual services (n=1; 6.2%): Organization- or system-level governance commitments, including policy, oversight, and transparency, were described as supporting reliable implementation across sites.

Shared standards and protocols (n=1; 6.2%): Shared standards and protocols, including criteria for virtual versus in-person communication, were described as creating a common baseline for practice across contexts.

2.4.2.6 Situational and environmental

Situational and environmental facilitators (n=2; 12.5%) concern features of the physical environment that influence comfort, visibility, and practical feasibility during virtual communication. Although less frequently reported, these facilitators highlight how environmental optimization can improve the quality of virtual access in real-world settings.

Lighting, camera, and audio in the physical environment (n=1; 6.2%): Attention to background placement and orientation, lighting, camera positioning, and audio setup were described as ways that improved framing/visibility and enhanced audiovisual clarity for speech, signing, lip movements, or captions.

Spatial, ergonomic, and accessibility-oriented setup (n=1; 6.2%): Environmental and ergonomic adjustments that enhance participant comfort, mobility, and contextual awareness, such as optimal positioning, room layout, spacing/distance, use of mobility aids, and other ergonomic changes, were described as making it easier to maintain attention and support effective virtual communication.

Overall, the facilitator findings emphasize that virtual communication can be made more accessible and effective when services are easier to obtain, the technical foundation is reliable and high quality, participants and providers are well matched and supported relationally, and policies and procedures provide clear guidance for consistent practice. In combination, these facilitators describe multiple leverage points, from practical setup choices to system-level governance, for strengthening communication access in virtual contexts.

2.5. Considerations and recommendations

This section synthesizes recommended best practices reported in the academic and grey literature on the virtual (online) delivery of sign language interpreting and real-time captioning services. Across the sources included in our scoping review, 26 contained content describing best practices associated with effective virtual communication (see Table 2.1). Best practices clustered into four broad categories: (1) technology and technical practices, (2) professional practices, (3) situational practices, and (4)

preparation and procedural practices. Together, these recommendations describe concrete actions that support reliable access, clear audiovisual transmission, appropriate use of virtual modalities, and high-quality communication experiences.

Table 1: Summary of Considerations and Recommendations

Best Practice Characteristics
Technology/Technical
Layout, Configuration & Accessibility Features • Use layouts, controls, and accessibility features to foreground essential visual information
Network & Reliability • Ensure secure, stable connectivity and plan for redundancy
Audio Quality • Maintain clear and consistent audio capture and playback
Video Quality • Maintain adequate video quality and visibility
Support Systems • Provide real-time technical support and clear escalation pathways
Professional
Education & Training • Invest in continuing education and role- and context-specific training
Feedback & Quality Assurance • Establish quality assurance, assessment routines, and feedback protocols
Workload & Fatigue Management • Manage workload and fatigue through staffing and scheduling practices

Situational

Situational Appropriateness

- Use clear criteria for virtual versus in-person communication

Communication Dynamics

- Set ground rules for turn-taking, pacing, and repair, and include comprehension checks

Participant Needs & Capacities

- Assess and support individual readiness for virtual communication

Regulatory & Ethical Considerations

- Protect privacy and confidentiality and follow data-handling requirements

Preparation/Procedural

Advanced Preparation

- Conduct pre-session briefs and technical checks; share materials in advance; confirm roles and backup plans

Environmental Setup

- Optimize the physical and virtual environment

Operational Roles

- Assign and communicate roles and make protocols explicit

2.5.1 Technology and technical

Technology and technical best practices (n=23; 88.5%) focus on the essential setup, quality, monitoring, and support required to enable reliable virtual communication. Across sources, recommendations emphasized that communication access depends on both system performance (audio, video, connectivity) and active configuration and monitoring of platform features that make sign language interpreters, captioners, and critical visual information consistently available to participants.

Use layouts, controls, and accessibility features to foreground essential visual information (n=16; 61.5%): Sources emphasized selecting and using platform layouts and controls that keep the interpreter or captioning highly visible (e.g., pinning or

spotlighting, multi-view configurations) and ensuring accessibility features (such as live closed captions or CART integration) are enabled and actively monitored throughout the session so communication needs remain met.

Ensure secure, stable connectivity and plan for redundancy (n=15; 57.7%): Best practice recommendations frequently highlighted the need for stable bandwidth and low latency, alongside redundancy planning. Backup devices, alternative connection options, and alternative platforms, combined with proactive monitoring and clear fail-safe steps, were described as reducing disruptions and protecting communication quality if problems arose.

Maintain clear and consistent audio capture and playback (n=14; 53.8%): Ensuring accurate and intelligible audio was described as foundational. Recommended practices included appropriate microphone placement, noise-control or echo-reduction strategies, and routine sound checks to support clarity and accuracy in virtual interactions.

Maintain adequate video quality and visibility (n=13; 50%): Sources emphasized maintaining sufficient video resolution and frame rate and minimizing motion blur so that communication participants remain visible at all times. These practices were described as essential for accurate perception of signing and other visual communication cues.

Provide real-time technical support and clear escalation pathways (n=10; 38.5%): Best practice recommendations included having real-time technical support available (e.g., help desk functions, on-call escalation, or on-site support) and ensuring participants know how to access help without derailing the session. Built-in contingency procedures that are communicated in advance were also described as reducing interruption-related complications.

2.5.2 Professional

Professional best practices (n=21; 80.8%) reflect the standards, education, feedback processes, and workload management strategies that support high-quality professional practice in virtual settings. Across the literature, recommendations emphasized that the move to virtual communication delivery requires explicit training, structured quality improvement, and staffing practices to sustain performance, offset fatigue, and protect communication quality.

Invest in continuing education and role- and context-specific training (n=19; 73.1%): The most frequently reported professional recommendation was ongoing

training for sign language interpreters, captioners, and service staff, with attention to role-specific responsibilities and the context in which virtual services are delivered.

Establish quality assurance, assessment routines, and feedback protocols (n=9; 34.6%): Sources recommended systematic quality assurance and assessment routines, including structured mechanisms for user feedback and review and post-session reflection to identify issues and guide improvements to virtual communication systems, supports, and services.

Manage workload and fatigue through staffing and scheduling practices (n=7; 26.9%): Policies and practices to address workload and fatigue, such as breaks, staffing adjustments, rotations, and team interpreting, were recommended to support sustained quality and reduce performance degradation during virtual sessions.

2.5.3 Situational

Situational best practices (n=20; 76.9%) emphasize aligning communication strategies and modality decisions with the specific context and the needs of participants. Across sources, recommendations focused on making explicit decisions about when virtual delivery is appropriate, setting clear interactional rules that protect conversational flow, and ensuring that privacy and readiness requirements are met.

Use clear criteria for virtual versus in-person communication (n=15; 57.7%): Sources recommended developing and applying explicit criteria to determine when virtual communication is appropriate and when in-person support is required. Examples included safety-critical encounters and situations that are private, confidential, or highly complex.

Set ground rules for turn-taking, pacing, and repair, and include comprehension checks (n=9; 34.6%): Recommended practices included establishing explicit ground rules for turn-taking and pacing, agreeing on signals for repair (e.g., requests to repeat or slow down), and building in brief comprehension checks to keep participants aligned and maintain conversational flow.

Assess and support individual readiness for virtual communication (n=9; 34.6%): Sources recommended assessing and supporting readiness for virtual participation, including comfort with the platform or interface and access to adequate equipment and space.

Protect privacy and confidentiality and follow data-handling requirements (n=7; 26.9%): Best practice recommendations included taking steps to protect privacy and confidentiality (e.g., using private rooms, appropriate camera positioning, and obtaining consent for recordings or transcripts) and following institutional and legal requirements for data handling.

2.5.4 Preparation and procedural

Preparation and procedural best practices (n=17; 65.4%) focus on advance planning, environmental optimization, and clear assignment of roles so sessions run smoothly and predictably. Across the literature, recommendations emphasized that communication quality is often determined before the session begins, through preparation that reduces uncertainty and ensures all parties understand how the virtual interaction will be managed.

Conduct pre-session briefs and technical checks; share materials in advance; confirm roles and backup plans (n=16; 61.5%): Sources recommended pre-session briefing and technical checks, sharing materials and terminology in advance, and confirming roles, backup plans, and points of contact so that everyone is prepared and problems can be addressed quickly if they emerge.

Optimize the physical and virtual environment (n=11; 42.3%): Best practice recommendations included optimizing environmental conditions by adjusting lighting, background contrast, and camera framing, and ensuring appropriate acoustics and privacy or security in the space where virtual communication occurs.

Assign and communicate roles and make protocols explicit (n=7; 26.9%): Sources emphasized assigning roles, such as who manages pinning or spotlighting, monitors chat or Q&A, and tracks time. Making turn-taking and cueing protocols explicit for all participants was also described as supporting predictable, effective communication.

Overall, best practice recommendations emphasized that effective virtual communication is achieved through a combination of technical readiness, professionally supported practice, context-sensitive decision-making, and disciplined preparation. Across categories, recommendations converge on the need to reduce preventable variability by standardizing setup, clarifying roles and procedures, investing in training and quality improvement, and ensuring that virtual delivery is used in contexts where it can meet privacy, safety, and communication-quality requirements.

3. Needs Assessment

3.1 Background, Purpose, and Objectives

The needs assessment complemented the scoping review and field-testing components of this project by capturing lived and practice-based experience of virtual communication access across real settings. It was designed to identify what helps and hinders communication access, recognizing that access is shaped not only by technology, but also by service provision and availability, user supports, and the social and environmental conditions where virtual communication occurs. The needs assessment also supported standards-oriented translation by eliciting both current conditions and ideal conditions, enabling a needs-as-gap framing grounded in established needs assessment theory.

The needs assessment was designed to clarify the nature and priority of communication-access needs experienced by Deaf, DeafBlind and Hard of Hearing people and their communication partners when sign language interpreting and captioning services are delivered in virtual formats across multiple service settings (e.g., health, education, socio-legal, financial, government, community). The assessment was built upon discrepancy-based conceptions of need, which define need as the gap between current conditions and desired or ideal conditions (Kaufman, 1972; Labrecque, 1999). This approach emphasizes gaps in results or outcomes rather than solely gaps in processes or resources. It supports the prioritization of needs by considering the consequences and costs of meeting versus ignoring gaps (Kaufman, 1992; Kaufman & Russell, 2001).

Our assessment recognized that needs can be understood and measured from different viewpoints, such as users of service, service providers, communications partners, and the comparison of the three groups (Bradshaw, 1972). The needs assessment was treated not only as a descriptive exercise, but as a means for problem definition and solution identification, consistent with calls for needs assessments to inform practical supports and service improvements (McKillip, 1987).

The notion of “need” has implications for measurement and conclusions, and therefore the assessment was divided into two interrelated lenses:

- Gap-focused need: differences between current conditions (“what is”) and ideal conditions (“what should be”) for virtual communication access.
- Object-focused need: the specific practices, procedures, and enabling conditions (including tools and service features) required for people to experience barrier-free, high-quality communication access.

The overall purpose was to describe and understand needs, gaps, and enabling requirements with respect to virtual delivery of sign language interpreting and captioning services. The central and guiding needs assessment question for this project asked what can be learned from Deaf, DeafBlind and Hard of Hearing people and their communication partners about existing needs, gaps in implementation, and barriers and facilitators related to virtual communication access. The needs assessment was related to gap-focused and object-focused inquiries that investigate needs through the measurement of:

Gap-focused questions:

- What gaps in communication access are experienced by Deaf, DeafBlind and Hard of Hearing people and their communication partners when using or accessing sign language interpreting and captioning services delivered in virtual formats in various settings?
- To what degree do current conditions differ from ideal (high-quality and accessible) conditions for communication access in these virtual service encounters?

Object-focused questions:

- What barriers are experienced by Deaf, DeafBlind and Hard of Hearing people and their communication partners when accessing virtual communication services in various settings?
- What practices, procedures, and other enabling conditions are needed to facilitate effective (high-quality and accessible) communication access when sign language interpreting and captioning services are delivered virtually?

3.2. Methodology

3.2.1 Design

The needs assessment employed a qualitative, exploratory design where participants were asked during individual or group interviews to describe both present experiences with virtual communication services and desired future conditions. The design

supported the identification of “what is,” “what should be,” and the specific gaps and enabling requirements necessary to transition from current to desired states (Barbazette, 2006; Kaufman, 1992; Kaufman & Russell, 2001). The data collection method was intentionally participant-centered. The interview style we used aimed to ensure participants felt heard and respected while allowing in-depth discussion of successes, challenges, best practices, and recommendations relevant to accessibility standards and policy.

3.2.2 Participant groups and sampling approach

To make sure that “need” was assessed from multiple angles, the sampling process was set up under the assumption that it may be experienced and expressed differently depending on the role and context (Bradshaw, 1972). The needs assessment used purposive sampling to include multiple perspectives relevant to virtual communication access. Participant groups included adults (18+) who were Deaf, DeafBlind and Hard of Hearing with recent (past year) experience using virtual sign language interpreting or captioning services; service providers such as sign language interpreters and captioners; and communication partners from organizations or professions that used these services (e.g., health care providers, lawyers, police, financial advisors). Participant recruitment was supported by Wavefront Centre through postings and outreach, with interested individuals completing a brief web-based registration form prior to receiving project information and consent materials.

The total number of participants who participated in individual or group interviews were 30, with the following participants across the groups:

- 7 Deaf persons;
- 12 Hard of Hearing persons;
- 3 DeafBlind persons;
- 6 virtual communication service providers (sign language interpreters, captioners)
- 2 communication partners

3.2.3 Data collection methods and interview guide structure

The primary method of data collection was semi-structured, conversational individual and group interviews. Focus group interviews were 1 to 1.5 hours in length; individual interviews were up to 1 hour. To support accessibility, focus groups and interviews were conducted in-person or via video meeting and were supported by sign language

interpreters and captioners as required (including ASL and Deaf interpreters for DeafBlind participants when requested).

Interviews were designed to elicit detailed accounts of experiences with virtual sign language interpreting and captioning services. Question specificity and pacing were adapted to participant role (e.g., Deaf, DeafBlind and Hard of Hearing service user versus interpreter or captioner) and to the level of rapport established. In some interviews the questioning was more direct and structured; in others it was more conversational. Across interviews, questions were frequently reframed, based on participant responses, to support deeper reflection and to ensure participants were able to articulate key experiences and conditions they felt were necessary to enhance communication accessibility. Major categories of interview questions included: background and frequency of virtual communication service use, what usually happens in virtual sign language interpreting/captioning service interactions, worst and best experiences and what made them so, comparisons across contexts, an ideal scenario, and recommendations for improvement.

3.2.4 Analytic approach

The analysis of the interview transcripts was structured to align with the assessment's dual definition of need (gap-focused and object-focused) and to support translation into actionable recommendations. Conceptually, the analysis followed a gap-analysis logic by organizing data around: (1) current conditions ("what is"), (2) ideal conditions ("what should be"), and (3) the gaps and enabling requirements that must be addressed to move from current to desired states (Barbazette, 2006; Kaufman, 1992; Kaufman & Russell, 2001). Transcripts were thematically coded and examined for evidence of: (a) gaps in communication access; (b) barriers and facilitators affecting virtual communication access; and (c) concrete practices, procedures, and enabling conditions needed to achieve high-quality, accessible virtual communication.

3.3. Key Findings

The following is a detailed thematic summary of what sign language interpreters, captioners, Deaf, DeafBlind and Hard of Hearing participants said about their best and worst experiences with virtual captioning and sign language interpreting. Selected findings have also been integrated into Appendix B, which summarizes practical guiding principles for virtual communication service delivery.

3.3.1 Best Experiences

To understand what went into best experiences with virtual communications, we extracted content from our thematically coded interviews that provided insights into: (1) specific factors that contributed to or created participants' best experiences; (2) the range of conditions that made particular environments especially good for virtual communication; and (3) the kinds of situations participants felt were particularly well suited to virtual sign language interpreting and captioning services. The following sub-themes surrounding best experiences emerged.

Strong Technical and Visual Setup as the Foundation of "Best" Experiences

Participants consistently described high-quality technical and visual conditions as the basic foundation for positive virtual communication experiences. When platforms, devices, and visual setups worked well, everything else became easier.

Reliable internet, platform stability, and clear audio

Deaf participants described being very satisfied when the platform had good speed and quality, the interpreter's video did not freeze or pixelate, and there were no connectivity interruptions. A good Wi-Fi network and modern infrastructure helped to ensure that interactions were successful, with only occasional challenges.

Captioners emphasized that the quality of the audio feed was critical. Best experiences occurred when their laptops received a direct audio feed from the venue's sound system rather than picking up sound from a laptop set up in the corner of the room. When audio was clean and stable, captioning could be accurate with low latency.

Appropriate devices and screen size

Deaf users repeatedly contrasted small phone screens with larger devices. Phones were seen as too small, forcing them to hold the device in one hand and sign with the other, or search for a place to prop it up. Using wireless data on phones was also described as expensive. In contrast, laptops, iPads and larger monitors were strongly associated with best experiences. DeafBlind participants highlighted the importance of larger screens or dual monitors to keep interpreters and presentation materials visible at the same time. For some DeafBlind and low-vision users, larger tablets (e.g., big iPads, large-format phones turned sideways) were preferable for accessing video remote interpreting, but they also stressed that not everyone can afford high-end devices and that public funding for accessible technology would greatly improve access.

Camera placement, lighting, and visually clean backgrounds

Participants described best experiences when sign language interpreters had their cameras at eye level, with good lighting and uncluttered, high-contrast backgrounds. Dark clothing against a plain background, minimal jewelry and no visual distractions made it much easier to follow and watch, especially for DeafBlind users with restricted visual fields. DeafBlind participants emphasized that small visual details (e.g., background colour, interpreter clothing, and how the screen is split) made the difference between barely accessible and truly accessible communication via virtual sign language interpreting services. Deaf participants also recognized that they themselves contributed to visual clarity. Some expressed a desire for workshops teaching Deaf people how to frame themselves in camera, use appropriate lighting, and keep their hands in frame for interpreters; skills they currently learn only through trial and error, sometimes in high-stakes environments.

Platform features that support visual control

Certain platforms were repeatedly highlighted as enabling positive experiences when they allowed users to pin and spotlight interpreters, keep interpreters and speakers visible at the same time, and adjust layouts. Best experiences occurred when Deaf users had control to keep interpreters big enough and centrally located. In medical telehealth examples, ideal scenarios involved seeing the doctor, sign language interpreter, and Deaf patient together on screen, with clear visuals and good audio. One interpreter described a specialist appointment where “all three of us were on the screen really clear… everyone was happy,” and even the doctor was surprised at how well it worked. For virtual sign language interpreting services in hospitals and banks, participants described best experiences when the viewing screen was large and adjustable and when there were enough machines/equipment available, so people did not have to wait or share devices.

Skilled, Prepared and Well-Matched Providers

A second major theme concerned the human side of virtual communication. Participants linked their best experiences to sign language interpreters and captioners who were highly skilled, well-prepared, appropriately matched to the setting, and supported with good working conditions.

Qualified, local interpreters and high standards

Deaf participants stressed that high standards for hiring interpreters were central to good experiences. They wanted qualified, local interpreters and Canadian-owned virtual

services with clear quality control, rather than anonymous interpreters whose training and evaluation were unclear. Best experiences with virtual sign language interpreting services were associated with interpreters who understood local place names and Deaf community norms, could sign fluently in ASL, and did not default to Signing Exact English inappropriately.

Long-term relationships and continuity with interpreters

Deaf and DeafBlind participants repeatedly linked their best virtual communication service experiences to longstanding relationships with specific sign language interpreters. In educational settings, students who had worked with the same interpreters for two to three years described online classes as some of their best experiences because the interpreters already knew their vision, language preferences, and typical connectivity needs. Over time, these relationships allowed for smoother back-and-forth feedback, both sides arrived with shared expectations about pacing, turn-taking, and how to handle technical glitches. By contrast, one-off appointments with unfamiliar interpreters were rarely described as the best experiences, whether online or in person.

Preparation, context and realistic goal-setting

Sign language interpreters and captioners highlighted the importance of receiving preparatory materials such as names, acronyms, technical terms, land acknowledgements, and information about the meeting's purpose beforehand. Captioners emphasized that even a short list of nuanced terms and proper name spellings greatly improved the quality of their output and reduced stress. Sign language interpreters described best virtual communications experiences when service providers shared their goals with interpreters, enabling them to align their work with the meeting intent. Knowing the goal of the meeting meant they could prepare for likely vocabulary and emotional tone. For captioners, best experiences also included having visuals available along with audio, allowing them to anticipate content and resolve ambiguities more easily.

Empowered, Informed Consumers and Interveners

Many participants framed best experiences as collaborative efforts, where Deaf, DeafBlind and Hard of Hearing people, interpreters, captioners and interveners were all knowledgeable about how to use virtual communication tools and how to advocate for specific adjustments.

Knowledge and training on how to “show up” well on camera

Deaf participants acknowledged that they sometimes signed outside the camera frame or used informal setups when chatting with friends that were not suitable for interpreted meetings. They expressed an interest in workshops being offered to teach Deaf users how to frame their signing, adjust lighting, and position devices so that sign language interpreters can see clearly. It was felt that these skills would prevent misunderstandings in high-stakes environments.

DeafBlind-specific strategies and hybrid arrangements

DeafBlind participants described best experiences as hybrid. In these situations, everyone else might meet via video platform, but they have an in-person sign language interpreter or intervener who sits beside them, or they use two monitors to separate any presented material/slides from interpreter video. They emphasized that having an intervener or Deaf interpreter who understood their visual field and preferences made the process run smoothly. They stressed the importance of asking DeafBlind individuals directly about background colour, clothing, screen size, and tactile needs, rather than assuming one configuration works for all. Best experiences occurred when these preferences were respected and integrated into the setup.

Captioning as a tool of independence and participation

Hard of hearing participants described captioning as essential to some of their best experiences. One participant recalled a high-stakes job interview where remote virtual captioning allowed them to follow a panel’s questions in real time. The panel was unaware captioning was in use, but without it, the participant said they would never have even considered taking the call. Others described captioning in conferences, church services and group meetings as a way to not miss out on important information, helping not only people with hearing loss but also hearing audience members dealing with accents and poor acoustics. When captioning was present, participants felt able to engage rather than withdrawing.

Organizational Readiness, Lead Time and Tech Support

Best experiences also depended heavily on how organizations and hosts set up and supported virtual communication. When institutions were ready, proactive and flexible, virtual sign language interpreting and captioning services worked much better.

Pre-session test runs and early log-in time

Sign language interpreters, Deaf participants, and captioners all valued being able to log in early, often 10–30 minutes before the official start time, to update software, test the platform, check cameras and audio, and sort out teaming. Captioners noted that for larger events, organizers sometimes built in dedicated test runs; these were associated with smoother live sessions. Captioners reported that even when early log-in was not formally paid extra time, they routinely gave themselves 15–20 minutes beforehand to ensure technology was working, because that prep “means the appointment runs smoothly” and avoids wasting client time during the session.

Availability of equipment and dedicated tech support

In medical and banking environments, participants identified best experiences when there were enough machines or screens available to support virtual sign language interpreting services and when staff knew how to set them up without long delays. Being able to quickly provide a video screen or terminal and connect to an interpreter signalled that the organization had integrated virtual communication into its routine operations. Captioners and sign language interpreters both described particularly good experiences when events had professional audio-visual teams or production staff who understood how to route audio and manage multiple outputs, compared to smaller organizations that struggled to get audio out of a laptop. Good technical support reduced the cognitive load on captioners and interpreters, allowing them to focus on language rather than troubleshooting.

Clear policies on recording and privacy

Some interpreters raised concerns about automatic recording of video meetings, worrying that their real-time interpretations, which were meant for a specific interaction, might be shared publicly. They noted that they sometimes declined work that would be recorded and posted, which could leave Deaf consumers without their preferred interpreter. Best experiences were associated with clear agreements about if and how sessions would be recorded, and with technical solutions that could blur or omit interpreter video from recordings if it was not needed, balancing consumer access and provider privacy.

Situations and Environments Particularly Well-Suited to Virtual Communication

Participants highlighted several types of situations where virtual sign language interpreting and captioning services not only worked but were particularly effective or

uniquely valuable. These examples offer guidance on where virtual communication services may be especially appropriate or beneficial.

Remote appointments and services for people in smaller or distant communities

Sign language interpreters and Deaf participants emphasized that virtual interpreting has opened up the world for people in remote or smaller communities who previously had no access to sign language interpreters. Deaf clients in northern towns could see dietitians, doctors and lawyers using online platforms instead of relying on written notes and miscommunication. Interpreters described virtual sign language interpreting services as particularly helpful when in-person visits are impossible, but communication still needs to happen promptly. Most continued to prefer in-person for many situations but saw virtual as very helpful for remote access.

Telehealth and some medical appointments when all parties can see and hear well

Although many participants preferred in-person interpreting for medical settings, some described excellent virtual communication/telehealth experiences when doctors were willing to use Zoom or similar platforms and when all three parties (doctor, interpreter, Deaf patient) were clearly visible and audible. One interpreter recounted a specialist appointment where the doctor, initially nervous about virtual care, ended the session saying the setup worked very well. The clear visuals, good audio, and shared understanding of goals made the experience feel comparable to in-person service.

Job interviews, meetings and trainings with integrated captioning

Hard of hearing participants identified remote job interviews and professional training as situations where virtual captioning was particularly beneficial. Captioning allowed them to handle panel questions in tense situations. Participants felt that captioning should be standard in conferences and government or public-facing events, noting that many hearing people also quietly rely on captions when dealing with accents, poor acoustics, or fatigue. In such settings, virtual captioning services benefit the whole audience.

Smaller virtual meetings and committees with consistent teams

Sign language interpreters described smaller meetings as particularly suited to virtual sign language interpreting services, especially when participant numbers were limited enough that the screen did not fill with tiny postage-stamp sized images. Smaller groups made it easier to keep the sign language interpreter and Deaf consumer large on the screen and to track who was speaking. Committee work involving DeafBlind persons also went well when there were consistent sign language interpreters with appropriate

backgrounds and lighting and when participants met regularly, building shared familiarity and routines over time.

Everyday access and use of virtual communication in banking and other services

Several Deaf participants praised platforms that offered virtual interpreting on demand as a daily lifeline that allowed them to call mechanics, colleagues, family, and service providers from anywhere. They framed these platforms as achieving the original vision of enabling everyday social and business communication supported by a pool of sign language interpreters on demand. Some also described positive first experiences with virtual sign language interpreting services in banks, where staff proactively brought in a screen and set up the connection. Even where backgrounds or screen sizes were not ideal, having real-time interpreted communication in previously inaccessible settings was experienced as a major improvement.

3.3.2 Worst Experiences

To understand what went into worst experiences with virtual communications, we extracted content from our thematically coded interviews that provided insights into (1) specific factors that contributed to or caused their worst experiences; (2) the range of factors that made particular environments or situations especially poor for virtual communication services; and (3) the types of situations they felt were particularly bad, worst, or not well suited for virtual communication. The following sub-themes surrounding worst experiences emerged.

Technical Failures and Poor Signal/Audio as Immediate "Worst Experience" Triggers

The single most prominent theme with respect to worst experiences with virtual communication was basic technical breakdown: weak internet, frozen or pixelated video, poor audio, and platform glitches that made virtual sign language interpreting or captioning services impossible or unreliable.

Weak internet, pixelation and freezing video

Deaf, DeafBlind and Hard of Hearing participants described worst experiences occurring when video quality disintegrated, signing became choppy, only part of a conversation appeared before freezing, or the interpreter's image repeatedly stalled/froze mid-sentence. People in rural areas or on low-speed internet plans reported chronic pixelation and lag, acknowledging that their choice or availability of cheaper data plans often meant the best quality of video was simply not possible.

Sign language interpreters described instances where one team interpreter had such bad Wi-Fi that they froze constantly, missing large chunks of what the Deaf client signed. The co-interpreter had to carry the load for 30–40 minutes at a time while the first interpreter tried switching devices and using a WI-FI hotspot. Even after switching to another device and network, the experience remained disjointed.

Virtual sign language interpreting service users in hospitals said that when the interpreter view on the iPad froze, medical staff often did not know how to fix it or were reluctant to spend time troubleshooting, leaving Deaf patients with no effective communication support.

Poor or unusable audio feeds for captioning and interpreting

Captioners repeatedly identified bad audio as their worst-case scenario. In these conditions, speech recognition and human listening both fail, leading to inaccurate or nonsensical captions or long strings of “inaudible audio” notices. Captioning jobs in large spaces were particularly problematic when microphones were not on the speakers. Captioners emphasized that they can only put out what they get in; if audio is muddy or distant, captions will be poor no matter how skilled the captioner.

Interpreters also described courtroom and hybrid meetings where they simply could not hear speakers because laptops had no amplification, people spoke away from microphones, or multiple conversations overlapped. They stressed that “if I can’t hear them, I can’t do my job,” and that these audio issues frequently turned otherwise manageable sessions into worst case scenarios.

Connection drops, data limits and partial participation

Deaf participants using virtual sign language interpreting services or video platforms on mobile data described calls abruptly cutting off when they reached their data cap. In these situations, interpreters had to explain that the connection loss came from the user’s phone plan, not the interpreting platform, which created confusion and frustration on both sides. In some worst-case scenarios, Deaf clients were walking between buildings or entering spaces with poor Wi-Fi while on a call using a virtual sign language interpreting service. The connection dropped, and the interpreters were left unsure whether the meeting was continuing or whether the client could reconnect at all.

Captioners similarly described sessions where audio or platform would suddenly fail, leaving them connected but without any audio input or locked out during transitions.

These situations often made them feel they were “not helping at all,” contributing directly to the worst experiences.

Platform-specific glitches and cumbersome layouts

Sign language interpreters noted persistent problems with features such as breakout rooms, where carefully pinned interpreter and Deaf consumer windows disappeared every time people were moved between rooms, forcing them to reset layouts while speakers continued talking.

Certain specific proprietary or enterprise platforms were repeatedly described by some participants as “not great” or “not fully accessible,” with tiny “postage-stamp” windows and limited ability to pin or resize videos. Interpreters struggled to see Deaf consumers clearly, particularly in meetings with many participants and shared screens dominating the display. Captioners mentioned difficult integrations and systems that sometimes prevented them from connecting properly as designated captioners, creating stressful last-minute troubleshooting and delayed captions.

Human and Provider Factors: Wrong Fit, Lack of Training and Inappropriate Substitutes

Another major theme concerned human and provider-related factors that turned virtual interactions into worst experiences, these included: interpreter mismatch, lack of training or professionalism, unqualified substitutes, and shortages of Deaf interpreters.

Interpreter mismatch and dialect differences

Dialect mismatch when using national virtual sign language interpreting service platforms (e.g., interpreters from another region unfamiliar with local place-name signs) was seen as especially stressful, contributing to avoidance of the service and reliance on friends or known sign language interpreters to make calls instead.

Deaf participants reported online meetings where hosts, unable or unwilling to book professional sign language interpreters, assigned staff who had limited sign language experience to act as interpreters. These individuals were not formally trained, and Deaf participants described such arrangements as very poor experiences that effectively denied them equal access. The presence of unqualified interpreters online was framed as both an accessibility and ethical failure: it created miscommunication and signaled that the organization did not value true accessibility.

Shortages of Deaf interpreters and lack of teaming support

With only a handful of medically qualified Deaf interpreters covering large regions, worst experiences occurred when Deaf interpreter teaming was not provided for long or complex virtual sessions, raising concerns about service quality and interpreter well-being. Deaf interpreters described four-hour virtual medical assignments where two hearing interpreters were scheduled but only one Deaf interpreter; they worked the entire four hours without a Deaf interpreter team member, becoming so mentally exhausted that they had to cancel subsequent work.

Situations Seen as Particularly Bad or Poorly Suited for Virtual Communication

Beyond specific technical or qualification failures, participants identified types of situations that they felt were poorly suited to virtual sign language interpreting or captioning services, even when technology worked reasonably well.

Dynamic, multi-speaker, and large-group environments

Deaf and DeafBlind persons and sign language interpreters pointed to large meetings and webinars with many active speakers as among the worst virtual situations. Multiple pages of tiny video tiles, rapid turn-taking and crosstalk made it extremely difficult to track who was speaking and to pin the right windows.

Sign language interpreters said tiny postage stamp-sized windows were unacceptable when that person needed to present or engage in extended discourse. Deaf participants similarly advised against using virtual platforms for very large groups whenever possible.

In noisy group situations when real-time virtual captioning services were not in place, some Hard of Hearing participants commented that they used automatic captioning for communication access, which often captured “a little of everything” making such environments poorly suited for app-based captions.

High-stakes emergencies and critical medical decisions

Participants repeatedly framed emergency medical situations as worst-case scenarios for virtual-only access. Particularly problematic were situations when participants were arriving by ambulance, in an ER when masking and accents made lipreading impossible, and in settings where virtual captioning or sign language interpreting services were not available or allowed. Deaf and Hard of Hearing participants said their “worst nightmare” was being hospitalized in an emergency with no captioning or sign

language interpreting access; several said they would avoid hospitals unless “taken there against my will,” given how bad past experiences had been.

Some mental health care and emotionally intense conversations

While not universally rejected, some participants described virtual mental health appointments, especially without captioning or where interpreters were poorly matched, as very problematic. One participant endured two years of psychiatric care without captions, needing another person present to repeat what the psychiatrist said. In other emotionally intense contexts, participants felt that rigid time limits, frequent interpreter changes and lack of in-person presence made virtual communication particularly ill-suited to the gravity of the situation.

DeafBlind access via standard virtual sign language interpreting configurations

DeafBlind participants described standard virtual or video remote sign language interpreting service setups (e.g., small screens, white or cluttered interpreter backgrounds, tiny squares) as often effectively unusable. They stressed that DeafBlind people might be unable to see interpreters on small screens, particularly when there were multiple interpreters or other visual content sharing the limited space. They emphasized that many public-service environments (e.g., banks, customs and revenue, transport offices) are not DeafBlind-friendly when there is reliance on virtual communication service delivery, and that in-person sign language interpreters or interveners remain essential for meaningful access.

Hybrid meetings where only the interpreter is remote

Sign language interpreters noted that some of their worst virtual experiences occurred when everyone else was in person and only they were remote. They had to rely on other people to set up laptops or cameras, move devices closer to speakers, and adjust microphones. They also stated that auto-tracking devices such as owl cameras, while appealing for hearing users, were disorienting for interpreters since the view swung between speakers, making it hard to maintain visual focus and causing dizziness. Interpreters preferred static views where they could reliably see the Deaf client and the main speaker.

Organizational and Policy Failures: Denial, Delay and Structural Inaccessibility

Participants maintained that communication access was often blocked not only by missing captioning or sign language interpreting, but also by organizational rules and service practices that made access difficult or impossible. They described barriers

created by refusals to provide accommodations, privacy and security policies that limited accessible tools, and complex or burdensome captioning setups that failed to support full participation.

Refusal or failure to provide captioning or sign language interpreting services

Hard of hearing participants described long struggles to get live captioning for essential medical appointments, including a two-year battle with a psychiatrist who refused to arrange captions despite repeated requests and legal obligations.

Hospital staff and other service providers sometimes turned off captions or forgot to enable them, leaving Hard of Hearing employees or clients to repeatedly ask for captions to be turned back on. When captions, chat, or transcripts were prevented or disabled for “privacy” (e.g., in banking systems) without alternative access, participants experienced this as a direct barrier.

Privacy and security policies used to block access or tools

Participants recounted doctors and institutions refusing to allow automatic captioning apps because they did not consent to being recorded, even when no sign language interpreter or CART could be arranged. For Deaf and Hard of Hearing patients, this turned encounters into worst-case scenarios where communication was effectively impossible. Moreover, government, court and employer security policies that banned specific software or restricted external links resulted in forced use of less accessible platforms (e.g., proprietary systems) and prevented captioners or interpreters from connecting easily.

Complex, unclear or burdensome setup for captioning

Hard of Hearing participants described the process of arranging CART as challenging, both in terms of cost and effort. Best-intended setups for large events (e.g., multiple projectors, StreamText links, fixed seating) often made rooms rigid and uncomfortable. They had to look up at presenters and around the room to see who was speaking while simultaneously looking down at their phone or tablet for captions. Participants noted that in educational settings or conferences, the combination of captioning delay, rigid room layout, and difficulty identifying speakers left them confused and unable to participate fully, despite captioning ostensibly being provided.

Emotional Consequences: Stress, Fatigue, Mistrust and Withdrawal

Participants also spoke about the emotional impacts of worst virtual experiences including stress, exhaustion, mistrust of systems and services, and decisions to avoid virtual communication in certain contexts altogether.

Stress and guilt for both consumers and providers

Deaf and Hard of Hearing participants felt stressed about constantly asking people to repeat themselves, to turn on captions, or to adjust microphones. They often blamed themselves when technology failed, even when problems were entirely on the provider or organizational side. Sign language interpreters and captioners said that they felt guilty when poor audio or connection quality meant they could not provide accurate interpretation or captions, or when their technical problems caused adjourned court cases or disrupted workshops. Some described such events as “heartbreaking” and “a disaster.”

Mistrust and avoidance of certain platforms or services

Several participants reported avoiding hospitals, non-captioned events, and complex hybrid meetings where they had previously had bad experiences, choosing to “just miss out” on some opportunities rather than risk more frustration or humiliation.

Fatigue and cognitive overload from compensating for poor setups

Hard of Hearing participants described the cumulative fatigue of juggling multiple devices and apps, tracking delayed captions, and trying to participate in fast-moving discussions where captions lagged. They linked this cognitive overload to anxiety, social withdrawal and reduced engagement. Similarly, DeafBlind users found that the extra coordination needed for arranging interveners and sign language interpreters, combined with slow-paced, stop-and-start conversations, made short meetings feel like marathons. When meetings were not scheduled for enough time to allow for these communication dynamics, the result was frustration and incomplete communication.

3.4. Considerations and recommendations

The following is a detailed thematic summary of what sign language interpreters, captioners, Deaf, DeafBlind and Hard of Hearing participants said when asked for their recommendations on how to set up or improve virtual captioning and interpreting services. The summary focuses on: (1) specific factors they felt would make virtual communications better; (2) best-practice suggestions for platforms, technology, and

service models; and (3) broader policy and system-level changes needed to support equitable virtual access. Six main headings are used to summarize key points.

3.4.1 Center Deaf, DeafBlind and Hard of Hearing Leadership; Promote Universal Design

A major theme coming out of the recommendations for improving virtual communications was that virtual communication systems should be designed and operated with Deaf, DeafBlind and Hard of Hearing people in leadership roles and guided by universal design principles that benefit everyone.

Involve Deaf, DeafBlind and Hard of Hearing people in planning, design and setup

Deaf, DeafBlind and Hard of Hearing people should be consulted on platform choice, layout, lighting, and interpreting/captioning arrangements because they are the ones who are using and, in some cases, depending on the technology. They urged planners to weave communicating with Deaf, DeafBlind and Hard of Hearing people into planning, treating access as a starting assumption rather than an add-on. DeafBlind participants emphasized the need for more direct conversations about their specific needs instead of one-size-fits-all solutions.

Apply universal design so features help everyone, not only disabled users

Participants explicitly linked their advice to universal design. Captions were framed as useful not only for Deaf and Hard of Hearing people, but also for hearing participants dealing with accents, poor audio, or different learning styles. Hard of Hearing participants argued that live captioning and visual supports should be standard service in government and front-facing organizations. They saw captions as basic infrastructure that supports inclusion.

Increase awareness and promotion of existing services and tools

Several Hard of Hearing participants said they had worked in large organizations (including government) for decades without anyone knowing about available captioning or CART services. They called for proactive promotion of these services, so employees and clients do not have to discover them by accident. Participants suggested education campaigns providing basic information on how to request services and who pays for them, so that individuals are not left to navigate complex systems alone.

3.4.2 Ensure Equitable Access to Devices, Connectivity and Infrastructure

Participants stressed that virtual access depends on having appropriate devices, data plans, and network infrastructure. They framed these not as personal luxuries but as prerequisites for equitable communication.

Subsidize high-quality internet and devices for Deaf and Hard of Hearing users

Deaf participants explained that it's quite expensive to get a good high-speed data plan and that many Deaf people are under- or unemployed and can't afford the internet, data plans or the high-end devices. They called for subsidies to ensure people who rely on virtual services can afford sufficient data and robust connections. They noted that hearing people often have unlimited minutes on phone plans, while Deaf users burn through limited data using virtual or video remote sign language interpreting services. Participants argued that if we are truly thinking about equitable access, governments, and companies should support unlimited or high-cap data plans and devices for people who need them for communication.

Invest in stable connectivity and better coverage across regions

Deaf interpreters from smaller communities described patchy cell coverage and weak internet that made virtual communication services unreliable. They recommended expanding tower coverage and improving infrastructure so emergency calls and remote appointments do not fail due to weak signals. Participants linked this to safety, noting that poor connectivity can make it impossible to contact emergency services or doctors using virtual tools when they are most needed.

Provide accessible hardware (larger screens, appropriate phones, assistive devices)

Deaf and DeafBlind participants recommended that governments and agencies use grants to provide suitable hardware (e.g., larger tablets or monitors, better phones) and screens big enough to show both the interpreter and other content clearly. They stressed that many people on disability benefits cannot afford premium devices or multiple screens, even though larger displays significantly improve comprehension, especially for DeafBlind users.

3.4.3 Choose Accessible Platforms and Improve Their Features

Participants gave concrete recommendations about which platforms to use and how to configure or improve them to better support virtual sign language interpreting and captioning services.

Standardize services on platforms that work well for interpreters and captioners

Interpreters and Deaf participants recommended standardizing on a small number of platforms, such as Zoom, because it offers familiar, relatively accessible features (e.g., pinning, spotlighting, multi-window layouts, and transcript access). They suggested that using many different platforms (Zoom, Teams, other proprietary systems) forces users and providers to continually re-learn controls. A standardized platform that works well that everybody gets very comfortable on was seen as a key needed improvement.

Improve platform layouts and view controls

Interpreters recommended giving users more control over platform features and operation, such as being able to dynamically enlarge a Deaf signer to full screen when they take the floor and shrink them when finished. They wanted simple keyboard or mouse controls to zoom specific windows in and out, rather than being constrained by fixed tile sizes. Deaf and DeafBlind participants suggested split-screen for medical appointments, where the doctor, sign language interpreter, and Deaf or DeafBlind patient can all be seen clearly at once. They contrasted this with current systems where they must look back and forth between the doctor and a separate screen to view the interpreter, missing information.

Make platforms user-friendly and customizable for different access needs

DeafBlind participants recommended that platforms allow easy adjustments of background colour, text size and font, and that interpreters wear plain, high-contrast clothing and avoid distracting jewellery or patterns. They stressed that DeafBlind people are not all the same, and that platforms should support a range of configurations (e.g., visual, tactile, and hybrid) instead of assuming that one video layout fits everyone.

3.4.4 Improve Technical Setup, Training and Support in Service Environments

Participants repeatedly emphasized that technology alone is not enough. Staff in hospitals, courts, banks, and workplaces need training and clear procedures to set up and troubleshoot virtual services effectively.

Provide clear training, manuals and “how-to” guides for staff

Participants recommended simple posters or manuals attached to virtual communication and video remote interpreting service units in hospitals, explaining how to turn them on, position the screen, adjust lighting and connect to interpreters. Because nurses and doctors rotate frequently, training needs to be available at the point of use.

Interpreters said that having someone who knows how to use the technology in medical and legal settings is very important and should be built into service models.

Schedule test runs, early log-in and prep time

Interpreters and captioners advised building test runs into event or meeting planning, updating the platform beforehand, checking audio and video, and sorting out teaming arrangements. One Deaf interpreter described regularly giving themselves about 20 minutes of unpaid prep time before virtual service appointments, so the appointment runs smoothly. Captioners stressed that even short prep and audio checks can prevent worst-case scenarios where they are trying to caption a lecture with unintelligible, echoey audio from a laptop mic in the middle of a large room. Recommended is that compensated prep time be provided for each virtual communication session.

Ensure enough equipment and 24/7 access where needed

Deaf participants recommended significantly increasing the number of video remote interpreting service devices in hospitals and other institutions. Sharing a single unit across all languages and departments results in long waits and missed communication opportunities. Some participants suggested that ASL interpreter services should be available 24/7 as a matter of language rights, with on-demand options for emergencies, banks, investment services, and real estate transactions (e.g., selling a house, consultations with financial advisors).

Establish audio-quality standards and direct audio feeds for captioning

Captioners proposed setting minimum audio quality standards, using proper microphones, reducing background noise, and avoiding reliance on distant laptop mics. They recommended direct audio feeds to captioners whenever possible. They also requested backup communication channels in case chat messages are missed, so they can quickly alert hosts when audio or connectivity problems arise.

3.4.5 Strengthen the Interpreter, Deaf Interpreter and Captioning Workforce

Participants stressed that high-quality virtual access ultimately depends on having enough skilled sign language interpreters, Deaf interpreters, and captioners, supported by sustainable working conditions and thoughtful deployment. This requires training and funding more ASL-English interpreters, both hearing interpreters and Deaf interpreters. Interpreters noted that even if more virtual technology and platforms are provided, there are still not enough interpreters to meet consumer needs. They recommended increased funding for sign language interpreter training programs and supports to

ensure graduates are competent and ready to work. Deaf interpreters called for better support and recognition of Deaf Interpreter roles, including appropriate teaming for long or complex virtual medical and legal appointments so that they are not left working alone for hours.

Use interpreters and captioners where they are actually needed, and value their time

Interpreters described being hired for large events where there were no Deaf attendees, while at the same time many medical appointments for Deaf people went unfilled. They recommended more thoughtful allocation of interpreter resources based on real demand, rather than symbolic inclusion alone. Captioners asked for clarity about their role when automatic captions are already active in a meeting. They suggested that organizers explicitly explain why a human captioner is present to avoid confusion.

Respect privacy and control around recordings

Interpreters raised concerns about being recorded in virtual sessions and having their image and real-time interpretations posted online, which can affect their safety and professional practice. They noted that some interpreters decline recorded work, which can leave Deaf consumers without their preferred providers. They suggested technical solutions that allow recordings while blurring or omitting interpreter video when not required, balancing interpreter privacy with consumer needs for records or transcripts.

3.4.6 Tailor Virtual Services to DeafBlind and Other Specific Access Needs

DeafBlind participants offered detailed recommendations on how to make virtual communication services more usable and when in-person or hybrid options are essential.

Provide larger screens, high-contrast visuals and appropriate interpreter appearance

DeafBlind participants recommended that virtual communication service delivery and virtual meetings use screens larger than standard laptops whenever possible and that interpreters wear plain, dark clothing with simple backgrounds. They emphasized that screen size and visual clarity are a priority for understanding. They also suggested standardizing accessible fonts and ensuring transcripts or summaries are sent after meetings so they can revisit content at their own pace.

Offer interveners and support people, plus extra time and breaks

DeafBlind participants urged hosts to recognize that involving interpreters and interveners slows the overall process. Meetings that would be one hour for hearing

participants may need to be two hours to allow for tactile or guided communication. They recommended frequent breaks in long sessions (e.g., every hour in a three-hour meeting) to address visual strain and fatigue for both DeafBlind participants and interpreters.

Recognize when virtual-only is not appropriate

DeafBlind participants and interpreters highlighted contexts where virtual-only setups are not suitable, such as situations requiring tactile interpreting or highly interactive discussions. In those cases, they recommended budgeting for in-person interpreters and interveners rather than assuming a single video remote interpreting screen can provide meaningful access. They cautioned against assuming that providing an on-screen interpreter automatically makes an event accessible for DeafBlind people, noting that needs vary and must be discussed individually.

3.4.7 Policy, Funding and System-Level Changes for Sustainable Virtual Access

Finally, participants looked beyond specific setups to broader policy and funding changes needed to sustain accessible virtual communication over time.

Keep accessibility standards and legislation responsive to new technologies

Deaf participants noted as an example that Canada was very slow in implementing video relay services compared to the U.S. and warned against repeating this delay with emerging technologies. They argued that governments should not operate under the assumption that video remote interpreting alone is enough when new tools become available. They called for federal and provincial governments to adopt new communication technologies more quickly, so Deaf and Hard of Hearing people can benefit at the same pace as hearing populations.

Make captioning and sign language interpreting standard in government and public-facing sectors

Hard of hearing participants argued that live captioning should be a standard feature of government meetings, public services and many community-facing events, rather than something individuals must fight for on a case-by-case basis. They suggested starting with government as an example, then extending expectations to businesses and community organizations, supported by accessibility legislation and clear funding mechanisms.

Fund technology, services and training as core accessibility infrastructure

Deaf and Deaf interpreter participants recommended targeted grants to fund devices, data plans, virtual sign language interpreting service infrastructure, and training for both staff and community members. They framed communication as a basic right that should not depend on personal financial capacity. Hard of hearing participants emphasized that high costs of hearing aids, captioning devices, and specialized glasses keep many people from accessing available technology. They argued that these costs should be treated as necessary accessibility expenses, not luxury purchases.

4. Field Test of Virtual Sign Language Interpreting Services

4.1. Background and overview of field test objectives

As part of the project, three field tests were conducted of on-demand virtual sign language interpreting in two different organizations with two different on-demand platforms. Our objectives for this phase of the project were to develop a set of focused recommendations for the design and delivery of on-demand virtual sign language interpreting services to enhance communication access. We wanted to determine ways that on-demand virtual sign language interpreting could support Deaf, DeafBlind and Hard of Hearing individuals who used American Sign Language (ASL) to connect more easily with their non-ASL-using communication partners at workplace and service environments.

Field testing was designed as real-world pilot implementations of virtual communication platforms. The pilots were an opportunity to evaluate virtual communication in use and to identify implementation conditions that support equitable, high-quality access and to document barriers that can be prevented through standards or best-practice guidance.

4.2. Field test design and approach

We engaged employers from employment and service sectors and technical experts in virtual software and platforms to support the field-testing phase of the project. Design of the field test involved Wavefront Centre's Departments of Accessible Communications and Community Outreach, which are largely staffed by persons who are Deaf, DeafBlind and Hard of Hearing.

To establish the project, the field test team:

- Identified virtual service platform providers, which delivered two different platforms, hereafter referred to as 'Platform A' and 'Platform B;'
- Reached out to businesses to invite their participation in the project and connected with those interested in pursuing an implementation plan that would meet their needs;
- Developed introductory letters about the project and prepared client and interpreter briefing materials on how to use the on-demand service, including access and login instructions for the technical platform;
- Provided in-person in-service for field test participants;

- Developed materials to explain the project within each organization to encourage its use;
- Set up the platforms for use in the field; and
- Designed evaluation mechanisms for obtaining user feedback.

Over the period of the field testing, we recruited purposeful samples of ASL users and their communication partners from the two field testing sites, Wavefront Centre and Holiday Inn. Both organizational sites prioritized: 1) communication access for their services with customers, and 2) the provision of communication access for employees who are Deaf, DeafBlind and Hard of Hearing persons. Using a smart phone, tablet, or computer, participants could connect to an online platform to access a professional ASL interpreter during daytime hours. These spontaneous conversations were made possible thanks to interpreters being booked and available on standby throughout the field test.

The field testing occurred over three phases. Phase 1 of the on-demand virtual sign language interpreting service using Platform A occurred at Wavefront Centre over a three-week period from March 3rd to March 20th, 2025. Phase 2 using the same platform occurred at the Holiday Inn over a two-week period from July 21st, 2025 to August 8th, 2025. For Phase 3, a second platform was also tested, Platform B, with calls occurring over a four-day test period at Wavefront Centre in September 2025.

The field testing evaluation relied on multiple feedback mechanisms designed to capture both structured ratings and open-ended experiential detail. An online user experience questionnaire was administered shortly after sessions to preserve recall, along with an end-of-pilot feedback form where participants could provide reflections on how the field testing worked overall.

4.3. Key Findings

Phase 1 field testing at Wavefront Centre using Platform A involved 29 virtual sign language interpreting calls totaling 171 minutes. The field-testing period during Phase 2 at a Holiday Inn in the Lower Mainland involved 52 interpreted calls totaling 185 minutes. The field-testing period at Wavefront Centre using Platform B involved 13 interpreted calls totaling 50 minutes.

Table 2: Field testing activity

Phase / Period	Site	Platform	Call Type	Number of Calls	Total Minutes
Phase 1	Wavefront Centre	Platform A	Interpreted calls	29	171
Phase 2	Holiday Inn (Lower Mainland)	Platform A	Interpreted calls	52	185
Phase 3	Wavefront Centre	Platform B	Interpreted calls	13	50
Total				**94**	**406**

We collected field-test user feedback data (i.e., user feedback questionnaire/evaluation forms, debriefing notes) regarding virtual service user and provider experiences and perspectives on ease of use, quality of communication access, and areas of strengths and improvement. Overall, 29 online user experience questionnaires and 13 final feedback forms were received, with 3 additional written feedback summaries provided to the field-testing team through email.

Sixteen online user experience questionnaires were completed by virtual sign language interpreting service users (9 who identified as sign language users; 7 spoken language users), while the remaining 13 were completed by sign language interpreters. All service user questionnaire respondents accessed the service using a smartphone; the sign language interpreter respondents reported using a desktop computer while providing the service.

The feedback form completed at the conclusion of each pilot elicited additional responses. Of the 13 final feedback forms received, 7 were from sign language interpreters, 2 from a service user who used sign language, 3 from individuals who provided sign language interpreting services and 1 from an individual who supported the field testing planning and implementation.

The vast majority of feedback received from the first two phases came from the field test using Platform A. We received very limited user feedback (i.e., 3 feedback forms received) for Phase 3 involving Platform B. As a result, the summary described in the

next sections reflect feedback received while using Platform A. Further field testing and evaluation of different platforms, including Platform B, in future research would enable comprehensive identification of barriers and facilitators to communication access.

Table 3: User feedback data collected

Category	Count (n)
Overall data collected	
Online user experience questionnaires received	29
Final feedback forms received	13
Additional written feedback summaries provided by email	3
Online questionnaire respondents	
Virtual sign language interpreting service users	9 sign language users
	7 spoken language users
Sign language interpreters	13
Final feedback form respondents	
Sign language interpreters	7
Service user who used sign language	2
Individuals who provided sign language interpreting services	3
Individual who supported field-testing planning and implementation	1

4.3.1 Strengths of the virtual communication service

The on-demand virtual communication service through Platform A was generally viewed very favourably by service users in terms of facilitation of communication that generally met the service users' needs. Questionnaire respondents noted that the platform was simple in design and made communication smoother between sign language users and spoken language users. Comments on the user-friendliness of the platform varied somewhat with some highlighting ease of initial use while others noted system complexity. Some field test participants noted the importance of regular use and that the platform would become easier and more beneficial with frequent use.

One of the most appreciated aspects about on-demand virtual sign language interpreting services via the platform was the convenient and rapid communication access for Deaf, DeafBlind and Hard of Hearing users to communicate effectively with hearing individuals. The simplified and streamlined access allowed for quick interactions and chats in work-related contexts without communication barriers. Many valued how the platform made everyday communication and staff training more efficient and accessible, and users saw the platform as a reliable and practical tool for supporting inclusion and access.

When asked about strengths of the platform for supporting on-demand virtual communication, some of the field test participants commented on the following:

- User-friendly design, particularly highlighted in the ease of training new staff to use the platform. Some participants appreciated the simple visual layout and the flexibility to customize settings individually for each user.
- Good quality video and audio.
- Quick and efficient service, characterized by low wait times.
- Scheduling system helped ensure that interpreters were available when needed.
- Mobile accessibility allowing convenient access through smartphones.
- Ease of use for interpreters, making the service quickly accessible.

4.3.2 Barriers to virtual communication access

It was challenging for some users to understand how the platform worked; they required a period of trial and error before the platform could be used as intended. Some service users commented on limited service hours during the field testing period. Others noted that there was no waiting-room indicator, so they didn’t know where they were in the queue while waiting for an interpreter. For sign language interpreters, challenges of the on-demand service were that there were low-call periods involving little or no activity, which made the schedule for interpreters unpredictable and inconsistent.

Field test participants pointed to aspects of the system they found frustrating or confusing:

Technical interruptions

- Connection problems. Slow initial connection times created frustration for some users. Calls sometimes failed. There were also technical issues with service calls

not initially connecting through the interpreter's desktop computer (preferred), but instead on the interpreter's phone.

- Audio/Video quality: The video sometimes froze. Sound / audio issues arose, such as when sound cut in and out and audio quality was weak or uneven. There were difficulties in accessing audio during calls, especially when service users were using smartphones. Service users needed to repeatedly turn up the volume. There were also challenges when users were unable to quickly mute/unmute audio.

Framing & visibility

- Difficulty seeing the interpreter. For example, users pointed out problems when views were too close or where interpreters' hands or faces were not visible on screen.
- Discrepancies between what interpreters and sign language service users saw in the frames (i.e., interpreter self-view vs. user view), causing uncertainty for interpreters in how best to set up adequate signing space that was visible to service users.
- Inability of service users to adjust the screen views and manage video framing through the platform so that the interpreter is visible in the frame. Service users had only partial views of the interpreters on their smartphone screens.
- Lack of accessibility features, particularly for users with vision loss or who are DeafBlind. Specific challenges included small fonts on screen and lack of accessible ways to notify service users that an interpreter connected to the call. Use of smartphones and tablets for service meetings was problematic as the screen was too small for viewing the interpreter.

Some noted additional weaknesses or challenges when using the platform for on-demand virtual communication included the following:

- Lack of consumer orientation on how best to use the service and ways to provide sufficient context for interpreters.
- Distractions present in the environment (e.g., use of different backgrounds on screen that were deemed less professional).
- Guidelines & protocols lacking.
- Lag / view-switching delay.
- Limited interpreter options / features.
- No private text / notes field.

- User interface challenges / window sizing and workflow blockers.
- Lack of technical support and procedures for reporting problems.

While these issues did not outweigh the overall value of the service, they noted that the experience could be smoother and less stressful. Overall, people felt that the platform still needed refinement to make it more consistent, accessible, and predictable.

4.4. Considerations and Recommendations

Overall, the on-demand virtual communication services in field test Phases 1 and 2 were viewed favourably and generally met the service users' needs, offering quick, real-time access to interpreters. The on-demand platform made it possible for Deaf, DeafBlind and Hard of Hearing people as well as their hearing communication partners to connect naturally and spontaneously.

The field test showed that easy access and a user-friendly platform are essential for people to make the most of on-demand virtual sign language interpreting. It also highlighted how valuable this service can be in creating more inclusive, accessible communication.

Arising from the field test, we identified several ways to enhance on-demand virtual sign language interpreting services as well as ways to help prevent or remove barriers. Our recommendations for service design and delivery are in three main areas:

4.4.1 Technical Standards Development

- Ensure service settings provide strong and stable internet connectivity.
- Improve interfaces to be user-friendly and customizable.
- Ensure framing and video settings on the platform enable framing options for viewing the interpreter's signing space on a screen.
- Enhance accessibility that incorporates customizable text, font size, backgrounds, and zoom options, with additional attention to improving accessibility for DeafBlind users.
- Add a synchronized camera view, ensuring sign language interpreters and service users see the same framing clearly.
- Include text/chat fields, enabling efficient communication of numerical, technical, and sensitive information, with the ability to erase or delete typed details.

- Build in platform features that communicate information on user queues and service provider availability, providing an indicator for queue positions and online status.
- Provide real-time technical support during virtual sessions.

4.4.2. Workforce and Training

- Provide clear education and orientation for both users and sign language interpreters on how to use the on-demand virtual sign language interpreting platform and service.
- Provide clear guidelines and best-practice tips on
    - How to configure rooms, cameras, lighting, and seating for optimal communication.
    - How to promote communication access for Deaf, DeafBlind and Hard of Hearing participants in virtual contexts.

4.4.3 Quality Assurance

- Establish continuous feedback loops that integrate mechanisms for users and providers to report issues and track improvements over time.
- Ensure functionality by doing preview calls to test equipment and verify video and audio quality before sessions.
- Embed privacy and confidentiality agreements and standards into virtual communication policies.

With continued development and testing of platforms, improved user support and guidance, and continued platform upgrades, the service offers a valuable and promising service to help make communication more inclusive, accessible, and equitable. Across both phases of the field test, users felt that the virtual service via the platform offered a significant step forward in enabling equitable, real-time communication for sign language users and their communication partners. While some technical and accessibility issues remain, participants viewed these as manageable improvements rather than major obstacles. The overall tone was one of appreciation and optimism, recognizing the on-demand virtual service platform as an inclusive, user-focused communication tool that continues to evolve and improve. Many expressed gratitude for being part of the evaluation process and saw the service as a key step toward broader accessibility.

5. Final Considerations and Recommendations

Drawing from the combined evidence, our project formulates recommendations in Accessibility Standards Canada's main priority areas. In this section we highlight our recommendations in relationship to the priority areas that we identified at the outset of our project: accessible communication, design and delivery of programs and services, and accessible employment (see sections 5.1, 5.2, 5.3, and 5.4). We also put forward for consideration ways that our project findings may inform standards development and future research in the other priority areas (see sections 5.5, 5.6, and 5.7), including the built environment, procurement, and transportation. General guiding principles and best practices for service organizations and providers that are planning or implementing virtual communication service delivery are summarized in Appendices B and C.

5.1. Communication with Information and Communication Technologies (ICT)

Under Communication, our recommendations focus on the accessibility, reliability, and usability of virtual platforms, software, and digital features that enable sign language interpreting and captioning in online environments. Results from our scoping review, needs assessment, and field testing emphasized that accessible virtual communication is not only a "nice to have" but the core infrastructure that determines whether communication access is achieved or undermined.

5.1.1 Build accessible platform design into default configurations

Virtual platforms should be configured so that accessibility is the default experience rather than an optional add-on. This includes enabling built-in accessibility features, offering clear layout controls, and supporting customization to match diverse access needs.

- Use platform layouts and controls that keep sign language interpreters and captioning consistently visible (e.g., pinning or spotlighting, multi-view layouts), and ensure captioning features are enabled and monitored throughout sessions.
- Improve layout and view controls so users can quickly enlarge a Deaf or DeafBlind signer when they take the floor, manage split-screen views, and avoid fixed tile sizes that reduce comprehension.

- Provide user-friendly customization options, including adjustable text size, font, background colour/contrast, and zoom controls, with attention to DeafBlind requirements and varied visual access needs.
- Include synchronized camera views so interpreters and service users see the same framing and signing space, reducing misalignment and interpretation errors.

5.1.2 Ensure technical performance standards and redundancy

Accessibility depends on stable, high-quality audiovisual transmission. Technical standards and backup planning are useful to anticipate potential problems that may arise, reduce avoidable failures, and help protect users from inequitable disruptions.

- Ensure secure, stable connectivity and anticipate/plan for potential problems, including backup devices, alternative connection options, and clear fail-safe procedures when disruptions occur.
- Maintain clear and consistent audio capture and playback through appropriate microphone placement, noise control or echo reduction, and routine sound checks.
- Maintain adequate video quality, resolution, and frame rate to preserve signing clarity and visual cues and reduce motion blur and poor visibility.
- Establish audio-quality standards and provide direct audio feeds to captioners whenever possible to support accurate real-time captioning.

5.1.3 Provide real-time technical support and accessible communication channels

Results from all three components of our research highlighted that even well-designed platforms fail without timely support. Clear, accessible pathways to help prevent small issues from escalating into access failures are required to ensure that virtual communication is accessible and useful.

- Provide real-time technical support (help desk, on-call escalation, or on-site support) with clear instructions on how to access help without interfering with communication sessions.
- Build in and communicate contingency procedures in advance, including backup communication and technology options.

- Add platform features that show user queue position and provider availability for on-demand interpreting, so users can anticipate wait times and reduce uncertainty.

5.2. Communication (Other than ICT)

These recommendations emphasize how organizations communicate about access in ways that are clear, predictable, and easy to understand. They focus on interactional practices, plain-language guidance, and proactive communication that reduces barriers to requesting and using virtual sign language interpreting and captioning services.

5.2.1 Standardize clear interactional ground rules for accessible virtual communication

Accessible communication requires shared expectations about turn-taking, pacing and clarification. When these practices are explicit, communication flow improves for everyone, particularly when mediated through sign language interpreters or captioners.

- Set ground rules for turn-taking, pacing, and clarification (e.g., signals to repeat or slow down), and include brief comprehension checks to keep participants aligned.
- Assign and communicate roles (e.g., who manages spotlighting/pinning, monitors chat, or tracks time) so that accessibility tasks are consistently handled.

5.2.2 Provide clear, practical guidance and point-of-use instructions

Virtual communication users frequently request or require simple, practical “how-to” guidance that can be used in real settings. Guidance should be available at the point of service and written in clear language.

- Provide clear guidelines and best-practice tips for hosts, staff, sign language interpreters, captioners, and users, including quick-reference checklists for setup and troubleshooting.
- Create simple manuals, posters, and step-by-step guides attached to equipment (e.g., video remote interpreting units) that explain how to power on, position screens, adjust lighting, and connect to services.

5.2.3 Increase awareness and proactive promotion of available services

A recurring issue identified within the needs assessment was that people often do not know what services exist or how to access them. Organizations should treat awareness as a core accessibility responsibility.

- Proactively promote virtual sign language interpreting and captioning services within workplaces and public-facing organizations so individuals do not have to discover them by accident.
- Provide clear information on how to request services, who to contact, and how costs are covered to reduce navigation burdens and inequities.

5.3. Design and Delivery of Programs and Services

These recommendations focus on how programs and services are designed, staffed, and delivered so that communication access is built into day-to-day operations. The findings from our project highlight that access failures often occur because programs rely on ad hoc workarounds rather than planned, supported service models.

5.3.1 Center Deaf, DeafBlind and Hard of Hearing leadership and universal design

Service design should be guided by lived experience and universal design principles. Leadership and meaningful involvement by Deaf, DeafBlind and Hard of Hearing people improves fit, reduces one-size-fits-all approaches, and strengthens equity.

- Involve Deaf, DeafBlind and Hard of Hearing people in planning, design, and setup decisions (platform choice, layout, lighting, interpreting/captioning arrangements) and treat access as a starting assumption.
- Apply universal design principles so features support everyone, recognizing that captions and visual supports benefit many users beyond the intended audiences.

5.3.2 Use clear criteria for when virtual service delivery is appropriate

Virtual communication is not appropriate in all service and program contexts. Programs and services need explicit criteria to guide access and use decisions to prevent unsafe or inequitable reliance on virtual-only options.

- Develop and apply clear criteria for virtual versus in-person communication, particularly for safety-critical, highly complex, or confidential contexts.

- Assess and support individual readiness for virtual participation, including comfort with platforms, access to equipment, and suitable space and privacy.

5.3.3 Build preparation routines into service delivery

Many virtual communication access barriers are preventable when programs implement preparation and procedural routines. Planning reduces uncertainty and supports consistent quality across service environments.

- Conduct pre-session briefs and technical checks; share materials and terminology in advance; confirm roles, backup plans, and points of contact.
- Schedule test runs, early log-in, and dedicated preparation time as part of virtual service planning rather than relying on unpaid or informal preparation.

5.3.4 Provide adequate equipment, availability, and support in real settings

Federally regulated service and workplace environments require sufficient equipment for virtual service delivery that are reliably available. Results from our research stressed that access must be timely and practical, including in emergencies.

- Ensure sufficient equipment (e.g., adequate numbers of video remote interpreting devices) so services are not delayed due to shared units across departments.
- Provide 24/7 access to sign language interpreting services where needed, including on-demand options for emergencies and essential transactions.
- Ensure use in environments with strong and stable internet connectivity and provide clear education and orientation for both users and interpreters.

5.4. Employment

These recommendations relate to the workforce and employment conditions that sustain high-quality virtual sign language interpreting and captioning services and foster accessible workplaces that attract, recruit, and employ Deaf, DeafBllind and Hard of Hearing persons. The evidence indicates that technology improvements alone are insufficient without a supported, adequately staffed and trained workforce, and accessible employment practices.

5.4.1 Strengthen the interpreter, Deaf interpreter, and captioning workforce

Our findings emphasize the detrimental impact of uneven capacity. Workforce strategies should increase training, recognition, and sustainable practice conditions.

- Train, mentor, and fund more ASL and Deaf interpreters and captioners; include supports that ensure that qualified interpreters are hired to deliver interpreting services and that these individuals are trained and prepared for virtual practice and complex contexts.
- Require interpreters to take out membership in provincial and/or federal professional interpreting professional associations; such membership promotes professionalization.
- Support appropriate teaming for long or complex appointments and ensure staffing models reflect the cognitive load of virtual interpreting and captioning.

5.4.2 Embed continuing education and quality improvement as standard practice

Virtual service delivery requires role-specific training and continuous learning. Quality improvement processes help organizations learn from failures and normalize standards-driven refinement.

- Invest in continuing education and role- and context-specific training for sign language interpreters, captioners, and relevant staff.
- Establish quality assurance routines and feedback protocols, including structured user feedback and post-session reflection to guide improvements.

5.4.3 Manage workload, fatigue, and accessibility needs in scheduling

Fatigue and strain affect quality. Scheduling practices should protect communication quality, support safe working conditions, and recognize the additional demands of virtual communication access for DeafBlind persons.

- Manage workload and fatigue through staffing and scheduling practices, including breaks, rotations, and team interpreting where appropriate.
- Build in extra time and breaks for participation of DeafBlind persons and for sessions involving sign language interpreters and interveners, recognizing that accessible pacing may require longer sessions.

5.5. The Built Environment

While the project focuses on virtual communication, the built environment still matters because virtual access is enacted in physical spaces. Lighting, acoustics, privacy, and

room setup directly affect the quality of virtual sign language interpreting and captioning services and the dignity of participants.

5.5.1 Optimize physical environments that host virtual communication

Organizations should treat environmental conditions as part of accessibility planning, particularly in service sites and workplaces.

- Optimize lighting, background contrast, and camera framing to support visibility of signing and facial cues.
- Improve acoustics by reducing background noise and echo and by using appropriate microphones to support captioning accuracy.
- Ensure private, safe spaces for confidential interactions, with appropriate camera positioning and consent-based recording practices.

5.5.2 Ensure accessible service-site equipment placement and usability

Physical setup influences whether devices can be used effectively by Deaf, DeafBlind and Hard of Hearing users and by staff supporting them.

- Ensure virtual communication service devices and screens are positioned for clear viewing, with adequate screen size and stable mounts where needed.
- Provide point-of-use instructions and setup supports in the physical environment so rotating staff can reliably operate equipment.

5.6. Procurement of Goods, Services, and Facilities

These recommendations support embedding accessibility criteria into procurement so that platforms, devices, and service contracts reliably deliver communication access. Procurement decisions should be guided by end-user input, defined performance requirements, and accountability for accessibility outcomes. Procurement should require professional standards by service providers and those providing services in the field.

5.6.1 Procure platforms and tools with demonstrated accessibility for virtual sign language interpreting and captioning

Inconsistent platforms and inaccessible features prevent timely and effective access to and use of virtual communication. Procurement can reduce this burden by selecting communication solutions that are known to work and by requiring accessibility in contracts.

- Standardize on a small number of accessible platforms that reliably support virtual sign language interpreting and captioning (e.g., consistent support for pinning/spotlighting, multi-view layouts, and transcript or captioning integrations).
- Include clear accessibility requirements for layout controls, customization options, and usability for DeafBlind persons in platform selection and vendor agreements.

5.6.2 Procure accessible hardware and connectivity supports as core access infrastructure

Hardware and connectivity are prerequisites for virtual access. Procurement and granting programs can address inequities by ensuring people and service sites have the equipment required for meaningful participation.

- Procure and/or fund accessible hardware (larger screens, appropriate phones, assistive devices) that supports clear viewing of sign language interpreters, captioning, and content.
- Require minimum connectivity and audiovisual performance standards for service sites, including appropriate microphones, lighting supports, and camera setups.

5.6.3 Build technical support and privacy requirements into contracts

Accessible procurement should include service-level expectations for support, training resources, and privacy protections to prevent access breakdowns and reduce harms.

- Specify real-time technical support expectations and escalation pathways in service contracts, including accessible channels for users and providers.
- Require comprehensive privacy and confidentiality agreements, and ensure recording/transcript practices protect both consumers' needs and interpreters' and captioners' privacy and safety.

5.6.4 Ensure for Quality Service Delivery by Professionals

- Require that service providers adhere to professional standards and that those providing services in the field are qualified sign language interpreters and captioners.

5.7. Transportation

Transportation settings include travel-related services, terminals, and customer service environments where virtual sign language interpreting and captioning services may be used to support communication. The recommendations below emphasize reliable access, quick availability, and consistent standards so people can navigate travel processes safely and independently.

5.7.1 Ensure virtual communication access works reliably in travel-related service environments

Where transportation providers rely on virtual tools to deliver access, they should plan for reliability, redundancy, and real-time support.

- Use virtual sign language interpreting and captioning services in settings with strong, stable connectivity and include redundancy plans when connectivity is uncertain.
- Provide real-time technical support and clear escalation pathways so access failures can be resolved quickly in time-sensitive travel contexts.

5.7.2 Standardize virtual communication practices across the travel journey

Consistency across touchpoints reduces burden and improves independence. Travel providers should apply clear criteria and preparation routines so virtual communication access for Deaf, DeafBlind and Hard of Hearing travelers is predictable.

- Apply clear criteria for when virtual communication is appropriate versus when in-person or hybrid supports are required, particularly for complex or safety-sensitive situations.
- Conduct preparation and technical checks in advance for planned travel interactions, and ensure staff have clear guidance on how to set up and use virtual communication service tools.

6. Conclusion

The findings of our project underscore that virtual sign language interpreting and captioning services can significantly enhance communication access for Deaf, DeafBlind and Hard of Hearing persons when implemented thoughtfully. By combining a scoping literature review, a community-informed needs assessment, and real-world field testing, we identified where virtual communication services succeed, where they falter, and what conditions must be in place to make communication access reliable and equitable.

The project's recommendations provide a clear foundation for the Government of Canada and federal regulated entities, including but not limited to Accessibility Standards Canada and others committed to accessibility planning to strengthen future standards and implementation guidance. They point to minimum technical and accessibility requirements for platforms, consistent preparation and troubleshooting routines, clear criteria for optimal virtual communication service delivery, and system-level supports that reduce variability across organizations and contexts. Overall, this project met its objectives by translating evidence and lived experience into evidence-based insights that can be used to prevent barriers before they occur. The results support the broader goal of a barrier-free Canada by 2040 by helping organizations deliver virtual communication access as an essential accessibility infrastructure that is dependable, high quality, and reduces inequities and delays in communication access.

Appendix A: Scoping Literature Review Sources

Ref.	Authors, Year	Publication Type (Study Design)	Country of Origin	Type of Virtual Communication	Population	Sample size	Setting
1	National Association of the Deaf, 2020	Position statement	United States	Virtual sign language interpreting – Video Remote Interpreters, captioning, communication access Realtime transcription (CART)	Service providers	NA	Medical/health
2	Ryan & Skinner; Association of Sign Language Interpreters, 2015	Report	United Kingdom	Virtual sign language interpreting – Video Relay Services and Video Remote Interpreting	Interpreters	NA	Mixed locations
3	Canadian Association of Sign Language Interpreters, 2020	Position statement	Canada	Virtual sign language interpreting – Video Relay Services and Video Remote Interpreting	Interpreters/captioners	NA	Mixed locations

Ref.	Authors, Year	Publication Type (Study Design)	Country of Origin	Type of Virtual Communication	Population	Sample size	Setting
4	National Association of the Deaf, 2022	Position statement	United States	Virtual sign language interpreting – Video remote interpreting	Service providers	NA	Legal
5	National Association of the Deaf, 2018	Position statement	United States	Virtual sign language interpreting – Video Remote Interpreting	Service providers	NA	Medical/health
6	U.S. Department of Health and Human Services, 2024	Official website of the United States government	United States	Telehealth (videoconferencing) platform that includes virtual sign language interpreting, live captions, high-contrast display, automatic transcription; telecommunication relay services as an alternative to video appointments	Service providers	NA	Medical/health

Ref.	Authors, Year	Publication Type (Study Design)	Country of Origin	Type of Virtual Communication	Population	Sample size	Setting
7	National Association of the Deaf, 2020	Position statement	United States	Virtual sign language interpreting, communication access real-time translation (CART), captioning, video relay services or captioned telephone services	Deaf persons; Hard of hearing or persons with hearing loss	NA	Medical/health
8	National Association of the Deaf, 2020	Position statement	United States	Virtual sign language interpreting, communication access real-time translation (CART), captioning, video relay services	Service providers	NA	Medical/health
9	National Deaf Centre, 2020	Position statement	United States	Virtual sign language interpreting – video remote interpreting	Service providers	NA	General
10	Association of Sign Language Interpreters of Alberta, 2018	Position statement	Canada	Virtual sign language interpreting – Video relay services and video remote interpreting	Interpreters	NA	Mixed locations

Ref.	Authors, Year	Publication Type (Study Design)	Country of Origin	Type of Virtual Communication	Population	Sample size	Setting
11	Kushalnagar & Vogler, 2020	Peer reviewed journal	United States	Captioning, virtual sign language interpreting – video remote interpreting	Deaf persons; Hard of hearing or persons with hearing loss	NA	Small team gatherings, committee meetings, online classes, large teleconferences, international working meetings, webinars geared toward deaf and Hard of Hearing consumers.
12	Meyer et al., 2019	Peer reviewed journal	Australia/New Zealand	eHealth using telephone, mobile, email, internet, apps, and video conferencing	Hard of hearing or persons with hearing loss; Service providers; Communication partners	N=217	Medical/health
13	Yabe, 2019	Dissertation	United States	Virtual sign language interpreting – video remote interpreting	Deaf persons; Hard of hearing or persons with hearing loss; Service providers	N=103	Medical/health
14	Napier, 2017	Peer reviewed journal	Global	Virtual sign language interpreting – video remote interpreting and video relay services	Interpreters	N= 155	Mixed locations

Ref.	Authors, Year	Publication Type (Study Design)	Country of Origin	Type of Virtual Communication	Population	Sample size	Setting
15	Llewellyn-Jones, 2019	Book chapter	United Kingdom and Europe	Virtual sign language interpreting – video relay services and video remote interpreting	Deaf persons; Hard of hearing or persons with hearing loss; Interpreters; Service providers	NA	Multiple; Legal, Medical, other
16	Yabe, 2022	Book chapter	United States	Virtual sign language interpreting – video remote interpreting, video relay services; captioning services, text messaging	Deaf persons; Hard of hearing or persons with hearing loss; Service providers	NA	Medical/health
17	Mathew et al., 2023	Peer reviewed journal	United States	Augmented reality smart glasses	Deaf persons; Hard of hearing or persons with hearing loss; Deafblind persons; Interpreters; Captioners	N= 109	Medical/health
18	Trumm et al., 2023	Peer reviewed journal	United Kingdom	Virtual sign language interpreting – video remote interpreting	Deaf persons; Interpreters	N=15	Medical/health
19	Tavanai et al., 2021	Peer reviewed journal	Global	Video and phone calls, telehealth, telerehabilitation, tele-education	Deaf persons; Hard of hearing or persons with hearing loss	NA	Multiple: education, community, medical

Ref.	Authors, Year	Publication Type (Study Design)	Country of Origin	Type of Virtual Communication	Population	Sample size	Setting
20	Myers et al., 2022	Peer reviewed journal	United States	Virtual sign language interpreting – video remote interpreting	Deaf persons; Hard of hearing or persons with hearing loss; Deafblind persons	N=189	Medical/health
21	James et al., 2022	Peer reviewed journal	United States	Virtual sign language interpreting – video remote interpreting	Deaf persons; Hard of hearing or persons with hearing loss; Deafblind persons	N=11	NA
22	Yet et al., 2022	Peer reviewed journal	Global: English speaking; United States, Australia, Ireland, and South Africa	Virtual sign language interpreting – video remote interpreting	Deaf persons; Service providers	NA	Medical/health
23	Velarde et al., 2022	Peer reviewed journal	Global	Virtual sign language interpreting – video remote interpreting	Deaf persons; Hard of hearing or persons with hearing loss	NA	Medical/health

Ref.	Authors, Year	Publication Type (Study Design)	Country of Origin	Type of Virtual Communication	Population	Sample size	Setting
24	Mussallem et al., 2022	Peer reviewed journal	United States	Virtual sign language interpreting – video relay services and video remote interpreting; real-time captionists (CART); captioned telephone services ehealth platforms	Deaf persons	N=99	Medical/health
25	Roman et al., 2023	Peer reviewed journal	United States	Virtual sign language interpreting – video remote interpreting and video relay services	Interpreters	N=27	Multiple; staff, educational, community/freelance, video remote, video relay
26	U.S. Department of Justice Civil Rights Division, 2020	Position statement	United States	Virtual sign language interpreting – video remote interpreting and video relay services	Deaf persons, Interpreters, service providers	NA	General
27	Kwok et al., 2021	Peer Reviewed Journal	Canada	“Interpreter on Wheels”, mobile device providing access to voice and video translation in over 200 languages	Deaf persons, service providers	NA	Medical/Health

Ref.	Authors, Year	Publication Type (Study Design)	Country of Origin	Type of Virtual Communication	Population	Sample size	Setting
28	Meulder et al., 2021	Report	The Netherlands	Virtual sign language interpreting – video remote interpreting	Interpreters	N=2634	General
29	Ryan & Skinner, 2024	Report	United Kingdom	Virtual sign language interpreting – video relay services, video remote interpreting, remote translation services	Interpreters	NA	General
30	Allen et al., 2024	Book	International	Virtual sign language interpreting	Interpreters	NA	NA
31	Yabe, 2022	Book	United States	Virtual sign language interpreting – video remote interpreting	Deaf persons, Interpreters	NA	Healthcare

Appendix B: General Principles for Accessible Virtual Communication Services with Deaf, DeafBlind and Hard of Hearing Persons

Principle	Risk / Problem:	Recommendation:	Positive Impact:
Technology first – bad tech = poor experiences	Unstable internet, poor audio capture, and tiny screens make communication impossible.	Treat high-quality audio, video, and connectivity as non-negotiable prerequisites for any virtual interaction.	Conversations stay connected and intelligible, so people can focus on decisions and service/care, not troubleshooting.
Design the screen for the eyes that use it	Deaf and DeafBlind users appear on screen as tiny tiles; sign language interpreters can't see faces or hands; visual and mental fatigue is overwhelming.	Always configure layouts, cameras, lighting, and screen size so Deaf and DeafBlind participants as well as sign language interpreters can see each other clearly.	Everyone can follow and contribute; meetings feel organized, not chaotic.
Access is infrastructure, not an add-on	Sign language Interpreters and captioners are unavailable or hard to book; emergencies happen with no access; rural communities are left out.	Build virtual sign language interpreting and captioning into core service infrastructure, with clear, simple pathways in every setting.	Deaf, DeafBlind and Hard of Hearing people can rely on virtual communication access wherever they go, whether in their everyday life or in emergency situations.
People, not just platforms, make access work	Unqualified or unsupported sign language interpreters/captioners, no teaming, and blurred IT/interpretation roles undermine quality.	Invest in skilled, professional sign language interpreters and captioners, protect their working conditions, and give them the teaming and support they need.	Communication is accurate, nuanced, and sustainable; participants build trust and continuity with their interpreters.

Principle	Risk / Problem:	Recommendation:	Positive Impact:
Preparation and training prevent crisis-mode fixes	No preparation, no test runs, and untrained service hosts lead to mid-session failures and lost information.	Share agendas and names with sign language interpreters and captioners in advance; schedule pre-session tech checks; train hosts, staff, and users on accessibility features.	Sessions start smoothly, problems are rare and quickly fixed, and everyone knows what to do.
One size does not fit all communication needs	Deaf, DeafBlind and Hard of Hearing users are offered the same solution regardless of the setting or situation, even when virtual options may be inappropriate or ineffective.	Ask service users what they need and match the mode (virtual, hybrid, in-person, tactile) to both the person and the situation.	Individuals receive access that actually works for them, and virtual tools extend rather than replace essential in-person supports.
Policy should enable, not block, access	Security, privacy, and user cost rules are used to deny access to virtual captioning or sign language interpreting, block accessible platforms, or shift costs onto Deaf, DeafBlind, or Hard of Hearing people.	Align laws, institutional policies, platform choices, and recording practices with accessibility rights and safety.	Deaf, DeafBlind and Hard of Hearing people are not forced to trade safety or privacy for access, and service providers can plan confidently.
Center leadership and the well-being of Deaf, DeafBlind and Hard of Hearing persons	Access is treated as a favour; attitudes minimize hearing loss; repeated failures cause grief, fear, and withdrawal.	Share power with Deaf, DeafBlind and Hard of Hearing communities in designing, governing, and evaluating virtual services.	Systems become more responsive and humane; people feel respected, understood, and able to participate fully in decisions that affect them.

Appendix C: Guidelines for Virtual Communications Best Practices

The Virtual Communications Research Project was a 3-year partnership project (2023-2026) between Wavefront Centre and the University of British Columbia, with the support an Advisory Committee, the Canadian Hard of Hearing Association BC Chapter and the Deaf, Hard of Hearing and DeafBlind Well-Being Program. The project was funded by Accessibility Standards Canada. Using a mix (triangulation) of approaches involving a literature review, interviews, and field testing, our team learned about what makes it easier or more difficult for Deaf, DeafBlind, or Hard of Hearing participants to communicate with their communication partners when using virtual (online) professional sign language interpreting or real-time captioning services. Below we share guidelines for best practices that businesses and community service organizations can use to foster accessible environments using virtual communication services.

Virtual Communications Best Practices Guidelines

Inclusive Planning and Universal Design

- Develop and implement clear criteria for when virtual communication is appropriate and when in-person or hybrid support is required.
- Design, standardize, and configure communication platforms using universal design principles: optimize layouts and accessibility features and ensure user-friendly, customizable interfaces.
- Involve service users, particularly Deaf, DeafBlind and Hard of Hearing people in the planning and design of the service.
- Increase awareness and promotion of existing services and tools.

Connectivity, Hardware, and Infrastructure

- Invest in stable network connectivity and better regional coverage.
- Ensure use in settings with strong and stable internet connectivity.
- Ensure availability of equipment and 24/7 access.
- Fund or subsidize high-quality internet, devices and communication technologies as core accessibility infrastructure.

Preparation and Training

- Conduct pre-session briefs, test runs and technical checks; schedule early log-in and prep time; share materials and terminology in advance; and confirm roles, backup plans and points of contact so everyone is prepared.
- Assign and communicate roles (e.g., who manages pin/spotlight, monitors chat/Q&A, tracks time) and explicit ground rules for turn-taking and pacing.
- Invest in continuing education, orientation, and role/context-specific training for sign language interpreters, captioners, staff and communication partners, supported by clear training materials, manuals and guides.

Technical Setup, Functionality, and Support

- Ensure functionality by doing test calls to test equipment; verify video and audio quality before sessions.
- Maintain adequate video quality while optimizing the physical and virtual environment (e.g., lighting, camera framing, acoustics, larger screens, high-contrast visuals and appropriate sign language interpreter appearance).
- Maintain clear, consistent audio capture and playback, with agreed upon audio-quality standards and, where appropriate, direct audio feeds for captioning.
- Provide real-time technical support and clear pathways to get help.

Quality Assurance, Standards, and Feedback

- Provide clear guidelines and best-practice tips.
- Make captioning and sign language interpreting standard in government and public-facing sectors.
- Implement policies/practices to manage workload and fatigue.
- Hire only qualified professionals to provide sign language interpreting and captioning services.
- Ensure that new technologies conform with accessibility standards and legislation.
- Protect privacy and confidentiality and follow institutional and legal requirements, while respecting user control around recordings.
- Establish quality assurance and assessment routines and protocols for users to give feedback.

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