

Literature Review on Accessible Communication in Sign Language

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PROPOSAL FOR A DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL ON THE APPROXIMATION OF THE LAWS, REGULATIONS AND ADMINISTRATIVE PROVISIONS OF THE MEMBER STATES AS REGARDS THE ACCESSIBILITY REQUIREMENTS FOR PRODUCTS AND SERVICES

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1. Information Accessibility: Definitions and Legislation

The goal of this literature review is to provide an overview of concepts of accessible communication and information accessibility for deaf people, as well as their implementation by various States and in different social contexts. This is not an exhaustive review, but rather an initial one, whose bibliography choices were made based on geographical and cultural proximity (North American and European situation), the accessibility and practicality of the readings given the timeframe allowed, and the desire to cover a variety of topics (as the table of contents demonstrates).

From a more practical standpoint, the purpose of this literature review is to provide a foundation for a project that aims to 1) document and analyze standards and policies related to accessible communication and 2) identify the issues related to sign language-accessible communications in order to establish new accessible communication standards for deaf and hard of hearing Canadians.

The elements of this review will address sign language-accessible communications more specifically on the basis of their delivery mode (live or taped), as well as the characteristics of translator and interpreter training and qualifications.

1.1. Accessibility

The concept of accessibility most widely adopted by organizations in Quebec working for the defence and promotion of the rights of people with disabilities is that of **universal accessibility**. Universal accessibility is defined by the Confédération des organismes de personnes handicapées du Québec (COPHAN) using an interpretation of disability based more on an individual's relationship with the environment than as a diagnosed disability. This ecosystemic approach to universal accessibility identifies four main dimensions through which the environment must be considered **barrier-free** and **allow people living with limitations to be self-sufficient**:

1. Architectural and urban design;
2. Communications are available to people;

“This encompasses all types of communications, whether it be the direct delivery of a service, informative documents, advertising, or websites, etc.” (COPHAN, p. 4).

3. Programs and services;
4. Awareness of, and training in, universal accessibility.

In this representation of universal accessibility, great emphasis is placed on providing access to **an experience similar to people without limitations**.

This idea of equity and self-sufficiency is also the basis of the definition proposed by the group Défi Accessibilité, as part of the “Accessibilité universelle: une nouvelle définition” project (Langevin, Rocque, Chalghoumi and Ghorayeb, 2012) and adopted by the Réseau Québécois pour l’Inclusion Sociale des Personnes Sourdes et Malentendantes (ReQIS), which defines accessibility as “the characteristic of a product, process, service, piece of information or environment that, in the interest of equality and inclusiveness, allows people to perform activities independently and achieve identical outcomes. (Langevin, Rocque, Chalghoumi and Ghorayeb, 2012) This interpretation of accessibility highlights the fact that “the needs of people with functional limitations serve as indicators of the difficulties encountered by the population as a whole”. (Société logique, 2012)

Using the World Health Organization’s (WHO) classification of disability, the United Nations (U.N.), in collaboration with an advisory committee from York University, defined a “universal design” comprising seven variables that would make it possible to assess accessibility and, consequently, develop environments that would ensure full participation for everyone and equal opportunities (U.N., undated):

1. Orientation (do you have the information you want?)
2. Independence (can you choose what you want to do?)
3. Mobility (can you go where you want to?)
4. Organization of time (can you do what you want when you want to?)
5. Social integration (are you accepted by others?)
6. Economic self-sufficiency (do you have the resources you need?)
7. Transition (are you prepared for change?)

Accessibility was automatically included as one of the general principles of the United Nations Convention on the Rights of Persons with Disabilities. The principle of accessibility is presented in its preamble on even footing with equality between men and women. It recognizes “the importance of accessibility to the physical, social, economic and cultural environment, to health and education and to information and communication, in enabling persons with disabilities to fully enjoy all human rights and fundamental freedoms” (U.N., 2006, Preamble, par. 22).

Article 9 of the U.N. Convention on the Rights of Persons with Disabilities deals exclusively with accessibility and specifically mentions that access to information and communication should be considered by States as factors that allow people with disabilities to fully participate in all aspects of life.

To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas.

(United Nations Convention on the Rights of Persons with Disabilities, Article 9, paragraph 1)

States Parties to the Convention, including Canada, are required to identify and eliminate barriers to accessibility, with regard to, among other things, information and communication services, including emergency services (paragraph 1b). Among the means mentioned by the convention are the development of national accessibility standards for public and private organizations that provide facilities or services, the development of training in accessibility issues, etc.

The United Nations defines the concept of accessibility as part of an “effective approach to reversing exclusion and enhancing the equalization of opportunities” (U.N. undated, par. 1). This approach sees accessibility as one aspect of access to equal participation. Although such a vision seems to be based mainly on physical accessibility (can you go where you want to go?), access includes the concept of communication and suggests that it be viewed broadly as the possibility of interacting with one’s environment from an equal opportunity perspective. Therefore, the U.N. considers that “access is not an act or a state but refers to freedom of choice in entering, approaching, communicating with or making use of a situation” (U.N., undated, par. 2). Among the other aspects mentioned by the U.N., availability, accommodation, affordability and acceptability are also taken into consideration.

It is worth noting that, according to the Convention on the Rights of Persons with Disabilities, the obligations of States Parties with respect to accessibility involve many areas of social life including, among others, the law (articles 12 and 13), information (article 21), health (article 25), work (article 27), cultural life (article 30), political and public life (article 29) and education (article 24). For deaf people, the means mentioned in the Convention is the use of sign language-accessible communication.

Concerning access to information, States Parties are required to put measures in place so that people with disabilities can seek, receive and impart information and ideas through all forms of communication of their choice (U.N., 2006, art. 21). This obligation is aimed at ensuring that States Parties:

- Provide information intended for the general public to persons with disabilities in accessible formats and technologies appropriate to different kinds of disabilities in a timely manner and without additional cost;
- Accept and facilitate the use of sign languages, Braille, augmentative and alternative communication, and all other accessible means, modes and formats of communication of their choice by persons with disabilities in official interactions;
- Urge private entities that provide services to the general public, including through the Internet, to provide information and services in accessible and usable formats for persons with disabilities;
- Encourage the mass media, including providers of information through the Internet, to make their services accessible to persons with disabilities;
- Recognize and promote the use of sign languages.

(United Nations Convention on the Rights of Persons with Disabilities, article 21, paragraphs a, b, c, d, e)

These measures also apply to participation in political and public life, for which States Parties are supposed to ensure “that voting procedures, facilities and materials are appropriate, accessible and easy to understand and use” (U.N., 2006, art. 29, par. i).

With regard to culture, States Parties are required to provide access to cultural spaces and products in accessible formats, and to recognition and support of their deaf cultural identity and sign languages. Article 30 also expects the same type of engagement with respect to leisure activities through access to sport, tourist and recreational venues and services.

Canada renewed this commitment through the Accessible Canada Act, whose purpose is:

[...] the realization, within the purview of matters coming within the legislative authority of Parliament, of a Canada without barriers, on or before January 1, 2040, particularly by the identification and removal of barriers, and the prevention of new barriers, in the following areas:

- (a) employment;
- (b) the built environment;
- (c) information and communication technologies;
- (c.1) communication, other than information and communication technologies;
- (d) the procurement of goods, services and facilities;
- (e) the design and delivery of programs and services;
- (f) transportation; and
- (g) areas designated under regulations made under paragraph 117 (1) (b).

(Accessible Canada Act, S.C. 2019, c. 10, article 5)

Article 5.1 clarifies the area of communications mentioned in paragraph 5c by specifying that this area includes the use of American sign language (ASL), Quebec sign language (LSQ) and Indigenous sign languages and that these languages are recognized as being the primary languages of communication of deaf people in Canada.

1.2. Information Access Standards

In several countries, legal measures have been established to ensure that all citizens are able to enjoy their rights. For people living with a disability, these measures ensure that they will be able to have access to the same services as any other person, including access to information. We will briefly review the laws, policies and guidelines proposed in different countries (the United States, the U.K., Germany, etc.) for different spheres of society. For Canada, it is important to begin this overview by presenting the Accessible Canada Act, passed in 2019.

As part of the work leading to the Accessible Canada Act, the Association des Sourds du Canada-Canadian Association of the Deaf (ASC-CAD) showed that “people with communication disabilities are constantly deprived of information and are even at a disadvantage in discussions among people with other types of disabilities” (ASC-CAD, 2015, p. 4) and that “[their] participation is still hindered by:

- waiting periods (interpreters, facilitators, captionists and other actors facilitating human communication);
- the lack of alternative media (sign languages, subtitled videos, Braille, plain language);

- discussion dynamics” (ASC-CAD, 2015, p. 4).

The ASC-CAD (2015) drew up 24 recommendations for the establishment of the Accessible Canada Act, shown in the following table under eight main topics. The first of these recommendations is the recognition of the sign languages used in Canada as official languages in the country. This recommendation was not included in the proposed Accessible Canada Act, nor were several other recommendations made by the ASC-CAD.

TOPIC	The ASC-CAD’s recommendations for the proposed Canada Accessible Act
Recognition of sign languages	Recommendation #1 The Act should recognize American sign language and the Langue des Sourds du Québec as official languages, equal to French and English.
L1 acquisition	Recommendation #2 The Act should guarantee that babies and infants who are diagnosed as deaf, as well as their families, will be immediately and continuously exposed to, helped with, and trained in, sign language (American sign language and/or Langue des Sourds du Québec). The support that deaf children receive in acquiring ASL/LSQ as a first language should be at least equal to the support that they receive in acquiring spoken/written language, including English and French. The federal government should be responsible for ensuring that this provision is applied by all provincial and territorial governments.
Access to information	Recommendation #3 The Act should require full accessibility to communication , including plain language and alternative media.
	Recommendation #12 Tools to deal with barriers to accessibility and problems should include communications examined in detail, not just “universal design”.
Healthcare	Recommendation #6 The Act should pay special attention to the development and support of mental health programs and services specifically earmarked for people with a communication impairment and deaf people. This should include a component aimed at recruiting and sponsoring these people themselves so that they can become qualified mental health professionals and practitioners.
Respect and self-sufficiency	Recommendation #5 The terminology used in the act should be developed and defined in collaboration with communities of people with disabilities and not just by the government.
	Recommendation #8 The outcomes should include independence and self-sufficiency ; in other words, they should avoid outcomes whereby people with disabilities depend on other people.
	Recommendation #9 The outcomes should include standards allowing for the implementation of the goal of accessibility and the elimination of barriers.

	<p>Recommendation #11 The Act should clearly indicate that the person with a disability will be the one who chooses the tool that allows them to access accessibility.</p> <p>Recommendation #18 The Act should create an independent monitoring agency that is fully run and staffed by people with disabilities. The other solution consists of giving the monitoring responsibilities to the Canadian Human Rights Commission, granting it special new funding to establish a program made up entirely of people with disabilities.</p> <p>Recommendation #21 If the Act creates a centre of excellence, the centre should be run completely by Canadians with disabilities.</p>
<p>Implementati on and enforcement of the Act</p>	<p>Recommendation #4 The Act should include provisions ensuring its observance.</p> <p>Recommendation #7 The Act should take a hybrid approach, through which its prescriptive nature prevails over the outcome. It should not take a complaint-based approach.</p> <p>Recommendation #10 All organizations and industries under federal jurisdiction should be covered by this act. In addition, all entities and organizations—for profit, not for-profit, individuals, corporations, etc.—that receive public funding directly or indirectly (through grants, competitive bidding, purchases of goods or services, etc.) should be subject to the requirements of the Act.</p> <p>Recommendation #14 Accessibility rights are human rights. The new federal accessibility act should be incorporated into, and should not compete with, existing legislation such as the Canadian Charter of Rights and Freedoms and the Canadian Human Rights Act.</p> <p>Recommendation #16 We recommend random unannounced audits to measure compliance with the Act rather than action plans, progress reports or planned reviews/audits.</p> <p>Recommendation #17 Non-compliance should be met with enforcement of the Act, including compliance orders and monetary penalties.</p> <p>Recommendation #22 The Act should require the use of a comprehensive performance report based on results obtained; however, it should not be a personal statement, but rather should be used by the independent monitoring team in accordance with recommendation #16.</p> <p>Recommendation #23 There should be a 24/7 portal to allow the public to participate in the compliance assessment process.</p> <p>Recommendation #24 The draft law should itself be reviewed annually for the first three years, twice a year for the following six years and every four years after that.</p>
<p>Recognition of advances</p>	<p>Recommendation #15 The Act should become aware of accessibility standards already developed by provincial and territorial governments and other countries, without being bound by them.</p>

and other agencies	<p>Recommendation #19 The Office for Disability Issues should receive increased funding to allow organizations for people with disabilities to accomplish their work involving eliminating barriers and promoting accessibility.</p>
Funding	<p>Recommendation #13 The Act should create a federal funding mechanism to help eliminate, attenuate or minimize accommodation costs for people with disabilities for all products, services and businesses impacted by the Act.</p> <p>Recommendation #20 The accessibility fund should be closed and its funding transferred to a new national accommodation fund mandated by the Act to help small and medium businesses deal with the costs of accommodations that include ongoing support services and not only renovations to the built environment.</p>

1.2.1 Canadian Legislation

A recent overview of accessibility standards in Canada for people with disabilities was presented by the Canadian Standards Association in November 2020. The following table shows the main events concerning the development of accessibility laws in Canada:

2005	First province or territory to enact accessibility legislation: Accessibility for Ontarians with Disabilities Act (AODA)
2010	Canada ratifies the United Nations Convention on the Rights of Persons with Disabilities
2011	Integrated Accessibility Standards Regulations (IASR)
2013	Accessibility legislation passed in Manitoba
2017	Accessibility legislation passed in Nova Scotia
2019	Accessible Canada Act receives royal assent
2019	British Columbia Accessibility Act (currently under review)

This overview does not show Quebec’s accessibility policies. In Quebec, a policy was developed in 2007 dealing specifically with access by people with disabilities to documents and services offered to the public (OPHQ, 2007). The goal of this policy, intended for ministries and public agencies, was to “establish, within their administration, all the conditions that would allow people with disabilities to have equal access to services and documents offered to the public” (OPHQ, 2007, p. 7). The policy requires that ministries and public agencies implement the principle of universal accessibility through which “organizations aim to allow all users to make similar use of facilities, goods and services; they therefore must take into account situations related to every different type of disability.” (OPHQ, 2007, p. 8) The policy regarding access to documents and services states that all citizens must be informed of services offered, and that, upon **request by a citizen**, the following actions must be taken by the ministry or agency (OPHQ, 2007, p. 12):

1. Provide the document in an accessible format;

2. Respect the choice of format requested by the person and accommodate their preference as much as possible;
3. In the event that the person with a disability's choice cannot be fulfilled, communicate with them to agree on a solution.

The formats proposed by the policy are as follows (OPHQ, 2007, p. 25-26):

Print documents	Audiovisual documents
Large print	Open or closed captioning
Audio format	The addition of an inset for LSQ or ASL interpretation
Braille	Described video
Video document in LSQ or ASL	
Plain written language	
Electronic file	

The policy also states that citizens with disabilities must be able to communicate with the staff members of all ministries and public agencies, whether by phone, in person or by electronic means. The adapted means of communication proposed to allow such communications are:

Phone communications	Live communications
Telecommunications device for the deaf (TDD)	Interpretation services
Communication software for deaf or hard of hearing people	Plain spoken language
Plain spoken language by phone	Use of pictograms
Use of a webcam	Awareness and training activities
Sound amplifiers for public phones	

These methods of information dissemination and communication aim to meet two of the policy's guidelines, namely: 1) the obligation to provide accommodations for access to documents and services; and 2) the development of a proactive approach to eliminate barriers to access to documents and services (OPHQ, 2007, pp. 12-14). The second guideline is based on three conditions, namely:

1. Plan which documents need to be adapted among those that are most frequently requested by citizens;
2. Train and inform staff members of ministries and departments;
3. Use adapted means of communication.

Note that, although this policy aims to provide access to public documents for citizens with disabilities, and recommends the obligation of providing accommodations, two factors distinguish it from the definition of universal accessibility defined above:

1. Accommodations require a request from the person and are not provided automatically. People with disabilities have to take the steps and inform the relevant party of their need for accommodations and help find an adapted solution;
2. Not all documents are accessible, and the decision to make them accessible depends on use by a majority of citizens. People with disabilities have access to only a sample of documents.

In the context of the “Accès aux documents et aux services offerts au public pour les personnes handicapées” (Access to documents and services offered to the public for persons with disabilities) policy, documents are not accessible from a universal accessibility perspective.

The *Equals in Every Respect* policy (OPHQ, 2009) proposes a list of the main barriers related to, among other things, communications (see the table below, adapted from the OPHQ, 2017, p. 5). Among these barriers, the policy targets inaccessible communication with ministries and public agencies. The follow-up on the implementation of the policy on access to documents and services (OPHQ, 2007) showed that, there may well have been few complaints, but not many people with disabilities were familiar with the policy and ministries and public agencies received few requests for access to documents or services.

Means of access	Barriers to access
Access to visual and tactile interpretation services	Access to interpretation services in the public sector should be improved to meet the requirements of the government policy.
	There is a shortage of qualified interpreters. ¹
	Interpreter competency is highly variable due to the absence of recognized compulsory training.
Technical communication aids	People with disabilities have trouble getting information about programs for technical communication aids.
	The time required for the review and updating processes for technical aid programs is long.
Access to websites and electronic documents	There is currently no regulation concerning website accessibility in Quebec.
	Electronic documents on government and public agency websites are often not accessible, depriving certain people of information available to the general public.

¹ Concerning this alleged shortage of qualified interpreters, the results of the study by Parisot and Villeneuve (2013) show that more than half of the interpreters questioned had time available in their workday. The authors claim that this alleged shortage should be analyzed in Quebec, in light of organizational factors, including the number of service providers and disparities in management and hiring standards, as well as the services being divided into two main areas (social and school). They propose aiming for a centralized management and service model, which would lead to, among other things, an optimal use of interpreters’ schedules based on their availabilities, as well as a standardization of competencies (Parisot and Villeneuve, 2013, p. 104).

Access to verbal information	Frontline employees of ministries and public agencies do not all have TTY equipment available to them, nor do they have the training needed to use it.
	Frontline employees of public services are not always trained to properly meet the specific needs of people with disabilities.
Access to telecommunications	Regulations that govern broadcasters do not ensure the quality of subtitling and described video.
	The subtitling of foreign audiovisual productions in languages other than French is not adapted to the needs of certain people with disabilities.
	Quebec does not have access to foreign audiovisual productions offering described video in French.
Access to written information	Documents created by ministries and public, private and community organizations are often complex and hard to understand.

With regard to access to interpretation services, when required, the first assessment of the implementation of the “Accès aux documents et aux services offerts au public pour les personnes handicapées” (Access to documents and services offered to the public for persons with disabilities) policy shows that few ministries (42%) and public organizations (29%) are able to provide interpretation services and that access to these services is rarely discussed during employee training and information activities at ministries (25%) and organizations (28%) (OPHQ 2011, p. 24). In the same vein, the *Rapport sur l’organisation et la gestion des services régionaux d’interprétation visuelle et tactile (Report on the organization and management of regional visual and tactile interpretation services)* (OPHQ, 2012) pointed out that: “regional interpretation services are often forced to justify to public service employees the need to use the services of an interpreter when providing services” (OPHQ, 2012: p. 36). Among the barriers mentioned by the regional interpretation services are:

1. The refusal of ministries and public organizations to pay for interpretation services.
2. Reduced meeting times to save on the cost of services.
3. The organization of meetings without interpreters on various pretexts (OPHQ, 2012, p. 36).

1.2.2 Accessible Communication Standards

The Canadian Radio-television and Telecommunications Commission (CRTC) develops and oversees the implementation of regulatory policies concerning information accessibility for broadcasting, internet and telecommunication services. This includes:

- “Accommodations in the form of trial periods with products;
- Provision of text-based services;
- Provision of documents or information in sign language or plain language;
- Provision of Internet Protocol/Teletypewriter (IP/TTY) Relay Service;
- Implementation of a customer service and complaint system for ISP, telecom, and broadcasting;

- Provision of closed captioning and described video for Canadian English and French television programming services” (Lau et al., 2020, p. 18).

Access to Websites and Electronic Documents

With regard to websites, the *Web Content Accessibility Guidelines* (WCAG) developed by the *World Wide Web Consortium* (W3C) is used as a guideline for recommendations concerning:

- Alternative texts
- Captioning;
- Sign languages;
- Website browsing;
- Text size.

The recommendations may be applied to Web content and to mobile applications and cover access to web content for all people, including people with disabilities, based on four guiding principles:

1. Information and user interface components must be presentable to users in ways they can **perceive**;
2. User interface components and navigation must be **operable**;
3. Information and the operation of user interface must be **understandable**;
4. Content must be **robust** enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

The use of sign language is covered in the W3C to allow deaf or hard of hearing people who use sign language to understand the content of an audio track, the guideline being to “provide sign language interpretation for any prerecorded audio content in synchronized media” (Level AAA) (W3C, 2009, guideline 1.2.6).

The WCAG standard proposed two “sufficient” techniques to provide access to web content via sign language. These techniques are identified as being “sufficient” because they represent reliable ways of meeting the success criteria allowing a deaf person to access content:

1. Including a sign language interpreter in the video stream.
Example: A television station provides a sign language interpreter in the corner of, or beside, its online news video.
2. Providing a synchronized video of the sign language interpreter that can be displayed in a different window or overlaid on the image.

Example: A university provides a synchronized sign language interpreter video stream that can be displayed, at the viewer’s option, along with any of their educational programs.

A third technique is also mentioned, but it is not essential for the site's compliance with the perception principle:

3. Using metadata to associate sign language alternatives of a video to enable the choice of a sign language.

Example: Providing, in metadata, URL(s) that point to several choices of translations in different sign languages (ASL, LSQ, ISL).

Several Canadian standards follow WCAG 2.0 or its most recent, 2018 version, WCAG 2.1. At the provincial level, Manitoba, the Northwest Territories, Newfoundland and Labrador, Ontario, Prince Edward Island, Quebec and Saskatchewan have internet accessibility policies that follow WCAG 2.0 or 2.1. For example, the standards of the Treasury Board of Canada Secretariat follow the WCAG and deal with:

- Web accessibility
- The user-friendliness of government websites accessible to the public;
- The formatting and form of emails sent by the Government of Canada.

The Quebec Government's Standard sur l'accessibilité des sites Web, created in 2011 and updated in 2018 (Secrétariat du Conseil du trésor, 2018b), is also based on the W3C's international standards. It applies to all web content of ministries and public organizations, including downloadable documents and multimedia. Under this standard, a website is considered accessible if it meets a certain number of requirements, including:

- Web pages and their content must meet the compliance requirements set out in the Web 2.0 Accessibility Guidelines (WCAG 2.0), meeting all the level AA success criteria, with the exception of criteria 1.2.4 Captions (Live) and 1.2.5 Audio Descriptions (Prerecorded).
- Web pages and their content must also meet WCAG 2.0 compliance requirements, fulfilling level AAA success criteria for guidelines 2.3.2 Three Flashes and 3.1.4 Abbreviations.
- Web pages having prerecorded audio content must comply with one of the two WCAG 2.0 compliance requirements for level A 1.2.2 Captions (Prerecorded) or level AAA 1.2.6 Sign Language (Prerecorded), using Langue des signes québécoise.

(Web Accessibility Standards [SGQRI 008 2.0], 2018, Section 2, S.-s. 2)

The third requirement, as described by the Secrétariat du Conseil du trésor, involves a choice between the use of sign language (guideline 1.2.6) or captions (1.2.2) to make audio web content accessible for deaf people. In this regard, the Government of Quebec's standard differs from the international WCAG standard. According to the WCAG, guideline 1.2.6 on the use of sign language for deaf or hard of hearing people is justified by, among other reasons, the issue of difficulties with written texts:

1.1 Intent of this Success Criterion:

The intent of this Success Criterion is to enable people who are deaf or hard of hearing and who are fluent in a sign language to understand the content of the audio track of synchronized media presentations. Written text, such as that found in captions, is often a second language. Because sign language provides the ability to provide intonation, emotion and other audio information that is reflected in sign language interpretation, but not in captions, sign language interpretation provides richer and more equivalent access to synchronized media. People who communicate extensively in sign language are also faster in sign language and synchronized media is a time-based presentation.

1.2 Specific Benefits of Success Criterion 1.2.6:

People whose human language is a sign language sometimes have limited reading ability. These individuals may not be able to read and comprehend the captions and thus require a sign language interpretation to gain access to the synchronized media content.

W3C, Sign Language (Prerecorded): Understanding SC 1.2.6,
<https://www.w3.org/TR/UNDERSTANDING-WCAG20/media-equiv-sign.html>

A consultation of third sector organizations prior to the revision of the Standard sur l'accessibilité des sites Web made it possible to raise the issue of the incongruity of the choice between captioning and a sign language to provide access to audio content: "With regard to alternative versions of multimedia content, it is important to remember that captions and Langue des signes québécoise (LSQ) are intended for different groups of people. The occasions when content should be offered with captions or in LSQ should be clarified." (Secrétariat du Conseil du trésor, 2018a, p. 6) The decision about which of the two should be chosen no longer seems to be a rule, but rather left up to organizations: "The editorial committee of the unified government platform will develop guidelines to help organizations determine which content should be broadcast by providing captioning or by using LSQ or both simultaneously." (Secrétariat du Conseil du trésor, 2018a, p. 6)

1.2.3 Standards and Policies Around the World

The European Union

In the European Union (EU), different strategies and guidelines have been implemented to promote the social integration of people with disabilities, and, from one action to the next, directives became more detailed. In 2008, the European Commission, an institution whose role is to develop and translate the EU's strategies into policies and initiatives, proposed the Active Inclusion Recommendation, whose goal was to increase the inclusion of all people in the labour

market, including people with disabilities; in 2010, the European Disability Strategy 2010-2020: a Renewed Commitment for a Barrier-free Europe, whose goal was to “empower people with disabilities so that they can benefit fully from participating in society and in the European economy” and, in 2013, the European Union’s Social Investment Package. All these proposals led to measures whose goal was to promote equality for everyone, the social integration of people with disabilities and access to information.

In 2015, the European Commission proposed the Directive of the European Parliament and of the Council on the approximation of the laws, regulations and administrative provisions of the Member States as regards the accessibility requirements for products and services. On April 17, 2019, this directive was adopted by the European Parliament and the Council of the European Union. The European Accessibility Act will apply to products that are placed on the market after June 28, 2025, in the European Union. It is a “directive that aims to contribute to the proper functioning of the internal market of accessible products and services by eliminating the barriers arising from divergent accessibility requirements in the Member States.” (European Commission [EC], undated, par. 1).

This Act fulfills the objectives of the 2010-2020 Strategy and those of the U.N. Convention on the Rights of Persons with Disabilities, because it will allow people with disabilities to have access to “products and services that have been identified as being most important for persons with disabilities while being most likely to have diverging accessibility requirements across EU countries. (EC, undated par. 6) The products and services targeted by this directive are, among others, computer or operating systems for use by the general public, self-service terminals and their equipment, e-readers, electronic communication services, services providing access to audiovisual media services, transport services (websites, ticket sales, etc.), banking services and emergency communications (Directive [EU] 2019/882, art. 2).

The Act describes the requirements that must be met to allow everyone to have access to products and services and, for the deaf community in Europe, general requirements are therefore in effect with regard to product accessibility. With respect to the provision of information on product use, the act requires that the information be “be made available via more than one sensory channel” (Directive [EU] 2019/882, Annex 1, Section 1, 2 and 3), more specifically:

Providing visual and tactile information or visual and auditory information indicating the place where to introduce a card in a self-service terminal so that blind persons and deaf persons can use the terminal. (Directive [EU] 2019/882, Annex 2, Section 1a.i.)

Concerning the design of the user interface and features (Directive (EU) 2019/882, Annex 1, Section 1, point 2), the product must be designed in such a way that it can be used by people with disabilities and, for deaf people, this means that when speech or audible signals are used, whether to convey information, indicate an action or require a response, the product must provide “alternative solutions” such as:

- “Offering in a self-service terminal, in addition to the spoken instructions, for example, instructions in the form of text or images so that deaf persons can also perform the action required”;
- “When a computer gives an error signal, providing a written text or an image indicating the error, so as to allow deaf persons to apprehend that an error is occurring.” (Directive (EU) 2019/882, Annex 2., Section 1, 2 b) and e)).

Moreover, for self-service terminals that use audio or audible signals, they must “be compatible with assistive devices and technologies available at Union level, including hearing technologies such as hearing aids, telecoils, cochlear implants and assistive listening devices” (Directive (EU) 2019/882, Annex 1, Section 1, point 2-o-i). For those “with interactive computing capability, used for the provision of electronic communications services” (Directive (EU) 2019/882, Annex 1, Section 1, point 2-o-iii), they must:

- “when they have video capabilities in addition to, or in combination with, text and voice, provide for the handling of total conversation including synchronized voice, real time text, and video with a resolution enabling sign language communication”;
- “ensure effective wireless coupling to hearing technologies”;
- “avoid interferences with assistive devices”, in order to “allow the simultaneous use of video to display sign language (*sic*) and text to write a message, so that two deaf persons can communicate with each other or with a hearing person”;
- And “ensure that subtitles are transmitted through the set-top box for their use by deaf persons” (Directive [EU] 2019/882, Annex 2, point 2-o-iv).

Requirements concerning the accessibility of specific services (Section iv) are also provided. For example, electronic communications services, including emergency communications, must:

- “Provide real-time text in addition to voice communication” (Directive [EU] 2019/882, Section iv, a) i)
- “provide total conversation where video is provided in addition to voice communication”, which allows “deaf people to use sign language (*sic*) to communicate with each other.” (Directive [EU] 2019/882, section iv, a) ii))

In addition, services providing access to audiovisual media services must “ensure that the accessibility components (access services) of the audiovisual media services such as subtitles for the deaf and hard of hearing, audio description, spoken subtitles and sign language interpretation are fully transmitted with adequate quality for accurate display, and synchronized with sound and video, while allowing for user control of their display and use.” (Directive [EU] 2019/882, Section iv, b), ii). A deaf person must therefore be able to choose the type of access they prefer, such as “subtitles for deaf persons or persons who are hard of hearing, audio description, spoken subtitles and sign language interpretation, by providing means for effective wireless coupling to hearing technologies or by providing user controls to activate ‘access services’ for audiovisual

media services at the same level of prominence as the primary media controls.” (Directive [EU] 2019/882, Annex 2, Section iv, b) ii))

In October 2016, the European Parliament and the Council of the European Union (two institutions of the European Union) established the Directive on the Accessibility of Websites and Mobile Applications of Public Sector Bodies. The objective of this directive was to create “a harmonized market for the accessibility of the websites and mobile applications of public sector bodies” (Directive (EU) 2016/2102, Preamble, par. 56). This directive would help with the social integration of people with disabilities by allowing them to have “accessible audiovisual media services” (Directive (EU) 2016/2102, Preamble, par. 23), and applied to websites and mobile applications of public sector organizations. Although this directive was implemented mainly to help people with disabilities, no specific requirement was provided concerning website accessibility directives for the deaf population and nothing is mentioned about the use of sign language, captions or insets. However, the directive does mention that, for websites and mobile applications:

Member States shall ensure that public sector bodies take the necessary measures to make their websites and mobile applications more accessible by making them perceivable, operable, understandable and robust. (Directive [EU] 2016/2102, art. 4)

In March 2021, the European Commission proposed the Union of Equality: Strategy for the Rights of Person with Disabilities 2021-2030. The goal of this strategy is to “improve the lives of persons with disabilities over the next decade, within the EU and beyond” (EC, 2021, p. 2). Although the European Disability Strategy 2010-2020 had beneficial effects in Europe, “over half of persons with disabilities say they personally felt discriminated against in 2019” (EC, 2021, p. 2) and the pandemic has increased the barriers and inequalities that people with disabilities have to deal with. Therefore, the new strategy is stronger than the previous one. To set an example, the European Commission is working on “improving the accessibility of its buildings, digital environments and communications” (EC, 2021, p. 30) and, with respect to the deaf community, this is reflected “in providing training for staff and supporting learning of interpretation in International Sign Language” (EC, 2021, p. 30). Therefore, the European Commission also aims to:

“improve, by 2023, accessibility across its audiovisual communications and graphic design services, as well as of its publications and events, including, where relevant, sign language interpretation and documents in ‘easy-to-read’ format” (EC, 2021, p. 31).

Another goal of the European Commission, in partnership with the European Asylum Support Office, is to work to facilitate the training of “interpreters dealing with asylum claims by vulnerable persons, including persons with disabilities.” (EC, 2021, p. 22)

The United Kingdom

In 1995, the Disability Discrimination Act² was passed to eliminate discrimination against people with disabilities in the employment, education, transportation, and public authorities sectors and in private clubs.

In 1996, the Broadcasting Act³ tasked the Office of Communications (Ofcom) with ensuring a reduction in disadvantages related to communications accessibility from the different broadcasters. The Ofcom issued codes and cut-off dates to broadcasters so that the project would be implemented gradually. It was also tasked with managing, within acceptable timeframes, viewers' complaints concerning the accessibility of TV programs.

In 2003, the Communications Act⁴, as a continuation of the 1996 Broadcasting Act, set out in detail the duties that Ofcom had to perform to achieve equality in communications, in addition to establishing a structure that had to be complied with to achieve the goal of accessibility. The Act stated that Ofcom had to be present in the different parts of the United Kingdom, i.e., England, Scotland, Wales and Northern Ireland, so that the project would be consistent by offering content in these parts of the U.K. The project was overseen by the Secretary of State, who required that Ofcom provide it with progress reports on objectives and work planning. Sections 303 to 305 of the Communications Act deal with the specific objectives for services provided to people with disabilities and section 303 states: "It shall be the duty of OFCOM to draw up, and from time to time review, a code giving guidance as to — (a) the extent to which the services to which this section applies should promote the understanding and enjoyment by people with disabilities, in particular—i) persons who are deaf or hard of hearing, ii) persons who are blind or partially sighted, and iii) persons with a dual sensory impairment, of the programmes to be included in such services; and (b) the means by which such understanding and enjoyment should be promoted." To make televised content more accessible, the objectives Ofcom had to achieve in 2003 were that: 90% of programs for TV channels 3 and 4 had to contain subtitles; 80% of the programs on the other channels had to contain subtitles, 10% of programs had to contain audio description for the blind, and 5% of the programs had to be accessible in sign language for deaf viewers. The Act also stipulated that representatives of the communities covered by these accommodations would be consulted, as well as people providing accessibility services (e.g.; subtitle, interpreter, etc.).

In 2010, the Equality Act⁵ was created to fight discrimination in the employment sector and in other spheres of society. The Act combined three existing laws: the Sex Discrimination Act of 1975, the Race Relations Act of 1976 and the Disability Discrimination Act of 1995.

To ensure the accessibility of the documents produced by the government, the Accessible documents policy was created in 2020. This policy follows WCAG 2.1 AA recommendations, as described earlier.

² <https://www.legislation.gov.uk/ukpga/1995/50/section/1>

³ <https://www.legislation.gov.uk/ukpga/1996/55/contents>

⁴ <https://www.legislation.gov.uk/ukpga/2003/21/contents>

⁵ <https://www.gov.uk/guidance/equality-act-2010-guidance>

France

France has two main accessibility laws. The *Loi pour l'égalité des droits et des chances, la participation et la citoyenneté des personnes handicapées*, passed on February 11, 2005, recognizes French sign language (LSF) as a language in its own right and specifies the arrangements that deaf people are entitled to in their communications “with public services, whether they are managed by the State, local authorities or an organization representing them, as well as by private persons entrusted with a public service task” (Law 2005-102, art. 78). The arrangements apply to access to information **concerning the deaf person**, are applied **at the person's request** and “in accordance with the procedures and within a time limit laid down by regulation” (Law 2005-102, art. 78). They may be:

- simultaneous written translation;
- the intervention of an interpreter in French sign language (LSF);
- the intervention of a cued speech transliterator.

Access to an interpreter or any other accommodation before administrative, civil and criminal courts is governed by Article 76 of this law. In addition, Article 77 mentions that deaf people can avail themselves of LSF interpretation services for the written and on-the-road driver's licence tests on predetermined dates so that the services can benefit several deaf people.

The *Charte d'accessibilité de la communication de l'État*, passed in 2021, states that “all communications, regardless of medium or format, must be made directly accessible or specifically adapted.” (Service d'information du Gouvernement, 2021, p. 15) Members of the government are responsible for ensuring that their communications and those of public institutions and administrations (speeches, press briefings, interviews, alert orders, recommendations, information, etc.) be fully accessible in real time to the public, including people with disabilities and those “with weak literacy skills” (Service d'information du Gouvernement, 2021, p. 31). The interpretation of speeches must therefore be accessible in both French sign language and subtitles on all media platforms.

Australia

In 1992, the government of Australia introduced the Disability Discrimination Act 1992, whose objectives are: “to eliminate, as far as possible, discrimination against persons on the ground of disability in the areas of: work, accommodation, education, access to premises, clubs and sport; and the provision of goods, facilities, services and land; and existing laws; and the administration of Commonwealth laws and programs; and to ensure, as far as practicable, that persons with disabilities have the same rights to equality before the law as the rest of the community; and to promote recognition and acceptance within the community of the principle that persons with disabilities have the same fundamental rights as the rest of the community” (Office of Parliamentary Counsel, 1992, part. 1, pt. 3). In the same vein, in 2014, the province of New South Wales enacted the Disability Inclusion Act (n° 4136)⁶ for the inclusion of people with disabilities. In doing so, the government of NSW undertook to comply with the United Nations Convention

⁶ <https://legislation.nsw.gov.au/view/pdf/asmade/act-2014-41>

on the Rights of Persons with Disabilities. The Disability Inclusion Act includes an action plan and strategy for the successful inclusion of people with disabilities, including: a) providing access to buildings, events and facilities, b) providing access to information, c) accommodating the specific needs of people with disabilities, etc. In order to develop the strategies to adopt, an accommodation group was created, consisting of people with disabilities, but no mention was made of the disability the people participating in it had to have to contribute their viewpoints and suggestions.

In 2011, all the provincial governments of Australia got together to sign the National Disability Strategy, a ten-year plan (2010 to 2020), which is in line with the United Nations Convention on the Rights of Persons with Disabilities, Australia being one of the States Parties that ratified the Convention in 2008. The National Disability Strategy made it possible to standardize accessibility and the rights of people with disabilities throughout the country, and thus efficiently coordinate the implementations of adaptations. The goals of this strategy were to: “1) establish a high-level policy framework to give coherence to, and guide government activity across mainstream and disability-specific areas of public policy, 2) drive improved performance of mainstream services in delivering outcomes for people with disability, 3) give visibility to disability issues and ensure they are included in the development and implementation of all public policy that impacts on people with disability, 4) provide national leadership toward greater inclusion of people with disability.” (National Disability Strategy, 2011, p. 9) The strategy comprises six policy areas: inclusive and accessible communities, rights protection, justice and legislation, economic security, personal and community support, learning and skills and health and well-being.

In 2013, the government of Australia added the Broadcasting Services (Television Captioning) Standard to the Broadcasting Services Act of 1992, to address caption quality. The 1992 policy provided guidelines that TV and radio broadcasters had to follow in order to ensure, among other things, quality content that was age-appropriate for users. The goal of the new 2013 standard was to ensure that broadcasters would make their programs accessible to the deaf and hearing impaired community through captioning: “The object of this Standard is to specify mandatory requirements for broadcasters and narrowcasters that relate to the quality of closed captioning services, to ensure that captioning services are meaningful to deaf and hearing impaired viewers” (Broadcasting Services [Television Captioning] Standard 2013, 2016, pt. 3). This standard applied to commercial and national broadcasters, requiring them to offer a fixed number of hours of captioned content on their primary and secondary channels.

2. Resources Contributing to Accessibility

In this section, we review the resources that contribute to communication accessibility for deaf and hard of hearing people. We will first discuss the problem of the use of written language—captioning in particular—for information accessibility and we will show how it is insufficient for full access to information for deaf and hard of hearing people. We then look at the professionals who provide access to information through sign language: interpreters, deaf interpreters and translators. Next, we summarize the different ways of incorporating sign language into information media, namely, video, VRS and avatars. Finally, we give examples of

accessible communications through different media, such as press conferences, TV shows, websites, etc.

2.1. Use of Written Language and Captions

Access to written language, a second language, is very difficult for many deaf people. Huenerfauth (2006) mentions that many deaf people have low English literacy skills, caused by a lack of exposure to language input during language acquisition. Other researchers mention that certain speakers of ASL find school challenging and at the age of 16 they have the reading level equivalent to a hearing child between the ages of 8 and 10 (Kramer, 1996; Huenerfauth, 2006; Young, 2010). This is problematic because access to information and entertainment depends mainly on written language and one of its variations, subtitles.

Subtitles opened up the world of broadcasting to the deaf and hard of hearing community and this continued with the possibility of the widespread distribution of videos (especially with digital video, which makes adding subtitles easier and more accessible to everyone) thanks to the internet. Even though the addition of subtitles makes information disseminated by video more accessible, it also has its limitations and does not allow fair and equal access to information for several reasons. First, because subtitles are often generated automatically, the result is frequently inaccurate, as the example below shows. In addition, if the pace of the subtitles is uneven or too fast or if there is a lag with the source sound, the video becomes difficult to read; as a result, the content is less accessible.



Excerpt of a video from a techno pedagogical training program offered at UQAM⁷. The speaker said: “by selecting the password of your choice”, which does not correspond at all with the translation generated.

⁷ <https://enseigner.luniversity.com/communaute-dapprentissage/>

Secondly, subtitles do not give full access to the information conveyed by voice. In addition to words, a voice conveys linguistic and non-linguistic information through intonation, stress, rhythm of speech, etc. (Dig Inclusion, undated). These types of information are often missing in translations, whether automatic or not. Lastly, subtitles are often hard to read because they are not properly positioned in the image or hide important visual content. Moreover, studies show that it is difficult to pay attention to subtitles and video at the same time. In fact, it seems that 90% of people read the subtitles only, resulting in the message being misunderstood (Romero-Fresco, 2011, from a report on *BBC Two*).

Sign language provides access to a full complement of linguistic and non-linguistic information corresponding to the source language. Therefore, sign language is a must if we want televised content to be accessible to deaf people. It is made possible mainly through the work of interpreters, deaf interpreters and translators, whose characteristics will be described in the next section.

2.2. Professionals Enabling Access to Information

In this section, we will identify the professions providing access to information in sign language. These professions play a crucial role in accessibility to information, as they not only produce the message, but they are its transmitters (unlike spoken language, which can be conveyed by the written word). In fact, it's important to remember that conveying a message via the written word is not a possibility with sign language (there is no written sign language system), which means that communication must be conveyed through a language brought to life by interpreters, i.e., through the work of these professionals.

2.2.1 Oral to sign language interpreters

In Canada, most oral to sign language interpreters interpret into English and ASL or into French and LSQ. Oral to sign language interpreters must have extensive knowledge of spoken languages, standards and hearing culture, and of sign language and the deaf and hard of hearing culture (Canadian Association of Sign Language Interpreters [CASLI], undated).

Their duties are to either simultaneously interpret spoken language messages or to translate consecutively from filmed sign language or written spoken language. In both cases, the message created in the source language must be analyzed so that the meaning is captured and reproduced in the target language (Association québécoise des interprètes en langues des signes [AQILS], 2016).

2.2.2 Deaf Interpreters

Deaf interpreters are deaf or hard of hearing people who are native speakers of a sign language (usually ASL, LSQ or ISL in the Canadian context) who have training in interpretation and who interpret speech into their native language by incorporating other communication strategies in order to provide an appropriate interpretation (CASLI, undated). Deaf interpreters are cultural insiders; their native knowledge of sign language and their inherent experience of deafness, and, in particular, of the conceptualization of the world of deaf people (Stone, 2007), allow them to

deliver messages that are linguistically, culturally and visually (by using gestures) appropriate. In addition to using these non-linguistic skills, deaf interpreters use strategies of substitution, repetition and addition of relevant information depending on the context (Cerney, 2004). Deaf interpreters who act as a relay between a hearing interpreter and a deaf client work mainly in the legal and physical and mental health fields, at the request of a hearing interpreter (Boudreault 2005). Few sources mention TV as a professional field for deaf interpreters (de Meulder and Heyerick, 2013). And yet this field has been thriving since States Parties to the U.N. Convention have had responsibilities related to information accessibility, and even more since the COVID-10 pandemic. De Meulder and Heyerick (2013) highlight different positive views of using deaf interpreters on TV to provide access to information, including:

1. Community ownership of information: it is easier to own information when the interpreter comes from the same cultural community. Communication is more effective;
2. Social responsibility of deaf interpreters: coming from the same minority community, deaf interpreters more readily have a sense of social responsibility, of the impact and consequences of their interpretation. Deaf interpreters share with their clients the experience of being dependent on a third party to get information.

In the U.K. and several European countries, deaf interpreters are professionally employed in the field of television broadcasting. Their presence is appreciated and sought both by broadcasters and signing communities. However, there are tensions between the different groups (hearing interpreters, service providers, broadcasters, deaf interpreters) concerning defining the role and the skills expected of deaf interpreters regarding access to information. Meulder and Heyerick's study (2013) on the outlook for deaf interpreters in Flanders targets four challenges that still have currency today for the integration of deaf interpreters in Canada: training, professionalization, awareness-raising and research on the topic of deaf interpreters.

Rathmann (2011) defends the fact that deaf people who translate a text live from a teleprompter perform work that is different from those who translate a paper-based text. He explains that the online nature of the teleprompter and text interpretation, for TV especially, requires the same cognitive processing steps as online interpretation. Conversely, the translation of paper documents, such as official documents, to sign language, is a type of translation, just like translating from one written language to another. However, translating documents to sign language requires editing skills other than those involved in translating from one language to another.

An exploratory study undertaken by Russell and McLaughlin (2018) suggests that information broadcast via deaf interpreter services are more effective than that broadcast by a hearing interpreter. Russell and McLaughlin's study (2018) compared the perceptions of a group of nine experts on the interpretation of a single fictitious, but plausible, scenario concerning an emergency during a natural disaster. The elements identified as more appropriate in the message produced by the deaf interpreter mainly had to do with the natural pace and character of the language used. The experts mentioned that the deaf interpreters provided better visual descriptions, more clarity and emphasis, that they avoided fingerspelling or performed it slowly for proper nouns for viewers unfamiliar with the names of the rivers in the area, etc. The experts

made a certain number of recommendations for broadcasters for interpreting emergency situations on television (Russell and McLaughlin, 2018, pp. 5-6):

- Use deaf interpreters as much as possible;
- Wear dark clothing (particularly for access for deafblind people);
- Add interpretation into BOTH official sign languages: LSQ and ASL, especially in the event of a national emergency;
- Select a team of expert interpreters, deaf and hearing, where the hearing interpreter receives the source message and the deaf interpreter produces the outgoing message;
- If possible, work beforehand with the press team to prepare the interpretation;
- Use facial expressions appropriately (without exaggerating).

The use of deaf interpreters targets full inclusion for the Deaf and allows deaf people to have equal communicational accessibility to information in many situations and sectors, including justice (Mathers, 2009), immigration (Russell *et al.*, 2018), health, education (Forestal, 2011), assistance with youth protection services (Adam *et al.*, 2011), or culture (for museum guides, for example), etc.

In their role as oral/signed language interpreters, deaf interpreters often team up with hearing interpreters. The deaf interpreter will adapt the language signed by the hearing interpreter simultaneously to make it accessible for the deaf client. Deaf interpreters can also work alone (without a hearing interpreter) for translations from a written language to signed language (prerecorded) or for interpretation from one signed language to another (simultaneously).

Deaf interpreters are also asked to act as relay interpreters or mirror interpreters (Howard, 2013) in situations where the deaf signer or active interpreter is not visible to part of the audience. The interpreter transfers the interpreted content without other modifications or reinterpretation (in the same sign language) to make it visible.

2.3. Ways of Incorporating Sign Language

Information made accessible through the work of interpreters, deaf interpreters and other language professionals working in sign language is incorporated into communications in different ways. Our review shows that it most frequently involves video. Among the possibilities that we identified is content in sign language provided directly in a video, with or without the source text on the page or incorporated into a video with spoken language content. Access to information also takes the form of live interpretation through video relay. Another way of incorporating sign language is through an avatar.

2.3.1 Videos in Sign Language

Videos with sign language content are primarily original productions by deaf signers in LSQ, and are neither interpretations nor translations. Content with sign language interpretation can also be made accessible through videos, which enable the translation of texts (websites, official documents, etc.) or the interpretation of spoken language content (press conferences, TV shows, etc.).

Sign language videos on websites or webcasting platforms are accessible through an icon on a web page (CB Linguistic Services [CBLIS], 2021). Sometimes they are also subtitled or accompanied by a voiceover, which is a spoken language translation of the signed content in sign language.

2.3.2 Interpreter/Translator Added to the Video, with the Original Content

In this case, the video shows the interpreter and original presenters/speakers at the same time. For live interpretations, the interpreter can either be filmed in the same frame as the spoken speech or in a separate frame and added to the image. Interpreters/translators whose work is taped are also filmed separately and added to the video during the post-production phase.

There are different ways of adding the video of the interpreter to the original image. An inset, which is a small oval picture within a picture showing the interpreter in a corner of the screen, is used less and less (we didn't find any in our review). The W3C Web Accessibility Initiative (WAI) suggests to avoid it and to opt for formats that capture the full signing space and to ensure that the signer is large enough in the image to be seen clearly (even small movements and facial expressions) (W3C, 2021). In general, the most commonly used formats consist of adding the video of the interpreter in the left or right quarter or third of the screen. In some circumstances, the image of the interpreter can also be superimposed over the initial image, somewhat similar to how they do weather forecasts on TV news programs. This technique is used, for example, in some children's shows for a more dynamic effect.

Note that certain televisions (for example: <https://www.samsung.com/fr/accessibility/tv/>) now have a feature that allows the viewer to magnify a portion of the screen chosen by the user and, for interpreted content, choose the area for sign languages when it is set.

2.3.3 Video Relay Service (VRS) (Live)

Video relay service (VRS) is a service offered to the deaf community that allows deaf people to easily communicate with hearing people unfamiliar with sign language. The principle is as follows: the deaf person uses the telecommunications platform from a certain location x , while the person they are communicating with is at location y and an interpreter is at location z . This is a remote interpretation service that uses video and phone simultaneously, and two languages of two different modes can be used for efficient communication (Napier *et al.*, 2017). This service, which enables greater accessibility for deaf people, is now used by many countries, including Australia, Denmark, France, Germany, New Zealand, Norway, Sweden, the United States and Canada (CSMG, 2012; Parisot *et al.*, 2013). SRV Canada VRS has officially been providing 24/7 interpretation services throughout the country since 2016. In the United States, video relay services have been available since 1995 and, in every U.S. state since 2003 (Alley, 2016).

VRS makes it possible to make daily calls, get news from friends and family, place orders for delivery, make appointments, enjoy increased independence, access information spontaneously, etc. (Alley, 2016; Parisot *et al.*, 2013). Dalle-Nazébi (2010) pointed to other advantages of the accessibility of phone service; for example, this service allows a person to develop relationships

with their peers, communicate more easily with coworkers and bosses and access government institutions.

As we describe in the next section, very few websites make information available in sign language. However, several government and public organization websites, in their accessibility policies, mention that they use VRS (or another equivalent service) for communications with deaf clients who use a sign language. Although the websites do not explicitly say so, one is led to believe that, in order to have access to information, communicating with an organization via VRS is the accessible alternative in sign language for visiting websites, which are mostly in written language.

2.3.4 Avatars

Another way of adding information in sign language is to use videos with signing avatars. Avatars have two main functions: 1) they provide an “anonymous” body for an interpreter who signs a message; and 2) they translate written language or automatically interpret spoken language. Moreover, they are always generated from the basic production of deaf interpreters and/or signers. Examples of the use of avatars found during our review mostly involved sharing prerecorded static information in train stations. These avatars communicate simple instructions in the form of videos displayed on screens in stations and inside trains, and are embedded in certain interactive question/answer touch-screen systems.

Avatars are still not commonly used, but research into the development of signing avatars is underway and very active (we discuss this in section 3). Translations obtained from technologies using avatars are still not very accurate. In this regard, the Fédération Francophone des Sourds de Belgique (FFSB) cautions against their use and recommends that they be used only for communications that are very simple and whose possibilities are checked by deaf people (Picron *et al.*, undated).

2.4. Examples of Communications Accessible in Sign Language

This section provides a review of examples of communications accessible in sign language by field, and covers what is done in Canada and abroad. This review is not exhaustive, but we believe that it is representative of what is possible and that it shows the different possible cases.

2.4.1 Press Conferences by Federal, Provincial and Municipal Authorities

In Canada, since March 2020 (the start of the COVID-19 pandemic), televised press conferences by federal, provincial (Quebec, Saskatchewan and Ontario, among others) and municipal (Montreal, Toronto and Vancouver, for example) authorities have been interpreted into LSQ and/or ASL (depending on the language of the channel, whether French or English). Here are a few examples of what has been done.

The first federal government press conference in the context of COVID-19 was interpreted into ASL on March 12, 2020. LSQ interpretation was available as of March 19, 2020, and broadcast

on the YouTube channel of the Cable Public Affairs Channel (CPAC)⁸. Videos on this channel are then shared by many media outlets.

In Quebec, press briefings are broadcast live on the National Assembly's website and on the Quebec government's social media⁹. They are simultaneously translated into LSQ¹⁰. The first interpretation in Quebec sign language seems to have occurred on March 13, 2020, and used hearing interpreters. August 31, 2020, is the first day that deaf interpreters were used for provincial press briefings, after which deaf and hearing interpreters seemed to be used on an alternating basis. The interpreters are generally added to the image in a frame to the right of the video.

In Montreal, COVID-19 press briefings given by the Direction régionale de santé publique de Montréal (DRSP) are accessible on the Santé Montréal Facebook page. They are accessible live or on playback. The first interpretation of the City of Montreal's press briefings seems to have occurred on March 19, 2020, using a hearing interpreter. We can see in the directory that the speeches are then interpreted by deaf interpreters. The deaf interpreter is on site, behind the speakers.

In the United States, all White House press briefings have been interpreted into ASL since January 2021 (Cohen, 2021)¹¹. The decision to always include interpreters at press briefings is consistent with regulations of the Office for Civil Rights and Civil Liberties Planning, which, because of a press release interpreted by a hearing person who did not know ASL during Hurricane Katrina in 2007, causing outrage within the deaf community in the U.S., indicated that all official information provided must be complete, accessible and understandable by everyone (U.S. Department of Transportation, Federal Highway Administration Office of Operations, 2020). During crises or natural disasters, to ensure that everyone receives updated information on the situation and that their lives are not in danger, the communication services used can include: pen and paper, sign language interpreters on site or on video, information provided in large print and assistance with reading or completing forms.

2.4.2 Broadcasting of Parliamentary Proceedings and Municipal Council Meetings

The question and answer periods of the Quebec National Assembly's parliamentary proceedings have been translated simultaneously into LSQ since September 2020. The hearing interpreter is in a frame in the upper right-hand corner of the video. The question periods can be accessed through the National Assembly's channel.¹² Note, however, that these are the question periods and not

⁸ <https://www.youtube.com/user/cpac/about/>: "CPAC, the Cable Public Affairs Channel, is Canada's only privately owned, commercial free, not-for-profit, bilingual TV service, dedicated to around-the-clock coverage of Parliament, politics and public affairs."

⁹ They are also available on the CPAC channel, as well as the official communications of the other Canadian provinces.

¹⁰ For example: <https://www.quebec.ca/sante/problemes-de-sante/a-z/coronavirus-2019/personnes-handicapees-dans-le-contexte-de-l-a-covid-19>

¹¹ Available here: <https://www.youtube.com/user/whitehouse/videos>

¹² Available at the following link: <http://www.assnat.qc.ca/fr/video-audio/archives-parlementaires/index.html>

videos presenting the work of the Assembly (Assembly proceedings, work of commissions, press activities, special, institutional or MNA activities), that the videos featuring interpreters are not indicated and that it is difficult to navigate through the site to find videos with interpreters.

At the municipal level, the meetings of the City of Gatineau's city council¹³ have been interpreted into LSQ since 2012. The meetings of the council can be accessed live or on playback on the City's website. The interpreter is inserted in the upper right-hand corner of the screen. The City of Laval¹⁴ also broadcasts its city council meetings with LSQ interpretation. Like the City of Gatineau, the interpreter appears in the upper right-hand corner of the screen.

It is interesting to mention that, when excerpts of press conferences, press briefings and parliamentary proceedings are shown on news broadcasts and shows, the interpreters are not always filmed, i.e., are not always captured in the camera's frame.

2.4.3 Election Debates

In 2021 and 2019, the Canadian federal election debates broadcast by the CBC were made accessible in LSQ and ASL through the presence of hearing interpreters from a link on the website of the Leaders' Debates Commission¹⁵. The broadcast was accessible live or on playback (the latter was also provided for about ten other languages through the same portal). The links for each language lead to a YouTube page¹⁶ where the videos are archived. The videos of two interpreters, who take turns interpreting, are visible on the right side of the video of the debate. The French leaders' debate was also broadcast live on the Ami-télé channel for LSQ.

For the 2021 municipal elections, the mayoral candidates' debate in Montreal was interpreted into LSQ by a deaf interpreter. The debate was broadcast live online, through Radio Canada's YouTube channel¹⁷.

Note that none of these debate broadcasts were shown live on TV. The sign language versions appeared only on the internet. Even though they were not broadcast live on TV, the inclusion of the sign language version represents progress for accessibility and gives ownership to the deaf community. This accessibility also allows people to know more about the parties and to make a more informed decision when the time comes to vote (Pinheiro *et al.*, 2020).

In the United States, the presidential debate of September 19, 2020, was not interpreted simultaneously into ASL, even though a petition had been filed to have an interpreter present so that the information would be accessible to the entire American deaf community, which led to many complaints from the community (Inside Edition, 2020). However, the Sign1News channel, powered by CNN, created English to ASL translations of the 2020 presidential race debates, with

¹³ Available at the following link: <https://villes.pqm.net/gatineau/index.php?lang=fr>

¹⁴ Available at the following link: <https://archivesvilledelaval.webtv.coop/conseil-de-ville-du-10-aout-2021/>

¹⁵ Available here: <https://www.debates-debats.ca/fr/debats2021/>

¹⁶ Here, for example, is the video with LSQ interpretation:

<https://www.youtube.com/watch?v=ZIOeMEYHuJA&list=PLzEiqSt1buc1w0zYKJkWPdVlvwvNi2RC5&index=8>

¹⁷ Available here: https://www.youtube.com/watch?v=ulYcSO-HfMA&ab_channel=Radio-CanadaInfo

the help of three interpreters who appeared at the top of the screen, against a black background, one for each person in the debate (a Democratic candidate, a Republican candidate, and the moderator¹⁸).

2.4.4 Live Broadcasts of World Events

For the first time in 2021, the opening and closing ceremonies of the Tokyo Olympic¹⁹ and Paralympic²⁰ games were interpreted into LSQ (for the French version) and into ASL (for the English version) and broadcast on the respective websites (Radio-Canada.ca/tokyo2020 and CBC.ca/tokyo2020), as well as on Radio-Canada's Facebook page. The recordings remained available on both web platforms for 24 hours. Deaf interpreters did the interpreting on those nights.

2.4.5 Educational TV Shows or Those Intended for Young Audiences (Taped)

In Canada, the TV shows that we inventoried were specific to the pandemic and not regular shows (the content is still available, but it is not new). We also have the example of France, where children's channels are required to broadcast content in sign language, which provides access to fresh and more diversified shows.

In Quebec, the pandemic and the resulting lockdown caused, among other things, school closures, creating a context conducive to the production of new educational TV shows for young people. In this context, Télé-Québec produced three new educational programs, each with 50 episodes, for preschoolers, children and teens. These programs were aired on TV in 2020 and are still available on the web platforms *Télé-Québec* and *Télé-Québec en classe*²¹. To make this content available to deaf children who are too young to read subtitles in French, the Ministère de l'Éducation et de l'Enseignement supérieur (MÉES) and the OPHQ jointly funded the translation of these three programs—*L'école à la maison*²², *Les suppléants*²³ and *Les moments doux avec Passe-Partout*²⁴. The translated versions are broadcast on the platform *Télé-Québec en classe*. The shows are translated by deaf signers who appear in the left or right quarter of the screen.

¹⁸ Here, for example, is the debate of September 29, 2020, between Biden and Trump:

<https://www.youtube.com/watch?v=PZXmkqR-JKc>

¹⁹

<https://parici.radio-canada.ca/corporatif/10950/CBC-Radio-Canada-La-Ceremonie-D-ouverture-De-Tokyo-2020-En-Huit-Langues-Autochtones-Deux-Langues-Des-Signes-Et-En-Videodescription>

²⁰

<https://ici.radio-canada.ca/jeux-paralympiques/videos/epreuve/episodes/567364/ceremonie-cloture-paralympiques-ls-q-tokyo>

²¹ This platform (<https://enclasse.telequebec.tv/lsq>) is part of Quebec's Ressources Éducatives Numériques (REN) platform, established by the MEES. It is a licensed REN. Two other platforms are also offered: Curio.ca (Radio-Canada) and the ONF's CAMPUS. A quick search in their respective search engines shows that Curio.ca contains no documents in sign language and that the ONF's Campus offers only one (the documentary "Les mots qui dansent", by Yves Étienne Massicotte).

²² <https://enclasse.telequebec.tv/emission/lecole-a-la-maison-eleves-du-primaire-lsq/54>

²³ <https://enclasse.telequebec.tv/emission/les-suppléants-eleves-du-secondaire-lsq/55>

²⁴ <https://enclasse.telequebec.tv/emission/les-moments-doux-avec-passe-partout-enfants-du-prescolaire/56>

Elsewhere in Canada, the animated series *I am Puff*²⁵, also created during the pandemic, is broadcast on the web. The character of the three-episode series communicates in ASL, dubbed in English. The series deals with issues such as diversity and acceptance and was created for broad online dissemination (several platforms seem to have shared it) with the support of CCA Digital Originals, an initiative of the Canada Council for the Arts.

In France, channels for young audiences (for children 3 to 6 years of age), such as *TIJI* and *Piwi*, are required to broadcast every week a program for learning sign language and an ad from the program guide translated into sign language. This obligation replaces the subtitling requirement, for children's shows, as this age group does not have sufficient knowledge of the written language²⁶. On *TIJI*²⁷, the cartoons *Tchoupi et ses amis* and *Sam Sam* are available in LSF. These shows are translated by a deaf interpreter actor with picture-in-picture videos of the deaf interpreter²⁸. The program *Fais-moi signe* is hosted by a deaf actress and its goal is to teach LSF to young audiences. On Canal J, *À qui veut l'entendre* follows a young hearing girl as she is immersed in the world of the Deaf to help people understand the hardships that deaf people encounter, as well as their way of seeing and dealing with the world.

2.4.6 News and Current Affairs Programs (Live and Taped)

Our review revealed very few Canadian content news programs in LSQ and ASL. To our knowledge, no televised news show is interpreted or adapted into sign language in Canada. However, this type of program is in high demand among deaf people (Kyle, 2007). There are, however, a few platforms that present prerecorded current affairs content (e.g. the Facebook group *INFO COVID-19 LSQ*²⁹). Elsewhere in the world, there are many examples of news programs accessible in sign language or through sign language interpretation (in Belgium and France, for example, the state-owned broadcaster presents news programs in the country's sign language). There are also several websites and content-hosting platforms covering current affairs issues in a similar fashion to news programs. Some examples are given in this section.

In Canada, we did not find any news program produced in spoken language and interpreted (live) or translated (taped) into sign language. A few websites offer current affairs content in LSQ and ASL by deaf presenters. In Quebec, *LSQ Branche*³⁰ posts current events content and consists of a playlist that can be accessed via the *Cinéall* Facebook page (however, nothing has been posted since the summer of 2021). *Actualité en LSQ* can be accessed through the Facebook and YouTube pages of the Association de l'ouïe de l'Outaouais, as well as on the *Actualité* page of their

²⁵ <https://vimeo.com/showcase/8158824>

²⁶ <https://www.csa.fr/Proteger/Garantie-des-droits-et-libertes/Les-droits-des-personnes-handicapees>

²⁷ <https://www.tiji.fr/>

²⁸ A picture-in-picture video is made by incorporating in a single image objects filmed separately or computer-generated objects.

²⁹ <https://www.facebook.com/groups/INFOCOVID19LSQ>

³⁰ <https://www.facebook.com/watch/425863104100833/124358056179076/>

website³¹. Lastly, *Deaf Dots*³² is a platform that streams news videos with subtitled and signed (ASL and LSQ) content from different organizations (however, the LSQ version seems to be challenged on the site).

In Belgium, the public channel RTBF broadcasts two news programs interpreted into Belgian French sign language (LSFB)³³. *Les Niouzz en traduction gestuelle*, a 6-minute news broadcast for young audiences, is aired daily on the La Trois channel. The *JT* on the *La Une* channel is aired a half an hour later in LSFB (*Le JT en langue des signes*) every day of the week on the *La Trois* channel. The interpreter appears in the right quarter of the screen. Taped versions of both programs are also available online through the Auvio platform.

In France, we found four news broadcasts translated into LSF³⁴. First, the morning news, broadcast on the general-interest public channel **France 2**. Next are two public 24-hour news networks, **BFMTV** and **LCI**, which also have their daily news broadcasts. Lastly, the sports channel **Infosport** also airs a daily news broadcast.

In England, among the TV programs with deaf presenters using British sign language (BSL) are:

- *BBC See Hear* on the *BBC*, a news magazine show that highlights topics affecting the deaf community;
- the regional news program *Sign On* on Channel 4.

In Kenya, the sign-language TV station, *Signs TV*, was created to broadcast news, information, educational content and entertainment, all entirely produced by deaf people. The station influenced schools to add sign language to their educational program, which has facilitated communication for deaf children. The station works with the government to develop job opportunities for people with disabilities. It gets funding by having ads televised during viewing periods, which are also interpreted into sign language³⁵.

In Turkey, certain broadcasters add programs interpreted into Turkish sign language (Türk İşaret Dili, TID) to their website to provide the deaf community with a web TV channel, such as *Engelsiz TRT*, *Engelsiz Kanal D* and *Engelsiz shoe TVZ*. The channel TRT even offers cartoons accessible in TID, documentaries, sports programs, series and soap operas. *TRT radio* even offers some of their programs accessible in TID by adding the video to YouTube (Gökce, 2018).

2.4.7 Web Platforms with Varied Content in Sign Language

Certain general-interest web platforms or channels broadcast content in sign language produced by and for deaf people. Among these are (CBLS, 2021):

³¹ <https://www.adoo.ca/actualites>

³² <https://deafdots.ca/fr/>

³³ https://www.rtf.be/entreprise/contact-et-question/faq/detail_accessibilite?id=9309319

³⁴ <https://www.csa.fr/Proteger/Garantie-des-droits-et-libertes/Les-droits-des-personnes-handicapees>

³⁵ <https://zeroproject.org/practice/practice/pra201183ken-factsheet/>

- In Canada, the *Deaf Culture Center*³⁶ website, which offers content of all types in ASL;
- The American web channels *DPAN TV-The Sign Language Channel*, the *Daily Moth*, *DeafNation*, and *CODA Brothers*, which broadcast different types of content in ASL;
- In England, the channels *BSL Zone*³⁷ and *British Deaf News*, which offer content in BSL;
- In France, the website *Média Pi*, which offers news content and talk shows, programs and films in LSF;
- Across Europe, *Sign language TV Shows* offers news and programs accessible in several sign languages;
- The site *H3 World TV* produces videos in International Sign.

2.4.8 Websites of Different Organizations—Translations

Among the most accessible websites, very few sites have videos in sign language integrated across the entire site (the Canadian Hearing Services³⁸ and SIVET³⁹ websites) or have a website section in sign language (for example, the City of Vienna and Vienna tourism⁴⁰ websites). They are accessible from a menu providing a choice of languages.

We noticed in general that content in sign language is most often accessible from sections whose subjects are related to accessibility (presentations of accessibility practices) and health (particularly with COVID, so it can be supposed that these sections were added recently), and sign language content is limited to these sections.

It is very rare to get a clear indication of which sections contain sign language (nothing appears in the navigation menus) and a search in a website search engine doesn't always return the website's sign language content (a search from an external search engine was often required to identify the content provided in sign language on the sites).

A website's sign language content is sometimes combined on one page, but most of the time it's attached to content distributed unevenly throughout the site (attached to content of interest to the deaf community, for example).

We will now give the most precise possible description of the sites where we found content in sign language and indicate the characteristics that we identified (note that it is not always easy to distinguish between interpretation and translation and deaf or hearing interpreters without information on the process used to prepare the videos. Therefore, we do not provide details when we are not sure).

2.4.9 Government Websites

On the Government of Canada's website, sign language accessibility (ASL on the website's English version and LSQ on its French version) is achieved through translations by deaf

³⁶ <https://deafculturecentre.ca/>

³⁷ <https://www.bslzone.co.uk/>

³⁸ <https://www.chs.ca/fr>

³⁹ <https://sivet.ca/>

⁴⁰ www.wien.info

interpreters whose videos are embedded in the web pages. The *Accessibility Standards Canada*⁴¹ section is the most accessible. Translations accompany practically all the texts in this section. Related to accessibility, but added to other sections of the website, are:

- *Best practices for accessibility when working from home*⁴²
- *Consulting with Canadians on accessibility legislation*⁴³
- *The Government of Canada launches its first ever accessibility strategy*⁴⁴

There are also several videos in sign language on the National Defence website.

On the Government of Quebec's website, information in LSQ can be found in two places. First, the *Information for People with Disabilities (COVID-19)*⁴⁵ section contains four links to informational videos on YouTube dealing with vaccination and the vaccine passport. These videos, featuring deaf interpreters, have no text and are not linked to the corresponding sections elsewhere on the site. Second, the *Self-Care Guide (COVID-19)*, on the same website, is translated into ASL and LSQ by a deaf interpreter, and can be accessed through a link and is incorporated in its home page⁴⁶.

We found that the websites of the CISSS and CIUSSS, under the jurisdiction of the provincial government, contain the most content in sign language. This content is either related to COVID-19, or it deals with the establishments under their oversight that provide services to the Deaf and hard of hearing. Here are a few cases that we identified (in all cases, the videos are not shown with the text corresponding to them):

- The website of the CIUSSS de la Capitale-Nationale has a page with content in LSQ⁴⁷, which consists of information related to COVID-19 tailored to the deaf community. The page provides hypertext links to YouTube videos. Deaf interpreters.
- The CISSS de Chaudière-Appalaches also has its page with LSQ content, *COVID-19 — Vidéos LSQ*⁴⁸. The videos can be accessed directly on the website. Deaf and hearing interpreters.
- The CIUSSS du Centre-Ouest-de-l'île-de-Montréal, in its *Accessibilité* section, provides a video in LSQ embedded in the page: *Où trouver le site web de MAB-Mackay*⁴⁹. Deaf interpreter.

⁴¹ <https://accessible.canada.ca/>

⁴² <https://accessible.canada.ca/resources/best-practices-accessibility-working-home>

⁴³ <https://www.canada.ca/en/employment-social-development/programs/planned-accessibility-legislation/consultation-legislation/asl.html>

⁴⁴ <https://www.canada.ca/en/treasury-board-secretariat/corporate/news/government-canada-launches-first-accessibility-strategy-with-asl-translation.html>

⁴⁵ <https://www.quebec.ca/en/health/health-issues/a-z/2019-coronavirus/people-with-disabilities-during-covid-19>

⁴⁶ <https://www.quebec.ca/en/health/health-issues/a-z/2019-coronavirus/self-care-guide-covid-19>

⁴⁷ <https://www.ciuiss-capitalenationale.gouv.qc.ca/sante-publique/coronavirus/lsg>

⁴⁸ <https://www.ciussca.com/covid-19-population/videos-pour-la-clientele-lsg/>

⁴⁹ <https://www.ciuisscentreouest.ca/accessibilite/>

On the Ottawa Public Health website, there is a page that gives COVID-related resources in English that contain content accessible in ASL⁵⁰. The videos are embedded in the page and most are not accompanied by text.

The website of the Société de l'assurance automobile du Québec (SAAQ) provides the phone number to call for LSQ and ASL, which uses Bell Relay service (the website states that you can access a “professional ASL or LSQ sign-language interpreter”). To access this service, in the “To Reach Us” section, click on “For the deaf and hard of hearing”⁵¹. There is no mention of Deaf people, and the SAAQ called their service “Sign-Language Services”⁵².

2.4.10 Municipal Websites

The websites of the cities of Montreal, Toronto, Quebec City, Ottawa and Vancouver have no information accessible in LSQ⁵³.

The City of Gatineau’s website contains content in LSQ in the *Universal Access*⁵⁴ section. Several videos in LSQ are embedded in the site, some of which translate textual content on the page while others appear alone.

Here are a few examples of city websites available in sign language elsewhere in the world:

- City of Meaux (France): the *Papiers et vie citoyenne* section contains a link to the *Vidéos: démarches administratives en LSF*⁵⁵ section, which contains 38 explanatory videos embedded in the page, without text.
- City of Vienna (Austria): the *ÖGS*⁵⁶ subsection of the Video section contains explanatory videos in Austrian sign language (Österreichische Gebärdensprache, ÖGS). They are embedded in the page and presented without context. They don’t seem to be integrated in the site.
 - The Vienna tourism website (www.wien.info) contains information available in several sign languages. In fact, the site is translated into several languages, among which the German, French and English versions lead to sections in sign languages (ASL and BSL are available on the English version of the site, LSF on the French version and ÖGS and German sign language [Deutsche Gebärdensprache, DGS] on the German version). The sign languages can be accessed through an icon in the menu bar at the top of the page.

⁵⁰ <https://www.ottawapublichealth.ca/en/public-health-topics/covid-19-resources-in-american-sign-language.aspx>

⁵¹ <https://saaq.gouv.qc.ca/en/reach-us>

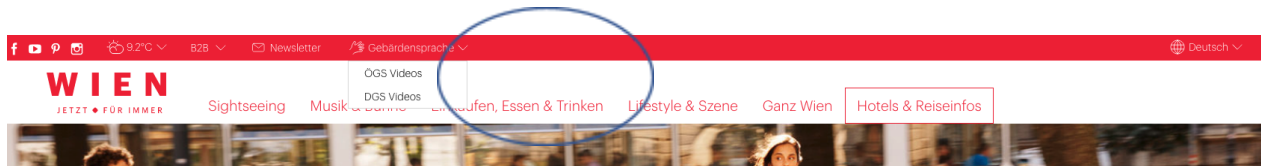
⁵² <https://saaq.gouv.qc.ca/nous-joindre/services-langage-gestuel>

⁵³ Montreal and Toronto have an *Elections* section with content available in sign languages. We will cover these in the *Elections* section later in this paper.

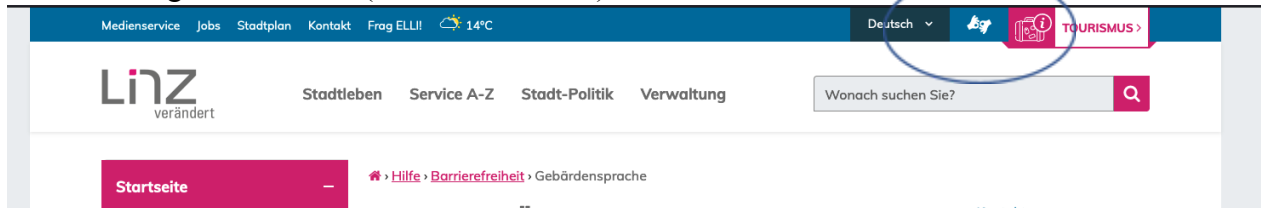
⁵⁴ https://www.gatineau.ca/portail/default.aspx?p=guichet_municipal/accessibilite_universelle&ref=haut-de-page

⁵⁵ <https://www.ville-meaux.fr/fr/mairie/papiers-et-vie-citoyenne/videos-demarches-administratives-en-langue-des-signes-francaise.html>

⁵⁶ <https://www.wien.gv.at/video/oegs/>



- City of Linz (Austria)⁵⁷: The website has versions in German and English. On the German version, a sign language icon leads to a page (also available through the site’s “barrierefreiheit” [accessibility] section) that presents a portion of the site made accessible through translations (embedded videos).



2.4.11 Election Information

The Elections Canada⁵⁸ website contains videos in LSQ (on the website’s French version) and ASL (on the English version of the website) providing information on procedures to follow during elections. However, the videos are not easy to find (they are available in the *Informational videos* subsection of the *Official election information* section) and are hosted on a YouTube channel⁵⁹. They discuss only concrete, general subjects such as working as a poll worker, deciding how to vote, etc. These videos are not available in the text sections that discuss the same topics.

The Élections Québec website contains a “Persons with disabilities” link that leads to a page with information for deaf and hard of hearing people, among others⁶⁰. This page contains a link to a page (“Adapted documents can be ordered”) where orders can be placed for a Voter’s Manual video on DVD in ASL.

We found a few municipal elections sites with information in sign language:

- City of Toronto: *Election videos*⁶¹ page: in the *Election/Learn More About City Elections/Election Education Resources/Election Videos* section: page containing a few videos in ASL, embedded in the page and without text. They are very hard to find on the site.

⁵⁷ <https://www.linz.at/>

⁵⁸ <https://www.elections.ca/accueil.aspx>

⁵⁹ https://www.youtube.com/results?search_query=federal+elections+canada+asl

⁶⁰ <https://www.electionsquebec.qc.ca/provinciales/fr/personnes-handicapees.php>

⁶¹ <https://www.toronto.ca/city-government/elections/city-elections/education-resources/election-videos/>

- The City of Montreal’s *Élections Montréal* website provides an accessible version of the Election Guide⁶² in LSQ (there is no version in ASL on the English version of the website). A YouTube link (also available in several languages [written, simplified written, audio and video]) brings you to the video, which is a translation by a deaf interpreter of the information in the guide. The guide can also be sent by mail and references to the LSQ version (and other languages) are provided.

In the United States, for the 2020 presidential election, the National Association of the Deaf (NAD) set up a web page to inform the public about the elections. The site contains a video in ASL of the most frequently asked questions about the elections, as well as a phone line in ASL (*Voter Hot Line*) to answer questions from deaf callers (NAD, 2020). The Secretaries of State of California and New Mexico also put information videos in ASL online concerning the steps to take to be eligible to vote:

- California: <https://www.sos.ca.gov/elections/voting-resources/voters-disabilities>
- New Mexico: <https://www.sos.state.nm.us/voting-and-elections/voter-information-portal/voters-with-disabilities/instructional-videos-on-voting-for-the-deaf-and-hard-of-hearing-asl/>

A new website, *SignVote*⁶³, was also created so that deaf people could get all the information they need to vote in an informed way. It also has a Facebook page containing several informative videos in ASL⁶⁴.

2.4.12 Information on the Census

On the Statistics Canada website, no video related to the 2021 census is available in LSQ. At the time of the 2021 census, it was possible to find a video of the short and a long-form version of the census questionnaire on the site. These videos are now available on Statistics Canada’s YouTube channel⁶⁵.

Germany’s census site⁶⁶ offers a version of the site in DGS that can be accessed via a button at the top of the page. It contains two sections, one offering information about the census (*Was is der Zensus?*) and the other about how the site works, each with an embedded video accompanied by the corresponding text.

The **Northern** Ireland census website contains a “Languages and accessibility” section which provides information in BSL and ISL (Irish Sign Language). The videos are embedded in the page, and not accompanied by text⁶⁷.

⁶² <https://elections.montreal.ca/en/election-guide/>

⁶³ Available here:

<https://signvote.org/?fbclid=IwAR1F7amELsiJa5opzob3HLH5jBsKS7cXtX76fYk40flwNpSOgvFFLOwKPGk>

⁶⁴ Available here: <https://www.facebook.com/SignVote>

⁶⁵ Available here: <https://www.youtube.com/channel/UCvfquhvHW5ffRamjLHdXDtQ>

For example, the video of the long-form questionnaire in LSQ is available here:

<https://www.youtube.com/watch?v=f9jfBT30IE4>

⁶⁶ https://www.zensus2022.de/DE/Service/Gebaerdensprache/gebaerdensprache_node.html

⁶⁷ <https://census.gov.uk/ni/help/languages-and-accessibility/accessibility/accessible-videos-with-bsl>

2.4.13 Public Transportation

We looked to see whether sign language was used in the transportation sector, train stations and airports. We found few mentions of it. We first found a few public transportation companies that mentioned being accessible for communications using VRS (in Canada) or a comparable system (as in the case with the O-Train [Ottawa], Amtrak [U.S.], the RATP [Paris] and the SNCF [France], among others).

The SNCF⁶⁸ mentions that it provides interpretation services in LSF and real-time speech transcription (TTRP) which makes phone communications accessible through a telephone platform of relay operators, LSF interpreters. The SNCF claims that this service can “enhance information access, fight a form of social exclusion and help hearing people improve their interactions with deaf people”. The service is offered in addition to its website (its accessibility) and as assistance in stations (situations in which a person would need to speak to a clerk).

In stations, the SNCF also offers translations into LSF of spoken messages on information screens through JADE, a virtual character (avatar)⁶⁹. The Gare de l’Est uses this virtual tool, which delivers structural messages and consists of a digital repertoire of about ten set sentences such as “Ladies and Gentlemen, we would like to remind you that smoking is not allowed in the station.” The same messages appear in writing on screen.

We did not find any public transportation websites in Quebec with content in sign language. However, it is worth noting the following:

- The VIA Rail website states the following: “By spring 2022, the home page and Accessibility section of our website will be more accessible for the deaf and hard of hearing communities, helping them to travel safely and autonomously.”
- The STM’s website indicates that the public meetings of the Board of Directors, which are webcast, can be interpreted into ASL or LSQ (depending on the person’s language) if a request is made 48 hours ahead of time⁷⁰.

2.4.14 Government and Municipal organizations

Here are a few examples of organization websites that include translations into ASL or LSQ:

- Canada Transportation Agency: the *Accessible transportation* section contains a few pages with videos in ASL (the French version in LSQ). The videos are embedded in the pages and are accompanied by text.
- Conseil des Arts de Montréal: a few explanatory videos in sign languages here and there on the website, in sections intended for deaf and hard of hearing people. In particular, there are videos in LSQ and ASL explaining the *Inclusive practices: Grants for artists*

⁶⁸ <https://www.sncf.com/fr>

⁶⁹ <https://www.accessibilite.sncf.com/la-lettre-de-l-accessibilite/lettres/2010/decembre-2010-no2/article/jade-des-mots-pleins-les-mains>

⁷⁰ <https://www.stm.info/en/about/corporate-governance/taking-part-boards-work>

who are D/deaf or have a disability⁷¹ program. The videos are embedded in the web page and feature a deaf interpreter.

- Canada Council for the Arts: In the *Accessibility* section, there is a link to a video in ASL summarizing the *Deaf and Disability Arts Strategy*, on YouTube⁷². The YouTube page of the Canada Council for the Arts contains several videos on the council, policies, reports and new website features, but that are not found on the site (i.e., in the relevant sections; for example, *About us* is a video in ASL in the playlist, but does not appear on the page that deals with this topic on the site). The site also contains a few videos dealing with projects or programs related to the deaf community, such as a page about a research report on deaf and disability arts practices in Canada⁷³.

2.4.15 Independent Organizations

Independent organizations whose websites contain information in LSQ or ASL are usually organizations serving the Deaf:

- Canadian Hearing Services⁷⁴: the website is available in two versions, English-ASL and French-LSQ. On the website, almost all sections are accompanied by a video in LSQ or ASL, available from a tab on the right-hand side of the page (a video then pops up in the centre of the page, over the text) or buttons between the sections of a page when there is a lot of content.
- SIVET⁷⁵: the website contains embedded videos in LSQ signed by deaf interpreters.
- Telus⁷⁶: in the *Accessibility* section of the site, there is a video in ASL entitled *Welcome to Telus*. The video is embedded in the page and features a deaf interpreter.
- Bell Canada: the website's *Accessibility Services Centre*⁷⁷ section contains two videos in ASL on Canadian wireless consumers' rights and internet customers' rights. They are embedded in the page and do not contain text.

3. Scientific Advances in Accessible Communications

Research into the development of talking gloves and avatars for sign languages has been underway for a few years. We will present a few of these research initiatives to provide an overview of technologies and tools that can be made available for the benefit of accessible communications now or in the near future.

In 1985, in the United States, a proposal was made to create a talking glove to facilitate communication between deaf-blind people and hearing people. When the project was finished, the talking glove was able to translate spelling and classifiers from ASL to English and to produce a message in English or Braille, thanks to an algorithm (Kramer, 1996).

⁷¹

<https://www.artsmontreal.org/en/news/2021-09-16/inclusive-practices-grant-for-artists-who-are-deaf-or-have-a-disability>

⁷² https://www.youtube.com/watch?v=TIMFwU6c6RY&list=PLjhCs-hRAvsG9XmVnD0edpt5O4qkqb_Wt

⁷³ <https://canadacouncil.ca/research/research-library/2021/02/deaf-and-disability-arts>

⁷⁴ <https://www.chs.ca/>

⁷⁵ <https://sivet.ca/>

⁷⁶ <https://www.telus.com/en/about/accessibility/welcome-to-telus-accessibility-video>

⁷⁷ https://www.bell.ca/Accessibility_services

In England, Bangham *et al.* (2000) created an avatar named *Simon-The-Signer*. However, the signer has to be present during the projection of the message to be interpreted for the avatar to be projected. The researchers appealed to deaf people to build a database (of vocabulary, of many target words and phrases) broad enough for the avatar to work. The data was collected by using motion sensors placed on the body, face, arms and hands of signers. To capture the position of the signers' fingers and reproduce them through the avatar, a glove equipped with sensors, the cyberglove, was used. The researchers used *Polhemus* magnetic sensors to record wrist, upper arm, head and upper torso movements. Facial expressions were captured by a camera and infrared light. This avatar followed the subtitles of a show, producing the message in signed English, with simultaneous interpretation and image. This project led to the development of an avatar working in post offices to answer the most frequently asked questions in BSL.

In 2006 in the United States, an animated humanoid projected onto a computer was created to make written information and communications accessible in ASL. The design incorporates a planning-based architecture that uses a 3D model to visualize how objects are arranged in a scene (Huenerfauth, 2006). This new technology enables text interpretation without needing to use an interpreter or linguistic mediator.

In France, in the aftermath of the Loi pour l'Égalité des droits et des chances, la participation et la citoyenneté des personnes handicapées, enacted on February 11, 2005, the signing avatar JADE was created (Segouat, 2008, cited in Paire-Ficout *et al.*, 2013). Researchers from the Laboratoire d'informatique pour la mécanique et les sciences de l'ingénieur (Limsi) of the Centre national de la recherche scientifique (CNRS), in collaboration with the company Websourd, designed, for the Société nationale des chemins de fer français (SNCF), software that generated statements in real-time through a signing avatar displayed on screens in train stations. The avatar translates spoken messages into LSF from a repertoire of about ten frequently used set phrases, such as: "Ladies and Gentlemen, we'd like to remind you that smoking is not allowed in the station" or "For your safety, the SNCF requests that you identify your luggage with your first and last name".

In Canada, Clin-Gordon (2012) proposed what she called an *avaglyph*, for LSQ. Her research focused on creating an avatar different from traditional avatars (which look real) in that it would have only the features necessary for the communication and clarity of the message. She was not interested in creating a translation system, but rather a system of representation: the body of the interpreter would be replaced by an avaglyph, a neutral shell to make the message visible. The features it would have were:

- The eyebrow lines, the lines below the eyes and the mouth, which were marked by illuminated dots;
- The hands, wearing gloves, and the forearms, covered with a membrane that would allow for gradations of light.

This would provide a streamlined representation of a signer, and therefore would make it possible to produce a message devoid of social clues such as the speaker's sex or ethnic origin, mode, etc., that would add noise to the communication. The fact that the avaglyph is based on the production of only one person allows it to deliver messages that are accurate and consistent. The goal of the

research study was to check to see whether this technology could be used for recorded messages to replace the productions of “embodied” interpreters in order to obtain content comparable to a written text. Using an avaglyph would eliminate visual noise and enhance concentration time when reading a signed document. In addition, this technology allows the deaf reader to use their imagination more like a hearing person reading a novel.

In Europe, different projects have recently received funding to meet the requirements of the Strategy for the Rights of Persons with Disabilities 2021-2030. Automatic language processing systems, which would allow deaf and hearing people to communicate more easily among themselves with the help of translation applications (from a sign language to a spoken language, from one sign language to another sign language, etc.) are under development. Three major projects are currently underway:

- The *SignON Project*⁷⁸: This project, with an EU grant extending from 2021 to 2023, is being developed across Europe. Its goal is to reduce the communication gap between spoken language speakers and sign language signers. It targets Irish, British, Dutch, Flemish and Spanish sign languages and English, Irish, Dutch and Spanish spoken and written languages.
- The *EASIER—Intelligent Automatic Sign Language Translation*⁷⁹ project: Developed by the University of Zurich’s Department of Computational Linguistics, this project aims to facilitate near-real-time and non-real-time (human-in-the-loop) communications. The project is being headed by experts in the technological sciences and humanities with the participation of deaf people. Seven sign languages (English, French, German, Swiss German, Dutch, Greek and Italian) will be translated into six corresponding oral languages.
- The *Rosetta*⁸⁰ project: this collaborative research and development project involves partners (SMEs, large businesses and research laboratories) working to implement technological solutions that will provide a representation in LSF of audiovisual content via animated virtual signing avatars. This project deals with areas such as automatic translation from French to LSF, the alignment of French captions and videos in LSF in the same video and the anonymization of animation through the use of avatars.

These research initiatives propose alternative or complementary solutions to what is already in practice in communications accessible in sign languages. However, the tools currently available are not accepted unanimously and have significant limitations that need to be recognized (World Federation of the Deaf, 2018). For example, automated, word-for-word translations do not provide a sign language message equivalent to a translation in sign language produced by an interpreter. For the time being, the deaf community is in favour of the use of avatars in situations where static, prerecorded information, validated by deaf people, is shared, but is against free translations, as the quality at this time is below par.

⁷⁸ <https://signon-project.eu/?cn-reloaded=1>

⁷⁹ <https://www.cl.uzh.ch/en/texttechnologies/research/accessibility/easier.html>

⁸⁰ <https://rosettaccess.fr/index.php/rosetta/>

4. Translator and Interpreter Training and Credentials in the Area of Accessible Communications

As mentioned above and demanded by many Deaf rights organizations, the ability to enjoy the services offered to the Canadian public depends on the availability of competent, professional interpreters. The professionalization of interpretation, which would justify training to practise the profession, a professional order, a code of ethics for all interpreters and a formal law to provide a legal framework for interpretation work, seems the obvious next step (Alley, 2016).

4.1 Credentials

In Canada, the Canadian Association of Sign Language Interpreters (CASLI) identifies associations of interpreters working in LSQ, ASL and ISL⁸¹ in most Canadian provinces. In Quebec, one association, the Association québécoise d'interprètes de langues des signes (AQILS), and one professional order, the Ordre des traducteurs, terminologues et interprètes du Québec (OTTIAQ), support and oversee the work of French-LSQ and English-ASL interpreters. These two organizations provide training to their members, as well as an ethics framework. However, a professional order has particular relevance when it comes to the protection of clients. Since one of the OTTIAQ's mandates is to protect clients, the reserved title of certified interpreter is granted only to interpreters who have been duly trained in ethics, professional conduct and standards of professional practice. An interpreter without proof of such training cannot receive the reserved title. However, no Quebec service provider requires this title and few clients of interpretation services are informed of the advantages of an interpreter certified by a professional order. For example, it is not necessary to be a member of the OTTIAQ to be able to pass the Translation Bureau's accreditation process to be a French-LSQ conference interpreter for the federal government (Translation Bureau, 2021). Apart from the great wealth that Canadian interpreters' associations represent, it would be worth exploring the professional order avenue and promoting communication between professional interpreters' orders and the deaf community. This could promote the development of standards of practice specific to the deaf community in an already tested and standardized professional structure. Sign language interpreters would be trained, evaluated and insured based on the same standards of quality as spoken language interpreters, while ensuring recognition of the community's contribution in the evaluation and training of interpreters.

In the United States, the mission of the Registry of Interpreters for the Deaf (RID) is similar to that of a professional order, namely:

- 1) to encourage the development and growth of the profession;
 - 2) to establish a national standard of quality for interpreters;
 - 3) to defend best interpretation practices;
 - 4) to defend professional development; and
 - 5) to educate the public on the role of interpreters and language mediators
- (Alley, 2016).

⁸¹ The list of associations affiliated with CASLI can be found on their website: <https://www.casli.ca/Affiliate-Chapters>

In Australia, the National Accreditation Authority for Translators and Interpreters (NAATI) has offered certification to receive accreditation as a certified conference, health and legal interpreter as well as accreditation for language mediators (*Certified Provisional Deaf Interpreters*) since 2021. In addition, since the 2019 bushfires and COVID-19, speeches must be interpreted by certified interpreters in Australia.

The Australian sign language interpreter's association (ASLIA) has developed training seminars dealing with interpreting in the media and the challenges encountered during emergency interpretation. It offers a guide, "Guidelines for Auslan Interpreting in Media Settings" (ASLIA, 2020; revised in 2021), in response to the COVID-19 pandemic and the increase in sign language interpreters on TV broadcasts. This simple, accessible tool contains guidelines for broadcasters, organizations and clients who book an interpreter, for interpretation service providers, as well as for interpreters themselves. It describes good and poor practices for organizing media interpretations (logistics, spatial, graphics, technological, human, etc.).

In Canada, the main organizations employing interpreters evaluate their employees themselves. This is the case with the federal government's Translation Bureau, which has interpreters pass an accreditation exam, and with Quebec's services régionaux d'interprétation (SRI), which evaluate its interpreters according to their competency level (junior, intermediate or senior). There is no external organization whose role it is to verify competencies as is the case for the RID in the United States.

Apart from the area of legal interpretation, there are also no particular field-specific certifications. Interpreters certified by the Translation Bureau or evaluated by SRIs in Quebec are deemed to be apt to interpret in all situations. Certification does not include criteria related to the accessibility of media content. For logistics and administrative reasons only, Translation Bureau interpreters who interpret for televised broadcasts are chosen from among a short list of certified interpreters.

However, even though there is no official accreditation process in Canada to train sign language interpreters for natural disaster situations, training has been developed by Debra Russell of the University of Alberta to provide deaf interpreters with the tools they need for state-of-emergency media announcements. In addition, the current pandemic led to an acceleration of the development of practice-based standards in each of the provinces. For example, before 2020, it was very rare to see a sign language interpreter on public media platforms. Prime Minister Justin Trudeau's COVID-19 press conferences were systematically interpreted, but this was not the case for the Quebec Premier's conferences. In Quebec, pressure on the government from the deaf community, the AQILS and SRIs resulted in the addition of interpretation to government COVID-19 press conferences as of March 19, 2020. Certain services decided to involve language mediators to promote ownership of content by the deaf community. SIVET was among these services, creating a precedent in Quebec. SIVET worked closely with the community to train mediators and interpreters for this particular type of work. This experience also gave rise to the development of an assessment specific to language mediators.

4.2 Training in Accessibility Matters

4.2.1 Canada

In Canada, several colleges and universities offer English-ASL programs and one university has a French-LSQ interpretation program. All of these programs have knowledge of ASL or LSQ as an admission requirement, which is verified through an admission test. Most of the programs have proficiency in ASL or LSQ as a graduation requirement.

- Sign Language Interpretation Diploma, 2 years, Douglas College, British Columbia;
- Sign Language Interpretation, 2 years, Lakeland College, Alberta;
- Bachelor of Arts in ASL-English Interpretation, Red River College and the University of Manitoba;
- Bachelor of Interpretation ASL-English, 4 years, George Brown College, Ontario;
- Major in French-LSQ Interpretation, 2 years, Université du Québec à Montréal, Quebec.

None of these programs offers training specific to accessibility to media communications or translation, but certain courses or content deal with technical, ethical or linguistic aspects essential to the interpretation of media communications:

- Remote interpretation;
- French-LSQ or English-ASL translation;
- Interpretation as, or with, a deaf language mediator⁸².

In addition, all of these programs train general interpreters and some also offer specialized content dealing with legal, educational or medical interpretation, among others. Note that courses dealing specifically with accessibility are offered in Deaf Studies programs rather than in interpretation programs⁸³.

Concerning training for interpreting on TV during emergency situations, Russell and McLaughlin (2018, p. 6) make a certain number of recommendations, such as:

- Free up resources to form a group of highly qualified and experienced deaf and hearing interpreters to deal with the experience of interpreting information in emergency or disaster situations.
- Training should be based on universal design principles so that interpreters from all provinces and territories can participate in, and benefit from, the training sessions.
- Training should specifically address representation strategies in ASL, prosodic structures and interpretation strategies to reach the broadest audience.
- Training should include how to use video media incorporated into a program so that the visual images support the interpretation.

⁸² Some associations and service providers, including SIVET in Montreal, have developed training programs and assessments for deaf language mediators.

⁸³ For example, the courses *Deaf Culture II: Community and Engagement* (CUTR 1020) and *Being an Ally* (CUTR 1022) of the *American Sign Language (ASL) Studies* program at Nova Scotia Community College.

- Put together a list of trained and experienced interpreters who are prepared to interpret programs live and share this list with radio broadcasters.
- Collaborate with radio broadcasters to develop a policy and procedure to immediately send for interpreters and captionists to work in the event of an emergency or disaster. This may involve entering into contracts with service providers so that there is no wait time between the contact with the interpreter and captionist and the request for approval to hire them.

These recommendations were made as the result of an exploratory study conducted with 9 experts in this area. Note that no LSQ expert was consulted and that it would be relevant to consider including the specific cultural and linguistic characteristics of the deaf community in Quebec in the development of future training in interpretation during emergency situations.

However, in 2017, the deaf population in Canada was surveyed to identify shortcomings in information accessibility during natural or human-generated disasters, as part of a project conducted by DLR Consulting for the Canadian Hearing Society (CHS) (Russell, McLaughlin and Denko, 2018). The consultation was carried out across Canada with:

- 213 deaf, hard of hearing and deaf-blind Canadians who answered a survey online (in French, English, LSQ or ASL);
- 52 deaf, hard of hearing and deaf-blind Canadians that took part in group interviews (a total of ten discussion groups took place in Edmonton, Halifax, Toronto, Vancouver, Montreal, Whitehorse, Edmundston and Saint John);
- 15 representatives of the community (deaf, hard of hearing and deaf-blind) or representatives of emergency management organizations who participated in individual interviews.

The results of this study led to the declaration of five priorities to promote information access in disaster situations (Russell, McLaughlin and Denko, 2018, p. 35):

1. **Strategic Planning Level:** Policy and guidelines within municipal, provincial, and federal government for accessible communication based on the use of captioning and sign language interpreters during live broadcasts of emergency information.
2. **Operational Planning Level:** Development of a website that can provide accessible information for ASL and LSQ users on how to prepare for a disaster, and offer current information for EMOs and broadcasters about the Deaf, hard of hearing and Deafblind communities.
3. **EMOs** [emergency management organizations]: Training to help EMOs understand how to effectively communicate with Deaf, hard of hearing and Deafblind people during an emergency.
4. **Broadcasters:** Development of protocols and practices to ensure captioning and interpretation is effective when provided for live broadcasts of emergency information.
5. **Interpreters:** Training on strategies and practices that can ensure interpretation is effective during live broadcasts of emergency information.

To ensure that information is properly conveyed, training has to be provided beforehand, not only for interpreters, but also for emergency management organizations and broadcasters.

4.2.2 The United States

In the United States, several ASL interpretation programs are offered, at the undergraduate and graduate levels. To measure ASL skills, the tests recognized by these programs are Gallaudet's American Sign Language Proficiency Interview (ASLPI) and the Sign Language Proficiency Interview (SLPI: ASL), based on the proficiency guidelines of the American Council on the Teaching of Foreign Languages (ACTFL).

Some programs, including the bachelor's program offered at Gallaudet University, require that students pass RID's National Interpreter Certification Knowledge written exam to graduate. When applying to masters programs, students must provide, among other things, a letter of recommendation that also mentions their ASL skills. Gallaudet University does not offer courses directly related to accessibility of media content or interpretation in emergency or social disaster situations.

However, certification is offered in Arizona for interpreters wanting to be trained to be an interpreter for disaster situations. The name of the program providing this certification is ERIC: Emergency Response Interpreter Credentialing. It offers a 3-day training program covering the Incident Command System, as well as content and vocabulary related to four types of natural disasters likely to occur in Arizona. It also includes practical training dealing with integrating into the emergency response team. The ERIC program was developed in collaboration with the Arizona Department of Emergency and Military Affairs (DEMA), the Arizona Department of Forestry and Fire Management (DFFM) and the Arizona Commission for the Deaf and the Hard of Hearing (ACDHH).

In California, the annual Disaster Response Interpreter (DRI)⁸⁴ training course is offered by the California Office of Access and Functional Needs, and the California Specialized Training Institute. This one-day course is intended for professional sign language interpreters who may be asked to provide interpretation services during or after a natural disaster. The training session deals with emergency response and recovery activities. The course also involves practising interpreting in press conference contexts, as well as interpreting in specific natural disaster situations (interpreting in shelters, for example). Participants have their fingerprints scanned digitally by the Department of Justice and, at the end of the workshop, they receive a disaster service worker badge.

4.2.3 Europe

Training for sign language interpreters in Europe is offered at university and mostly at the master's level. The goal is mainly to provide training for conference interpretation and some universities offer more specialized content, such as legal interpretation. In addition, even though the level of sign language proficiency expected of students varies at the time of admission, the

⁸⁴ <https://www.caloes.ca.gov/cal-oes-divisions/access-functional-needs/communication>.

level at graduation is mostly C1, and sometimes C2. There is a correlation between the desired proficiency level at admission and the number of language courses in the program. Lower levels of proficiency expected of students at admission mean more language courses offered. Some programs require level C1 or C2 as an admission criteria, but do not offer language courses. This is the case for the Master in Interpreting at the Université Catholique de Louvain.

In France, five universities have an LSF-French interpretation or interpretation and translation program at the graduate level (2-year master's program) and one of them also offers an undergraduate-level program in LSF translation and mediation (3-year bachelor's). All of these programs offer LSF courses and require applicants to provide proof of LSF skill level (previous training). Most programs also require an entrance exam based on the Common European Framework of Reference for Languages (CEFR) and the level required for admission is B1 (independent user). The LSF skill level required at the end of the programs is C1 (proficient user).

In Germany, three universities offer DGS interpretation programs. The levels required at admission vary, ranging from A1 to C2, but the exit requirement is C1 for the University of Cologne, and C2 for Hamburg University and Humboldt University in Berlin.

In Belgium, the Université Catholique de Louvain offers a Master in Interpreting (2-year program) and applicants must have an advanced Common European Framework of Reference (CEFR) level (C2+) and have perfect command of the language to be eligible for the program. Applicants have to take an admission test and provide proof of their level in LSF and no language courses are offered. This program prepares interpreters to practise at international conferences. Applicants also have to take an aptitude test during the first session, after a few weeks of courses. Université Saint-Louis-Bruxelles offers a 3-year Bachelor's Degree in Translation and Interpretation. No admission test or proof of level of competency in LSF is required, but language courses are offered.

In Spain, the University of Pompeu Fabra in Barcelona and Rey Juan Carlos University offer 4-year programs, the former offering a specialization in Catalan sign language (LSC) in their Translation and Interpretation undergraduate program and the latter in Spanish Sign Language and the Deaf Community. Both programs offer language courses and neither require an admission test or proof of sign language skill level and students can begin their programs with no knowledge of sign language. At Barcelona's University of Pompeu Fabra, students learn LSC from the basic, utilitarian level (A1), progressing to advanced independent level (C2) by the time they finish the program.

In Scotland, Heriot Watt University offers a full-time, four-year program entitled British Sign Language (Interpreting, Translating and Applied Language Studies). Students have to take courses in BSL to become proficient in the language. In the third year, students can choose from a full-time placement in the signing community in the U.K. or study abroad at one of Heriot Watt's partner universities. In their fourth year, students work with professional interpreters in real-life interpretation situations to gain work experience. In addition, all universities with BSL interpretation courses are affiliated with the National Register for Communication Professionals

Working with Deaf and Deafblind People (NRCPD) to ensure standardized academic content. For the program with a spoken language option, students have to do a year of immersion in their chosen European language and a year in the deaf community signing BSL. Queen Margaret University's continuing professional development program offers modules in sign language interpreting for interpreters with at least three years of experience, who are registered with the NRCPD. This is an online program and students can choose to complete either 60, 120 or 180 credits. The courses are given as modules and students can choose to take certain modules or combine several towards a postgraduate award.

In Ireland, Trinity College Dublin offers a 4-year Bachelor in Deaf Studies. Students take courses in Irish Sign Language (ISL). The first two years of the program focus on learning ISL, as well as its history, culture, community, etc. In the last two years, students can choose a major in ISL teaching or ISL interpretation.

4.2.4 Australia

Macquarie University in Sydney and the Royal Melbourne Institute of Technology (RMIT University) each offers an English-Auslan (Australian sign language) interpretation program. Applicants to Macquarie University must have NAATI certified provisional interpreter level accreditation in Auslan-English interpreting, which certifies that they have the minimum skills to be admitted to the program. At the end of the program, students can spend time at Northern Health Hospital to observe experienced interpreters. RMIT University also offers an Advanced Diploma of Interpreting, whose admission requirements are as follows:

- 1) Successful completion of Interpreting Skills for NAATI Certification, Translating Skills for NAATI Certification or Translating and Interpreting Skills for NAATI Certification, or;
- 2) NAATI certification at Certified Provisional Interpreter, Recognised Practicing Interpreter or Certified Translator level, or;
- 3) at least 2 years of documented work experience as an interpreter or a translator.

All interpretation exams in the programs simulate NAATI testing conditions.

4.2.5 Israel

Using the experience of deaf people during the period when missiles from the Gaza Strip targeted the civilian population in Southern Israel in 2009, the research work of Tannenbaum-Baruchi, Feder-Bubis, Adini and Aharonson-Daniel (2014) made a certain number of recommendations to ensure access to verbal commands and sirens during national emergencies:

1. The transmission of information must use a variety of channels to be accessible to a larger proportion of the deaf population.
2. New technology, such as cell phones, can be used to communicate risks and to give and receive information. It is important that technology includes light and vibration.

3. Translation into sign language on TV and the internet must be expanded, must use slow and simple language and must be on all transmissions during emergency situations.
4. Civil servants and people in direct contact with deaf persons during emergency situations must be familiarized with the basic aspects of deaf culture and means of communication with deaf people.

5 Conclusion

This review of the literature has presented the main factors to take into consideration with regard to the problem of accessibility to information in sign language. It has shown, on the one hand, that States have obligations with respect to accessibility and many exemplary practices and broadcasting standards exist, which can be drawn upon positively or negatively for accessible communication, whether to transmit information on an everyday basis or during a national crisis. This communication must be universal and lead to personal independence. Deaf and hard of hearing people should not, for example, have to take extra steps to gain access to information. They should not have to be made to choose between access via subtitles or sign language. With respect to interpreter training and credentials, the literature review has shown that there are very few programs that train interpreters in the concepts of accessibility, and none that include training in situations of national emergency (for example, pandemics, disasters, etc.). As a result of this literature review, we have developed the following recommendations for an exploration of the perceptions of deaf people in Canada with respect to communication standards universally accessible in sign languages:

1. Information should be automatically accessible in both sign languages.
2. Information should systematically be subtitled.
3. No access strategy (sign language and subtitles) should take precedence over another.
4. A Canada-wide protocol should be implemented for accessible communication in crisis situations. This protocol should target interpreters, deaf people and broadcasters.
5. Information in sign language should be communicated by a team consisting of a hearing and a deaf interpreter.
6. Training for deaf and hearing interpreters should include media (TV, internet, etc.) standards and practices in both everyday and crisis situations.
7. In each province, the bureau responsible for the protection of deaf people should work together with deaf community associations and interpreter training programs to develop material to disseminate information about standards for sign-language-accessible communication to ministries, public and parapublic organizations, broadcasters and citizens.

Lastly, it is important to note that, although Indigenous Sign Languages (ISLs) have been recognized since 2019 by the Accessible Canada Act as being among the primary sign languages, with LSQ and ASL, used by deaf communities in Canada, we did not find any information about ISLs on federal or provincial government websites.

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Appendix: Recap of Measures by European Union Institutions Concerning Inclusion and Accessibility

Organization	Laws, guidelines, legislation, etc.	Year	Objectives	
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<p>European Commission</p>	<p>Active Inclusion Recommendation Link</p>	<p>2008</p>	<p>“to develop a comprehensive strategy focusing on three aspects of social policy:</p> <ul style="list-style-type: none"> • adequate income support; • inclusive labour markets; • access to quality services; <p>with respect to inclusive labour markets in particular, to take practical measures in areas such as lifelong learning, in-work support, etc.”</p>	<p>Recommendation 3: “Ensure that active inclusion... (a) support the implementation... (b) promote gender equality... (c) take careful consideration of... disadvantages and the... various vulnerable groups... Source</p>
<p>European Commission</p>	<p>European Disability Strategy 2010-2020: a renewed commitment for a barrier-free Europe Link</p>	<p>2010</p>	<p>“The overall aim of this strategy is to empower people with disabilities so that they can benefit fully from participating in society and in the European economy, notably through the single market.”</p>	<p>Includes the main elements of Persons with Disabilities...</p>
<p>European Commission</p>	<p>The European Commission’s Social Investment Package Link</p>	<p>2013</p>	<p>“The Commission calls on the countries of the European Union (EU) to strengthen social investment. This is understood to mean building citizens’ capacities and supporting their participation in society and the labour market. These investments should benefit everyone, stimulate the economy and help the EU come out of the crisis stronger, more unified and more competitive.”</p>	<p>To recover from Eurozone... European Commission... economy and encourage... “WHO WOULD BENEFIT FROM STRENGTHENING SOCIAL INVESTMENT?... [...] • older people: possibilities for the economy for a longer period; • people with disabilities: creating workplaces; [...] “WHAT EXACTLY WOULD SOCIAL INVESTMENT MEAN?... • The EU proposes promoting citizens’ competencies to employment; • Resources should be allocated to ensure adequate and... • Social policies would focus on increasing productivity, improving health, helping poverty and exclusion... living.”</p>

<p>European Commission</p>	<p>Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the approximation of the laws, regulations and administrative provisions of the Member States as regards the accessibility requirements for products and services</p> <p>Link</p>	<p>2015</p>	<p>“The proposal aims to contribute to improving the proper functioning of the internal market and remove and prevent barriers for the free movement of accessible products and services.”</p>	
<p>European Parliament and the Council of the European Union</p>	<p>Accessibility of public sector websites and mobile apps</p> <p>Link 1</p> <p>Link 2</p>	<p>2016</p>	<p>“The establishment of a harmonized market for the accessibility of the websites and mobile applications of public sector bodies.”</p>	
<p>General Secretariat of the Council of the European Union (GSC)</p>	<p>Accessibility policy</p> <p>Link 1</p>	<p>2016</p>	<p>Make the GSC’s website as user-friendly as possible in accordance with the EU web accessibility directive.</p>	
<p>European Parliament and Council of the European Union</p>	<p>European Accessibility Act</p> <p>Link 1</p> <p>Link 2</p>	<p>2019</p>	<p>Directive that “aims to improve the functioning of the internal market for accessible products and services, by removing barriers created by divergent rules in Member States.”</p>	<p>“Directive on the approximation of the laws, regulations, administrative provisions and directives of the Member States relating to the accessibility requirements for products and services.”</p> <p>“This proposal is consistent with the European Disability Strategy 2010-2020 and the UN Convention on the Rights of Persons with Disabilities, which the EU and the Member States have signed and ratified.”</p> <p>“Persons with disabilities should be able to participate fully and on an equal basis with others in all aspects of life.”</p> <ul style="list-style-type: none"> ● more accessible products and services ● accessible products at affordable prices ● fewer barriers to employment and the open labour market ● more jobs available for persons with disabilities

				“covers products and being most important being most likely to h requirements across E
European Commission	Union of Equality: Strategy for the Rights of Persons with Disabilities 2021-2030 Link	March 2021	“improve by 2023 accessibility across its audiovisual communications and graphic design services as well as of its publications and events, including where relevant sign language interpretation and documents in ‘easy-to-read’ format.”	