Towards recommendations for TV sign language interpretation[1]

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Sign language interpreting (SLI) on TV is still in need of basic research to support video production guidelines, a complex matter given the variety of sign language styles and screen layouts adopted by international broadcasters. The current paper aims to draft recommendations regarding the formal parameters for displaying SLI on TV. First, it offers an overview of current SLI access services. Second, it proposes a set of variables to be further studied. Third, it reports on feedback gathered from stakeholders. The article concludes with a list of recommendations that may be applied by broadcasters offering SLI access services.

Key words: sign language interpreting, accessibility, deaf TV service users, media interpreting, audiovisual translation

1. Introduction

Sign language interpreting (SLI) on TV is one of the three major TV accessibility services, along with subtitling and audio description (e.g. European Parliament 2010a; European Parliament 2010b; European Parliament 2015; International Telecommunication Union [ITU] 2014a; Looms 2009). SLI access services need to improve both in terms of quantity and quality. On the one hand, affordability of the services should go beyond the amount of current broadcasting time (e.g. European Broadcasting Union [EBU] 2016; European Regulators Group for Audiovisual Media Accessibility [ERGA] 2016; Office of Communications [Ofcom] 2017; Haualand & Allen 2009). On the other hand, the quality of the SLI service may depend on various factors such as the language and interpreting skills of the interpreter, or the technical requirements impacting legibility of the signed content. "Television programmes […] may add layers of complexity by placing sign or text over the existing visual message. This creates interesting issues which are currently unresolved as to how to convey information with mixtures of signing, visual action, speech and text" (Kyle, Reilly, Allsop, Clark & Dury 2005: 57). Hence, the importance of studying which formal parameters and layouts affect on-screen sign language legibility and overall screen readability. Both legibility and readability may impact on service usability and, ultimately the service user experience.

Previous studies, mainly from the past EU funded project DTV4ALL, indicated that users prefer an inversion of the content priority where SLI has (visual) priority over the broadcast content as can be seen in Figure 1 (e.g. DTV4ALL 2008; Guttermuth 2011; Kyle,2007; Wehrmeyer 2014).

Figure 1 *SLI in the Danish broadcaster DR (reproduced from DTV4ALL 2008)*

While former research indicates that the screen layout shown in Figure 1 is the preferred format, these findings have not translated into standardised guidelines (e.g. Independent Television Commission [ITC] 2010; Esteban-Saiz 2017; National Disability Authority [NDA] 2014).

The overarching aim of the present paper is to identify the best SL on-screen presentation mode on TV. In order to identify which formal features could be recommended to include SLI on the screen, we have conducted a qualitative analysis of current SLI practice. First, we analysed the screen layouts adopted by 42 international broadcasters (section 2), to identify the variety of formal features that may occur. Second, we gathered feedback from stakeholders in Catalonia —SLI interpreters and deaf signing TV consumers— in order to evaluate the formal features identified in the previous phase and shortlist what features enhance user experience and usability (section 3). The hypothesis is that the preferred screen composite layout identified in previous research (see Figure 1), is influenced by the TV genre most widely available to deaf signing TV consumers, namely news broadcasts. Language information in news broadcasting is more relevant than visual information, especially when the regular newsreader is on the screen. This could explain why the interpreted sign language content is given a more prominent position than the broadcast content. Based on the findings from sections 2 and 3, section 4 offers a series of recommendations for the inclusion of SLI on TV broadcasts. Finally, discussion and conclusions are presented (section 5).

2. Data collection from broadcasters across 42 countries

The first stage of the research was to understand which formal features could impact the reception of SLI on TV. With this aim, screen layouts were collected from different international broadcasters, offering an overview of the formal features applied by broadcasters within and outside of the EU. The first data were collected from the online platform Sign Language Television for the Deaf.[2] This platform includes different accessible TV programmes from broadcasters in 42 countries. From this website 100 screen shots were retrieved with the aim to classify the many features and formats used when presenting sign-interpreted programmes on TV (Redón 2014). These data were analysed further, taking into account some of the common variable formal parameters and features previously described in

the literature (e.g. Gil-Sabroso & Utray 2016; Kyle, Reilly, Allsop, Clark & Dury 2005; Van der Graaf & Van der Ham 2003). The selected parameters were: SL on-screen presentation mode (Table 1), shot size (Table 2), interpreter's clothing colour (Table 3), interpreter's on-screen size (Table 4),[3] interpreter's location on the screen (Table 5). Tables 1–5 present the different categories analysed for each parameter.

Picture-in-picture box	49%
Split screen	27%
Chroma key (silhouette)	24%

Table 1 *SL on-screen presentation modes*

Long shot (LS)	30%
Medium long shot (MLS)	7%
Mid shot (MS)	49%
Medium close-up (MCU)	14%

Table 2 *Shot size*

Plain light-colour	14%
Plain dark-colour	62%
Patterned	24%

Table 3 *Interpreter's clothing colour*

Small	24%
Medium	44%
Large	32%

Table 4 *Interpreter's on-screen size*

	Bottom	Centre	Top
Right	40%	21%	3%
Left	17%	19%	0%

Table 5 *Interpreter's location on the screen*

The collected data analysis shows a great deal of variation among different broadcasters. It also shows an incongruity between the screen layouts adopted by broadcasters, and the user preferred option as shown in Figure 1. From the data collected in Redón (2014) the stereotyped format of SLI is a female interpreter, wearing plain dark-colour clothes, filmed in a mid-shot and shown in a medium-sized frame placed in the bottom right-hand corner of the screen. Figure 2 illustrates this common format.

Figure 2 *Common format of SLI on TV derived from the data analysed*

The typical layout (Figure 2) versus the one preferred by viewers (Figure 1) differ largely. The most common layout features a medium sized picture-in-picture frame, showing a medium-sized mid-shot of the interpreter, either side-by-side or overlaying on the news content. This contrasts with the one preferred by viewers: a prominent interpreter in a foreground position inserted in a layer in front of the broadcast news content, with mid-long shot, occupying a third of the screen width (e.g. DTV4ALL 2008; Kyle 2007; Wehrmeyer 2014). These differences affect the prominence of the interpreter in both the relative size and the on-screen presentation mode.

Variation in screen layout is not only found among broadcasters from different countries within and outside the EU (EBU 2016) but also sometimes within the same broadcaster. A second data collection process was designed in order to discuss the observed variation and understand which of the described formal parameters and features are perceived

to affect legibility of the SLI on the screen the most. Information was gathered from two groups directly involved in sign language production and reception on TV: sign language interpreting professionals who currently work or have worked on TV and signing deaf people. For each group a different qualitative data collection method was designed and developed.

3. Collecting data from service providers: TV sign language interpreters

Sign language communities are a minority group. They include not only signing deaf people but also their families and the professionals who take an active role in their cultural and linguistic daily life (e.g. De Meulder, Krausneker, Turner & Conama 2018; Harris, Holmes, & Mertens 2009). Before SLI studies became part of mainstream education programmes, sign language interpreters were normally signing hearing children of deaf parents. Even today some professionals are CODAs (Children of Deaf Adults) or their relatives (Bontempo 2015). In Catalonia (7.5 million citizens) there are some 25,000 Catalan Sign Language (*Llengua de Signes Catalana*, LSC) users, out of which 6,000 are deaf or deafblind (Cabeza & Porteiro 2010).

3.1. Professional interpreters' interviews: Method

We interviewed TV sign language interpreters to collect qualitative data. Sign language interpreters can both provide professional first-hand information and report specific feedback from their Deaf consumers. This method was chosen to allow interaction with professionals on the pre-selected format features.

3.1.1. Participants

Currently there are ten professional TV sign language interpreters in Catalonia working for both local and national broadcasters. These ten professionals were contacted through the Association of Sign Language Interpreters and Guide-Interpreters of Catalonia (*Associació d'Intèrprets de Llengua de Signes i Guies-Intèrpret de Catalunya*, ACILS),[4] and the Catalan Federation of Deaf People (*Federació de Persones Sordes de Catalunya*, FESOCA).[5]All potential participants were contacted either by phone or email.

Finally, a total of 12 professionals (9 female and 3 male) agreed to participate in the research, including nine active professionals and three professionals no longer working for TV. The median age of the participants was 38 (ages raging from 30 to 46). All participants were certified interpreters. Six participants who received their qualifications after 2000 had a level 5 diploma in sign language interpreting and guide-interpreting. The other six participants had other qualifications and accreditations (four of them were CODAs). All the interpreters had at least 3 years of work experience on TV. On average, interpreters had 4 years of prior professional experience in different settings, other than TV.

3.1.2. Materials

During the interview a personal computer was used to take notes and display a selection of screenshots collected from the online platform Sign Language Television for the Deaf. The semi-structured interviews were designed in five sections: 1) personal and professional information, 2) professional experience with TV interpreting, 3) formal aspects

of on-screen presentation (including screen-shots when available), 4) feedback from Deaf consumers regarding the formal aspects of SL on-screen presentation, and 5) open questions about other professional and formal aspects not asked in previous sections. Sections 1 to 4 consisted of a series of pre-determined, open-response questions that all interviewees answered in the same order.

3.1.3. Procedure

Prior to the interviews, a written questionnaire including the demographic information and outline of the pre-determined sections of the interview was sent to all participants. Respondents were asked to send screen-shots of their professional work in TV interpreting, if available. The preferred method of carrying out the interviews was face to face. Interviews were held in both public and private locations according to the interviewees' preferences to facilitate participation. Due to geographic distance and personal availability, one interview was conducted via video call and two via phone call. Due to time constraints one phone call participant did not finish all five sections. They were completed a few days later and sent via email. The interviews lasted from one to up to three hours. No participant was excluded.

All interviews started with sections 1 to 4. In section 3, if the professionals could not provide a screen-shot demonstrating their own on-screen presentation mode, they were asked to describe it, paying special attention to all the formal features. After the interview participants browsed the different screenshots collected from the online platform Sign Language Television for the Deaf. This was aimed to elicit further comments on formal features of SLI insertion. After the interview, the notes were sent via email to each participant to check their content. This in-depth qualitative research was carried out over a period of two months.

3.2. Professional interpreters' interviews: Results

Interview results show that both professional interpreters and deaf TV consumers agree that the most important formal aspect of SL on-screen presentation is size —provided that other more basic technical requirements are met (e.g. lighting technique). The perception of the interpreter's on-screen size mainly depends on two formal features: the size of the picture-in-picture box and the shot size. Although some broadcasters have an online feedback service, it is rarely used by consumers to make suggestions or complaints. According to the public Catalan Corporation of Audiovisual Media (*Corporació catalana de mitjans audiovisuals*, CCMA) Accessibility and Audience Feedback Services, only 6 people asked about the sign language service between 2015 and 2018 and none made reference to formal requirements (CCMA, personal communication, April 2, 2019). According to the information obtained in the interviews, deaf TV consumers provide their feedback more frequently by direct contact with the TV sign language interpreters via personal and informal ways. When discussing user feedback, interpreters mention that deaf consumers mostly complain about the interpreter's box being too small. Whenever the box is enlarged, user feedback is always positive. Interpreters also note that shot size also influences the overall size perception. Feedback from the consumers points to a medium long shot as the preferred format. That is just a bit shorter than a knee shot, with some space above the head to allow signs in that region to be clearly seen.

However, interpreters working on TV sometimes need to adapt. When the picture-in-picture box is too small interpreters ask the cameramen for a shorter shot for greater hand

visibility. Even though a mid-shot imposes restrictions on the signing space, it is always preferable to a longer shot because the latter makes hand size look even smaller. During the interviews, interpreters mentioned that they always tackle these technical issues during their TV assignments, while broadcasters are generally unaware of them.

Background colour was the second most frequently mentioned formal feature of SL on-screen presentation, and the feedback varies greatly. The reported colours ranged from plain white to grey, orange, all shades of blue and black, or even dotted or patterned backgrounds. This formal variation is due to personal aesthetic choices as to which colours match or contrast with the general on-screen setup of a given TV programme. SL on-screen legibility partly depends on the contrast between the background and the colour of the interpreter's skin and clothing. The right colour combination may contribute to the attractiveness and the visibility of the language presentation (World Wide Web Consortium [W3C] 2016). The interpreters also reported that service users mention that an unsuitable colour of the background not only affects legibility but may also result in eye fatigue. As for the colour of clothing, SL interpreters in Catalonia tend to wear plain dark clothes, and in formal assignments black is always preferred over alternatives. All interpreters currently working on TV said they wear black clothes and mentioned that users tend to accept this as part of their uniform. Most users complaining about colour contrast would rather change the background colour than the clothing colour.

The last formal feature is speed. This feature was not in our original list, but was brought up by professionals in their interviews as one of the most powerful factors in successful communication. Most TV interpreters work on news programmes and speech rate tends to be higher than normal speech rate. According to Serrat-Manén (2011) CCMA news interpreted into sign language show a rate of 2.8 words per second, which is very fast compared to signing news produced by deaf people at Gallaudet University in Washington DC (between 1.4 and 1.8 words per second). Professionals found it difficult to convey every single word. Common interpreting strategies to compensate for a high-speed rate are to paraphrase, compress or omit some information such as transitions between news or greetings (see Isal 2015 for an analysis of sports news reports broadcast by the CCMA). Also reported by interpreters are reading difficulties when finger-spelling names, especially for uncommon longer names in foreign languages. An interesting solution reported was to buffer TV reception to allow for personalised speed. It is worth mentioning that apart from a few exceptions all TV interpreters have worked in news broadcasting, and only three in other TV genres. One has also worked on a children's show at CCMA and the two Catalan professionals working for the Spanish commercial TV channel *La Sexta* have also interpreted some films.

Both interpreters at *La Sexta* also mentioned negative feedback from deaf users about the interaction between subtitles and the interpreter's box. In *La Sexta* subtitling, interpreting, and the digital on-screen graphics share the same bottom-of-the-screen area. From time to time these different layers of information overlap. Consumers suggested that the interpreter's box and subtitles should be displayed in different parts of the screen.

There was general agreement that the most frequent end-user feedback is on language features and content rather than on formal aspects. Interpreters are commonly contacted about the use of regional dialectal signs or neologisms, as well as regarding the general linguistic skills and performance of the interpreter (either to praise them or to suggest improvements).

4. Collecting data from service users: signing deaf TV consumers

According to the European Broadcasting Union (EBU) report on accessibility services, public European broadcasters deliver sign language on 4% of programmes on average (e.g. EBU 2016; ERGA 2016). Although sign languages are under-represented in mainstream media, deaf signers are expert users of TV accessibility services and have an opinion. To determine key formal features and their hierarchy, it is important to gather their views. To this aim a focus group study was designed as the primary qualitative data collection method.

4.1. Focus group with deaf users: Method

In order to raise interest in the topic within the Catalan Sign Language community, we contacted the National Federation of Deaf People of Catalonia (FESOCA). Contacts were also made by participating in the 5th Catalan Sign Language Seminar (Barcelona 2014), which is a social and scientific event organised especially for LSC teachers and other members of the Sign Language community in Catalonia. In this event we were invited to give a 40-minute presentation about the HBB4ALL project. Regarding the sign language pilot study, we presented the data included in section 2. After the presentation, many deaf people showed interest and were willing to share their opinions with us. We also recorded a recruitment video message in LSC asking for collaboration in a focus group to discuss the formal aspects of on-screen sign language presentation. FESOCA sent the video message to all the local associations, the majority of signing deaf people associations in Catalonia. The local associations then forwarded the information to their members.

4.1.1. Participants

The recruitment video message had 184 views and a total of 13 users contacted to participate. A total of 8 participants (7 female and 1 male) took part across 2 sessions. The participant median age was 43. The first session grouped older deaf people (with a participant median age of 63, ages ranging 50-72) whereas the second gathered younger users (with a participant median age of 23, ages ranging 22-38). This distribution was accidental, as users chose either session voluntarily.

All participants were deaf people from the Barcelona region. They all had either or both attended a deaf education center and were active members of a local deaf association. All were profoundly deaf, either congenitally deaf or deaf before the age of 3. They all reported LSC as their first language. Three of the participants were born to signing deaf families and 5 were born to hearing families, one of which reported the occasional use of sign language within the family.

In regard to TV and choice of access services, they all reported having viewed both subtitled and interpreted TV content when available. All but one of the participants mentioned they like to use both access services. Three participants reported to have watched interpreted content within 24 hours prior to the focus group session.

4.1.2. Materials

The focus group sessions were conducted in a meeting room in Casa del Mar, a public venue close to a deaf high school in Barcelona used to host Catalan Sign Language community events. The room was equipped with an overhead projector, a screen and a

desktop computer. During the focus group sessions screenshots and video clips were displayed showing different screen formats and on-screen presentation setups.

The participants were placed at two different tables arranged in a V shape facing the screen and the interviewer. Three cameras were used to record each session. Apart from the researcher two other people were present: a research assistant and cameraperson, both fluent signers. Three written forms were administered: an informed consent form, an image release form, and a questionnaire. To fill in the relevant forms and complete the last task of the session there were pens, paper, coloured pencils, and crayons. The questionnaire had two parts: the first part was designed to collect demographic information including hearing status, language use and social participation in the Sign Language community. The second part of the questionnaire gathered information about the habits of the participants as TV and access service consumers.

4.1.3. Procedure

LSC was the language of communication throughout the focus group discussion. At the beginning of the session the participants were welcomed and informed about the procedure and expected duration of the session. The three written information and consent forms were handed out. Both the researcher and the sign language research assistant helped to translate and answered questions about the content of the forms when needed. The aim of the focus group sessions was to discuss all the formal features of on-screen interpreting previously described in the initial data collection phase (see section 2) and those discussed in the interviews with the SLI professionals (see section 3). The results from the interviews were the starting point for the group discussion.

After collecting the completed forms, the group discussion began. From the beginning of the sessions it was stressed that the goal of the focus group study was to discuss the formal features affecting sign-interpreted broadcasts, as opposed to the interpreting and language skills of the SLI professionals.

Both focus group sessions followed a structured outline and made use of the same input materials. The session was organised in seven sections designed to provoke discussion on two topics: the formal features of SLI presentation on broadcast news, and different TV programme genres.

To focus the discussion, previous research within the HBB4ALL project was presented. The features of SL on-screen presentation researched as part of the first data collection process were summarised. Then four video clips (approximately ten seconds each) were shown to illustrate different on-screen presentation setups used by the Catalan or Spanish broadcasters. The third section introduced the results from the interpreter interviews. The following sections aimed to introduce other formal features not previously discussed and not analysed with the previous data collection methods. To wrap up this first part of the session, ten screen shots showing a wide variety of formal characteristics of SL on-screen presentation were selected and displayed. They illustrated several setups of the formal features under discussion and elicited new feature discussion. The participants were encouraged to come up with other formal features, not previously described. The final section was oriented towards rating the formal features from the most to the least important for accessibility. To close the session the participants were asked to draw two TV screens on DIN-A4 white paper and depict the best and the worst screen layouts.

After each session we took notes to summarise the main issues discussed. The videos recorded during the sessions were edited to show all participants simultaneously using

picture-in-picture. The relevant parts of the videos were transcribed using glosses for further analysis.

4.2. Focus group with deaf users: Results

The results from the focus group sessions with end-users are consistent with the feedback reported by the interpreters. All participants considered the interpreter's on-screen size to be the most important factor influencing accessibility. Most agreed that approximately a third of a vertically split screen and the use of MS/MLS would be the most suitable setup in this regard. Participants also agreed that different types of TV genres should use different SL presentation modes, utilising different formal features. They acknowledged that the only type of TV programme that they could access regularly in LSC was news broadcasts, and they would need more experience and time to find the best setup for other TV genres. Regarding size, for example, most mentioned that for films or TV series they would prefer a smaller interpreter. They also mentioned the possibility of adjusting clothes and colours according to the target audience and content. Some suggested that for interviews, or some reality shows, more than one interpreter could be used in different parts of the screen to match speaker location.

Deaf users also considered colour contrast to be one of the most important features. However, they did consider the possibility of interpreters wearing colours other than black, as a way to prevent eye-fatigue and provide colour contrast. The participants also mentioned the need to be consistent in the future if colours and the interpreter dress code matched the type of programs and their targeted audience. The suggested colours for the interpreter clothing showed a wide range of preferences including: light, dark, bright, and the classic black. They all seemed to prefer plain colours with no patterns. There was no consensus regarding the background colour beyond the expectation that it should contrast with clothing and skin colour. This was suggested as a means of highlighting linguistic details and preventing eye-fatigue. Regarding the colour contrast and the on-screen presentation mode, most participants considered that embedding the interpreter in a framed picture-in-picture box, rather than using chroma key technology, was a better way to guarantee contrast. Some participants mentioned that the contrast between the interpreter's box and the screen should also be considered.

Deaf consumers also discussed the overlaying (or even overlapping) of subtitling and the digital on-screen graphic with the interpreter's box on the screen. They all agreed overlapping should be avoided. Given that subtitles are displayed at the bottom of the screen most participants agreed that the sign language interpreter's box should be placed midway along the vertical axis. However, while there was no consensus regarding the right/left location, the participants agreed that the position parameter affected the overall screen readability. Interestingly, some said it was more comfortable to start by viewing the sign language on the right and then continue reading the subtitles whereas others argued the opposite.

When asked about the speed of delivery, most did not feel it was a feature that could be altered and would not elaborate further on this. They seemed to accept that news is delivered at a rapid pace of speech and that it is the interpreter's job to keep up with it, regardless of the challenges posed. They did point out that having the option to slow down the speed would make the content accessible for more people.

All the other features such as: gender, age, appearance or position, were considered irrelevant to accessibility. However, both groups agreed that certain aesthetics are important to appear on TV and always stressed the importance of interpreting skills, and cultural background. Further results and comments that arose during the focus group sessions are included in the next section as recommendations.

5. Recommendations for sign language on-screen presentation on TV

In addition to the commonly agreed criteria mentioned in sections 3.2 and 4.2, in both sets of interviews additional criteria were proposed. The provisional recommendations for SLI broadcast we suggest in this section combine our findings from the qualitative studies with previous guidelines for including a sign language in the video stream or in other multimedia content access services (for guidelines on TV see Centro de Normalización de la Lengua de Signos Española [CNLSE] 2017; ITC 2010; ITU 2014b; NDA 2014; Ofcom,2015, 2017; for web-accessibility metrics see W3C 2016; for signing video books see Pyfers 2000; for video interpreting see Ryan & Skinner 2015; and for hardware and software see Oliver, Martín & Utray 2009). Finally, the recommendations on size and position of the interpreter on the screen are partially supported by the results from experimental tests using eye-tracking and recall measures (Bosch-Baliarda, Soler-Vilageliu & Orero, 2020).

5.1. Signer Filming

Lighting is crucial for sign language articulators to be clearly seen with no shadows or dark parts on or around the signer. It is especially important to control the signing space, the shot size and the eye-line. The signing space is the area in front of the signer, and is used to articulate all the signs. This is very important because sign language is a three-dimensional language using different active articulators: in the head, torso and arms including face, lips, tongue and eyes, shoulders and arms, hands and fingers (Pyfers 2000). All these body articulators should be in shot at all times. Another important issue is that the signing space may vary from language to language, signer to signer, or even within different registers.

When filming the signer:

a. Check the lighting
b. When framing the shot: check the size of the signing space with the signer
c. Use a medium long shot to film the signer
d. When framing the signer: leave some room above the signer’s head and on both sides
e. Use an eye-level camera angle with the signers’ head at the level of the focus
f. Use a frontal or a semi-profile shot
g. Maintain the shot

Additionally:

h. Avoid shadows on or around the signer
i. Avoid long shots or close-ups
j. Avoid cut-offs
k. Avoid using different shot sizes
l. Avoid high and low camera angles

5.2. Interaction with the visuals and screen layout

On-screen sign language implies the presentation of a visual language through the visual medium. One of the key concepts to bear in mind is split or divided attention. Deaf signers need to attend to both the signed input and the visual medium broadcasting visual content. Not only promoting positive interaction with on-screen visual information, but also avoiding negative interaction is fundamental to screen readability. The signer creates a positive interaction when the signed discourse is related to the visual information on screen. This is performed by pointing to the visuals or incorporating the visual properties of the objects on the screen into the signed discourse. On the other hand, negative interaction is created whenever blockages or obstructions occur. On some occasions, visual information blocks the signer, such as: digital on-screen graphics, on screen text or subtitles. A fundamental requirement is to avoid obstructing the interpreter's facial expressions or hand-shapes. On other occasions, it is the signer who blocks, completely or partially, other on-screen visual information.

When designing the screen layout:

a. Facilitate positive interaction between the signer and the on-screen visual information

b. Provide the interpreter with all additional visual information prior to the interpreting/translation service (i.e. clips, graphics, tables)

c. Let the signer know where the visual information will appear on the screen prior to the interpreting/translation service (i.e. presenters, interviewers/interviewees, clips, graphics, tables)

d. Allow time to attend to all the visual information on the screen

Additionally:

e. Avoid any visual, on-screen information blocking the signer

f. Avoid the signer blocking any of the visual information on the screen

g. Avoid overlapping of the interpreter's box, when using picture-in-picture or chroma key technology

5.3. Colour combination

Colour contrast and combination are important to grant accessibility of sign language on screen. Three different aspects can impact colour interactions: background colour, the colour of the signer's clothes, and the signer skin colour. The colour combination can affect perception, legibility, and thus accessibility. Negative colour interactions can produce eye fatigue. Colour contrast and combinations have an even greater impact on accessibility for deaf-blind users. Deaf-blind people who typically use sign language services are congenitally deaf people who have acquired blindness later on in life; often they are not completely blind but have low vision, different eye conditions or are partially sighted.

Regarding colours:

a. Provide the signer with clothes that contrast with their skin colour

b. Provide the signer with one-colour plain clothes with no patterns

c. Use a plain, patternless background for the signer that contrasts with the signers skin

d. Use a dark blue plain background to grant accessibility to the deaf-blind users

Additionally:

e. Avoid multi-coloured or patterned clothes
f. Avoid multi-coloured or patterned background
g. Avoid dark spots or shadows on or around the signer

5.4. Shape and size of the sign language on screen

Deaf signers normally mention the size of the signer as the most important feature affecting legibility. It is important for older and deaf-blind users. The size and shape of the signer also reflect and affect the language status on broadcast media. The recommended minimum size established in earlier guidelines for picture-in-picture interpreters was at least one-sixth of the picture area, roughly 1/3 of the screen width, based mostly on news broadcast (e.g. ITC 2010; Ofcom 2015). However, this might not be optimal for other TV genres (Bosch-Baliarda, Soler-Vilageliu & Orero, 2020).

Regarding size and shape:
a. Present a "human-sized" signer
b. Use a rectangular-shaped signer's box, when using picture-in-picture technology
c. Provide a box at least 1/4 of the width of the screen
Additionally:
d. Avoid miniaturised signers
e. Avoid using circular or egg-shaped boxes when using picture-in-picture technology

5.5. Position of the sign language interpreter on screen

The on-screen position of the interpreter is determined in terms of left and right along the horizontal axis, and top, central, and bottom along the vertical axis. The most common location is bottom-right. However, it seems there could be cultural differences or learning effects regarding side preferences. Whereas British (Ofcom 2015), Spanish (Gil-Sabroso & Utray 2016) and German deaf viewers (HBB4ALL 2017) prefer the signer to be placed screen-right, Catalan deaf viewers did not show a clear preference when it comes to the horizontal location of the interpreter. Similarly, Van der Graaf & Van der Ham (2003) showed that Dutch deaf viewers preferred the screen-right position (coinciding with the common broadcast format) but considered the screen-left area appropriate too. Results from the experimental reception tests indicate that left position might enhance overall readability (Bosch-Baliarda, Soler-Vilageliu & Orero, 2020).

On the vertical axis, central positions seem to facilitate reading the different visuals on the screen and to allow positive interaction with the subtitles. Position choice made by broadcasters is dictated by design criteria rather than accessibility criteria.

News broadcasting is the genre commonly chosen by broadcasters for signing services. The screen layout for news broadcasting includes the visual information, the hearing newsreader and the sign language newsreader or interpreter. Eye-tracking studies have shown deaf people do not pay attention to the hearing newsreader (e.g. Gutermuth 2011; Wehrmeyer 2013; 2014), but rather concentrate on the signer and sometimes attend to the main visual information on the screen.

Regarding the screen position:
a. Use a central position along the vertical axis of the screen to present the sign language

b. Contact your national association of the deaf to know if they have any preference in regard to the positioning of the interpreter along the horizontal axis (screen-right or screen-left area).
c. Choose preferably the screen-left position and use it throughout your broadcast programs
d. Place the visuals between the signer and the news presenter
Additionally:
e. Avoid top and bottom positions
f. Avoid using different positions for different programs
g. Avoid placing the newsreader between the visual information and the signer

5.6. Recruitment of sign language professionals

It is important that broadcasters hire qualified and experienced interpreters, who have worked in a variety of interpreting settings, and have been exposed to different sign language users, so they can adjust to a wide range of registers, according to the programs and target audiences. Moreover, media interpreters need to be highly skilled interpreters. They should have native-command of the national sign language of the country and they should also have up-to-date knowledge of neologisms and terminology of current events. They have to be suitably trained for TV interpreting, that is, they should be familiar with using a teleprompter, signing in front of the camera and having no feedback from users. These are some characteristics that novice interpreters might not be equipped with.

Recruiting sign language interpreters (including both deaf and hearing):
a. Contact the national association to learn about the sign language qualifications and training in your country
b. Hire only qualified, accredited or registered interpreters
c. Hire signers with native-command of their national sign language(s)
d. Hire experienced interpreters
e. Hire highly skilled interpreters
f. Offer training for signers and interpreters (media technologies)
g. Always ask for expert advice when casting or recruiting new signers/interpreters

5.7. Preparation time and materials

Service preparation time is crucial to ensure interpreting quality in the visual media. The interpreter should have time to prepare for the task prior to the actual interpretation. During this preparation time, the relevant visual materials should be provided: the script, the step outline and/or the video clips that will be used in the program. Sign language is a visual language and the interpreter should interact positively with the visual media.

Before the sign language interpreting/translation service:
a. Provide all the audio-visual materials (clips, graphics, etc.)
b. Provide the script or step-outline
c. Allow sufficient time for preparation
Additionally:
d. Avoid introducing new visual materials without letting the signer know
e. Avoid hiring the signer only for the time of the assignment

6. Discussion and conclusion

Our findings suggest that both target groups consider the interpreter's size and speed of delivery the two most important formal features determining accessibility. These findings are consistent with previous research on other sign languages. For sign language users size and speed are as important as the linguistic content, and the interpreter's linguistic and interpreting skills (e.g. Steiner 1998; Wehrmeyer 2013; 2014; Xiao & Li 2013 as cited in Wehrmeyer 2014). Findings from the focus group study also suggest that the minimum size of the interpreter or the interpreter's box should be at least one-fourth of the total screen width regardless of the TV genre, which is relatively large for an embedded image. Previous guidelines suggested a minimum size of at least one-sixth of the picture area and were mainly based on news broadcasts (e.g. ITC 2010, Ofcom 2017). However, deaf SLI service users agreed that a larger image of the signer such as those described as the preferred setup in earlier literature would be appropriate for news broadcasts but not for other programme genres (as reported in section 4.2).

Another finding in our study is that miniaturised interpreters not only negatively affect accessibility but also the language's social status. Furthermore, adoption of smaller image sizes might have a negative impact on the TV providers' reputation within the Sign Language Community. Deaf signing TV consumers seem to assume it is a strategy used by broadcasters to comply with accessibility policies without providing actual access. Hence, customisation of the image size seems to be one of the formal parameters to be prioritised in future practice.

Regarding the position of the interpreter or the interpreter's box on the screen, our findings show a greater variation. Previous literature suggests that users preferred a right-hand-side position (e.g. DTV4ALL 2008; Gil-Sabroso & Utray 2016; Kyle 2007; Ofcom 2015; Van der Graaf & Van der Ham 2003; Whermeyer 2014). However, the results from the focus group study show that users either preferred a left position or considered the horizontal location of the interpreter irrelevant to the accessibility of the service. However, experimental tests using eye-tracking and memory measures indicate that significantly better results are achieved with screen layouts featuring the interpreter on the left and at a medium size (Bosch-Baliarda, Soler-Vilageliu & Orero, 2020).

In any case, both individual and cultural differences may exist due to a learning effect. Since the Catalan national broadcaster is currently deploying this access service using a left-central on-screen position, Catalan deaf signers may have been influenced by their TV consumption habits. This contrasts with the interpreted content broadcasts in Spanish Sign Language or LSE (also available to Catalan deaf signers): According to Gil-Sabroso & Utray (2016), 90% of the interpreted broadcasts in LSE implement a bottom-right location. Regarding the vertical position, users also commented that they preferred a more central position to avoid negative interaction with the subtitles. Although studying the interaction between subtitling and signing was clearly not our goal, we observed that deaf users exploit both access services in many different ways according to availability, literacy skills, TV genre and personal preferences (e.g. Bernabé & Orero 2019; Gaerts, Cesar & Bulterman 2008; Kurz & Mikulasek 2004).

In a similar unforeseen way, participants in both sets of interviews and focus groups pointed out that broadcasters deploying sign-interpreted content tend not to have sufficient knowledge about the Sign Language Community as a language minority. According to the

participants, some broadcasters still think that subtitling can grant full accessibility to all deaf people, regardless of their primary language of communication and thus think that SLI provision is redundant or unnecessary (see Neves 2007 for a discussion on the divide between subtitling and sign language on TV). Additionally, lack of awareness of the peculiarities of the sign language modality sometimes leads to misconceptions and prejudices that can affect sign language representation on the screen. More specifically, interpreters report that broadcasters are not familiar with the professional role of the SLI or the existing technical guidelines regarding on-screen presentation of SLI. This unawareness can impact negatively on the quality of the service and might explain why it is still not widely adopted.

The results of our research are preliminary. This initial probing of the current practice is a first step towards further investigation into the issues of sign language interpreting and its TV presentation. The main limitation of our findings is the number of participants, which is quite low, as with most research in Media Accessibility (Orero et al. 2018). Our tentative recommendations should be further validated by more experimental research methods, like the ones used in studying size and position.

Given the new ways of customising accessibility services on TV (Mas & Orero 2018), there are various areas of research worth pursuing, including viewers' preferences regarding sign language presentation depending on the TV genre, the implementation of formal features or interaction between different accessibility services. We are at an important time since legislation, research and technology are joining forces to guarantee equal access to media. The social and personal inclusion rights should be equal across groups of disabilities, and that includes deaf TV consumers who are Sign Language Community members.

Endnotes

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2 http://signlangtv.org/

3 The following scale is used: small - less than 1/4 of the screen width; medium - between 1/4 and 1/3 of the screen width; large - more than 1/3 of the screen width.

4 http://www.acils.org

5 http://www.fesoca.org

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