

Irene TOR-CARROGGIO

Universitat Autònoma de Barcelona. Spain. irene.tor@uab.cat

Dr. Sara ROVIRA-ESTEVA

Universitat Autònoma de Barcelona. Spain. sara.rovira@uab.cat

Broadcasting and Accessibility Services Currently Offered for Deaf and Hard of Hearing Viewers by Catalan-language Broadcasters

Comunicación audiovisual y servicios de accesibilidad ofrecidos por las televisiones que emiten en catalán para las personas con pérdida de audición

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Abstract

This article presents the main results of a user-centered study which seeks to provide an overview of accessibility services for the deaf and hard of hearing on offer from a representative sample of Catalan-language broadcasters. The study had three objectives. First, to analyze the type of accessibility services offered, basically captions and Catalan Sign Language interpreting, both in linear broadcasts and video-on-demand services. Second, to determine the volume of accessibility services offered and to what extent they comply with the law. Finally, to assess users' experience, focusing on their level of satisfaction with the current offer and on their opinions with regard to new possibilities that could lead to improving accessibility services. Combining a qualitative and quantitative approach has enabled us to triangulate data to afford not only a holistic picture of the situation, but also to suggest actions for improvement.

Keywords

Media accessibility; captioning for the deaf and hard of hearing; Catalan Sign Language interpreting; Catalan-language broadcasters; avatar; automatic captions; broadcasting

Resumen

Este artículo presenta los resultados principales de un estudio centrado en el usuario que pretende radiografiar los servicios de accesibilidad para las personas con pérdida de audición ofrecidos por una muestra representativa de televisiones que emiten en catalán. Dicho estudio se centra en tres objetivos. En primer lugar, analizar, tanto en emisiones lineales como en el servicio a la carta, el tipo de servicios de accesibilidad ofrecidos, básicamente subtítulos e interpretación en lengua de signos catalana. En segundo lugar, determinar el volumen de servicios de accesibilidad ofrecidos y su cumplimiento con lo que la ley prevé. Finalmente, evaluar la experiencia de los usuarios centrándonos en la satisfacción con la oferta actual y sus opiniones en cuanto a nuevas posibilidades que podrían contribuir a mejorar los servicios de accesibilidad. La combinación de métodos cuantitativos y cualitativos nos ha permitido triangular la información para ofrecer una radiografía holística de la situación y sugerir acciones de mejora.

Palabras clave

Accesibilidad en los medios de comunicación; subtítulos para sordos; interpretación en lengua de signos catalana; televisiones que emiten en catalán; avatar; subtítulos automáticos; comunicación audiovisual

1. Introduction

Access to communication is a right recognized by the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), which Spain ratified in 2007. Since then, Spain has strived to make TV accessible for everyone, however there are still many challenges to be met.

Televisió de Catalunya (TVC) was the first broadcaster in Spain to offer a film with captions via teletext in 1990 (Pereira-Rodríguez, 2005; Matamala & Orero, 2008: 302). Their next target was to offer live captioning, which was carried out following the BBC model and possible due to a subsidy granted by the Catalan Department of Social Welfare. The first program to include live captions was the evening news and not long after that other Spanish public TV stations such as Euskal Telebista and Televisión de Galicia followed suit ^[1]. From then on, TVC has successfully incorporated various accessibility services and is considered an example to follow within Spain. Its achievements cannot be divorced from digital technology, which has furnished accessibility with new potential, such as bitmap captions (Matamala & Orero, 2008: 304). TVC has also participated in several EU-funded projects -such as Hbb4All, EasyTV and ImAc^[2], whose aim is to grant access to the media for persons with disabilities by making the most of the potential of the newest technologies. One of TVC's most recent achievements is to offer programs that are interpreted into Catalan Sign Language (CSL) in a separate section in their video-on-demand (VoD) service so that they are easier to find.

Unfortunately, not all Spanish broadcasters have taken sufficient measures to cater to the needs of persons with hearing or visual impairments, let alone those broadcasting in Spain's other official (and minority) languages, such as Catalan, Basque and Galician. Pereira-Rodríguez (2005) analyzed the state of the art of captions in Spain and found out that the main broadcaster in Galicia -namely, Televisión de Galicia (TVG)- was not offering this accessibility service. More than a decade later, Martínez-Lorenzo (2018) carried out a study which showed that TVG still fails to comply with the existing Spanish legislation that specifies media accessibility requirements.

This article presents the results of a study which attempts to offer an overview of the current situation of accessibility services for the deaf and hard of hearing offered by Catalan-language broadcasters. It works from three objectives. Firstly, to analyze the type of accessibility services offered, basically captions and CSL interpreting ^[3], both in linear broadcasts and video-on-demand services (VoD). Secondly, to determine the volume of accessibility services offered and to what degree they comply with the law. Finally, to assess user experience, focusing on their level of satisfaction with the broadcasters from the sample that currently offer accessible content and on their opinions regarding new possibilities that could make available a wider range of accessibility services.

The article is divided into four sections. The first sets out the methodology followed and the legal context of media accessibility in Europe, Spain, the Balearic Islands and Catalonia. The second section examines the state of the art of the sensory accessibility services offered by a sample of seven Catalan-language broadcasters. The third presents the results of a survey conducted with TV viewers with hearing loss and some of the comments made by the respondents. The final section summarizes the conclusions and puts forward some proposals for improvements.

With this paper we hope to contribute to greater understanding and social awareness of the current situation, and we also hope our results can help broadcasters alleviate the need for media accessibility more accurately.

1.1. Methodology

A detailed analysis of the current offer provided a representative sample of television channels which broadcast in Catalan. From within the Autonomous Region of Catalonia the following were chosen from the public broadcasters: betevé, Radiotelevisión Española (RTVE) and Televisió de Catalunya (TVC); while the private broadcasters included: Televisió de Girona (Girona TV), 8tv and El Punt Avui TV. IB3 Televisió, from the Balearic Islands and not part of the Autonomous Region of Catalonia, was added as it also broadcasts in Catalan and because it has a special channel (IB3 Global) that can be viewed in Catalonia. À. Media, from the Valencian Autonomous Region, was initially considered, but later dropped because it still had not begun broadcasting. So, the final sample included a total of seven public and private broadcasting companies which have either national, regional or local coverage.

TVC offers different channels in Catalan comprising TV3, 33, Súper3, 3/24 and Esport3. All of these have been included in the analysis. RTVE is a Spanish national broadcaster and as such also a special case because, in addition to Spanish, it broadcasts some programs in Catalan given its status as one of the official languages of Spain.

To analyze the type of accessibility services offered, both linear and non-linear broadcasts were studied. The assessment of the accessibility services in linear TV consisted of watching a sample of eight channels from the five broadcasters already offering accessibility services: a total of 18 different programs and 70 different broadcasts. The non-linear broadcasts were studied via the broadcasters' VoD service available on their websites and applications for smartphones and tablets (when available): a total of seven broadcasters, eight channels, 62 different programs and 170 broadcasts. Also, in order to confirm and expand on our findings, the heads of the accessibility departments were contacted to arrange an interview. El Punt Avui TV and 8tv declined, as they do not offer any accessibility services and felt they would not be of any help. Those who agreed to be interviewed were: Rosa Vallverdú, Head of Accessibility at Televisió de Catalunya; Jordi Colom, Technology and Innovation Director of betevé; Àlex Martí, Director of Televisió de Girona; Joan Carles Martorell, Director of IB3 Televisió; and Francisco Armero, Director of Broadcasts and Accessibility of Radiotelevisión Española. As regards the quantification of accessible content, this was possible thanks to the data provided by the broadcasters themselves, which was then contrasted with the law that applies to each case, either national or regional.

To assess user experience, two questionnaires were designed: one for the oralist hearing-impaired viewers and the other for the signing hearing-impaired, which was provided with CSL interpretation through a video recording of the questions. They were both designed in Google Forms. Before administering them, the questionnaires were approved by our university's Ethics Committee. Once piloted, the surveys were distributed with the help of user associations that kindly contacted their members and asked them to answer the surveys. We obtained valid responses from 20 signing hearing-impaired informants and 21 oralist hearing-impaired informants, and the results were analyzed statistically using IBM SPSS (version 22). For the user satisfaction section, Wilcoxon signed-ranks tests were carried out, whereas contingency tables with a chi square test were applied for the section dealing with new alternatives to provide more accessible content. The significance threshold was set at 0.05.

1.2. Legal background

Although it does not directly address the issue of accessibility, the Universal Declaration of Linguistic Rights defends the right to "receive equitable and nondiscriminatory treatment in the communications media throughout the world" (UNESCO, 1996: 11). Proclaimed in Barcelona in 1996, this declaration serves as a tool to demand a fairer and non-discriminatory treatment of sign languages in the media.

As previously stated, access to communication is a right recognized by the UNCPRD, which was ratified by Spain in 2007 with the optional protocol of Porto, and in 2010 by the European Union. Following adherence to the UNCPRD, the EU -including Spain- has taken measures to grant access to the media for persons with functional diversity. These measures generally take the shape of legislative texts that stress the need to raise social awareness regarding media accessibility and set the foundations to increase quantity of sensory accessibility services offered by broadcasters to guarantee universal access. The following subsections provide more data about the specific legal texts issued in each case.

1.2.1. The European Union (EU)

The EU has launched different initiatives with the aim of guaranteeing and enforcing the rights of persons with disabilities, such as the Audiovisual Media Services Directive of 2010, which states that:

The right of persons with a disability and of the elderly to participate and be integrated in the social and cultural life of the Union is inextricably linked to the provision of accessible audiovisual media services. The means to achieve accessibility should include, but need not be limited to, sign language, subtitling, audio-description and easily understandable menu navigation (Directive 2010/13/EU of the European Parliament and of the Council, 2010: 6).

Article 7 of the same directive states that "Member States shall encourage media service providers under their jurisdiction to ensure that their services are gradually made accessible to persons with a visual or hearing disability" (Directive 2010/13/EU of the European Parliament and of the Council, 2010: 15). A proposal to amend this directive was presented in 2016, which no longer addressed accessibility issues. In April 2018, after an intense negotiation process, the European Parliament and the Council reached an informal agreement on how the Directive 2010/13 would be amended. Although this text still needs to be approved by the Council and then in a plenary session by the European Parliament, the new content will include concrete regulations on audiovisual media services which will ensure that media services providers make audiovisual services continuously and progressively more accessible for persons with disabilities.

The latest action by the EU on accessibility issues dates from 2016, with the approval of the Directive on the Accessibility of the Websites and Mobile Applications of Public Sector Bodies, which excludes public broadcasters from complying with it. Despite this, the European Accessibility Act, issued by the European Commission in 2015, does require broadcasters to make their websites accessible. Its main objective is to establish accessibility requirements for a wide range of products and services, including broadcasting services. It attempts to minimize existing and potential differences between Member States as they implement the accessibility requirements of the UNCRPD. The final approval of the European Accessibility Act has been repeatedly postponed, but it was expected towards the end of 2018.

1.2.2. Spain

The integration of persons with disabilities and the acknowledgement of their rights are mentioned in Article 49 of the Spanish Constitution:

The public authorities shall carry out a policy of preventive care, treatment, rehabilitation and integration of the physically, sensorially and mentally handicapped by giving them the specialized care they require, and affording them special protection for the enjoyment of the rights granted by this Part to all citizens (Spanish Constitution, 1978).

Similarly, there is also some legislation on media accessibility both at national and regional level. For Spain this takes the form of the General Law 7/2010, of March 2010, on Audiovisual Communication, which specifies the percentage of TV programs that must incorporate captions as well as the number of hours of audio description and sign language interpreting that must be broadcast weekly up to 2013. The minimum requirements vary depending on whether the broadcaster is public or private, as summarized in table 1.

Table 1. Legal requirements for Spanish public and private broadcasters

Years	2010		2011		2012		2013	
	Public	Private	Public	Private	Public	Private	Public	Private
Kind of broadcaster								
Captioning	25%	25%	50%	45%	75%	65%	90%	75%
Sign language interpreting	1 h	0.5 h	3 h	1 h	7 h	1.5 h	10 h	2 h
Audio description	1 h	0.5 h	3 h	1 h	7 h	1.5 h	10 h	2 h

Source: Ley 7/2010, de 31 de marzo, General de la Comunicación Audiovisual

Orero (2007: 38) and Díaz-Cintas (2010: 163) showed that the draft of this law provided for minimum requirements up until 2015. Unfortunately, the initial plans changed and the volume of accessible content that must be met currently is the same as that of 2013.

1.2.3. Catalonia

In Catalonia, accessibility issues are addressed in its Law 13/2014, of October 2014, on Accessibility, the preamble of which declares that ^[4]:

The importance of promoting accessibility as a tool to enforce the principle of citizen equality first took shape in Catalonia through Decree 100/1984, of April 10, on the Suppression of Architectural Barriers. Seven years later, the Catalan Parliament passed Law 20/1991, of 25 November, on the Promotion of Accessibility and the Suppression of Architectural Barriers, and later the Catalan Government passed Decree 135/1995, of March 24, which developed the aforementioned Law and authorized drawing up the Accessibility Code. These regulations laid the foundations for removing architectural and communication barriers, and for promoting technical aids to improve the quality of life and the autonomy of persons with disabilities or with reduced mobility. This regulation has brought about an important breakthrough for Catalonia. Despite the number of years it has been in force, there are still persons with physical, sensory, intellectual or mental disabilities, elderly persons or persons with other types of functional diversity that experience situations of inequality of opportunities, discrimination and difficulties participating socially, as well as exercising their rights, due to the existence of physical, communicative and attitudinal barriers (Llei 13/2014, del 30 d'octubre, Accessibilitat, 2014).

Article 26 of the above-mentioned law clearly states that broadcasters need to grant access to information in the following terms: "audiovisual media has to gradually incorporate audio description, subtitling and sign language systems in order to make programs accessible" (ibid.). Article 33 adds that, "public

administrations and public service providers have to facilitate access to information, especially the most relevant, for persons with sensory impairments through systems and means that combine aural, tactile and visual communication" (ibid.). This law also recognizes CSL as the mother tongue of both Catalan signing hearing-impaired and blind and deaf persons, although the Statute of Autonomy of Catalonia and Law 17/2010 on CSL already did so (Serrat & Fernández-Viader, 2013: 181). Notwithstanding, this law was subject to an implementation plan that is still pending.

The Catalan Audiovisual Council also drafted the Agreement 19/2013 in 2013 ^[5], which came into effect the same year. Its aim is to ensure TV content is accessible by gradually incorporating captions, CSL interpreting and audio description. This agreement is heavily influenced by the Spanish General Law on Audiovisual Communication because the broadcasters have the same obligations in terms of volume in both cases. The novelty of this agreement is that it specifies what kind of programs are subject to the accessibility requirements, namely feature films, short films, documentaries, news programs, debates, sports broadcasts, TV series and other content that the current technology provides accessibility for (Gil & Utray, 2016).

1.2.4. The Balearic Islands

Since IB3 TV has been included in the sample, the Balearic legislation mandates in terms of media accessibility also need to be taken into account. Law 15/2010 regulates the public broadcaster of the Balearic Islands and, among its main objectives one is designed to "guarantee that persons with disabilities can access effectively the content broadcast" (Llei 15/2010, de 22 de desembre, de l'Ens públic de Radiotelevisió de les Illes Balears, Article 4). Article 26 also highlights that the public broadcaster of this autonomous region has to, "meet the demands of persons with hearing disabilities (...) as well as the ones from persons with other types of disabilities, the elderly, children, young persons and also other groups that need special attention" (ibid.).

Also, the Balearic Audiovisual Law 5/2013 recognizes universal access to audiovisual communication for persons with visual and hearing disabilities and specifies the volume of accessible content these persons have the right to request. This law is the result of the Balearic authorities adapting their legislation to the Spanish General Law 7/2010, of March 2010, on Audiovisual Communication so that this autonomous region can develop the competences it has in this field (Blanquer, 2015: 130). Unlike the national law, it does not distinguish public broadcasters from private and it stipulates that autonomic TV stations are required to caption 75% of their programs and offer at least three hours of sign language interpreting and audio description every week. Local broadcasters are also encouraged to follow these established parameters.

Given that IB3 TV currently broadcasts in more than one autonomous region (in the Balearic Islands and now also in Catalonia), it must comply with the Spanish General Law 7/2010, of March 2010, on Audiovisual Communication, at least in Catalonia, which is the region from which its contents have been viewed.

2. State of the art in Catalan-language broadcasters

In this section the results of the investigation into each of the broadcasters from the sample will be presented. As stated earlier, this study looked at which of the selected broadcasters offer captions and CSL interpreting. The volume of their accessible content will also be presented, as well as the broadcasters' compliance with current legislation dealing with media accessibility.

2.1. 8tv

8tv does not offer any accessibility services at all, which means that they do not comply with the Spanish General Law 7/2010, of March 2010, on Audiovisual Communication. This law applies in the case of the Spanish autonomic private broadcasters. At this point it is not possible to comment on their future plans to allow for media accessibility as they declined to be interviewed.

2.2. Betevé

Betevé, which is Barcelona's local TV, is one of the few broadcasters that offers captions and sign language interpreting. These are actually the only accessibility services provided so far. Regarding captioning, this broadcaster took inspiration from TVC and implemented the same system to guarantee caption

interoperability, which has allowed betevé to have access to TVC's accessible content through the Federation of Autonomous Radio and Television Broadcasters (FORTA), just like IB3 TV.

Betevé offers the news with captions daily at 8 p.m. through teletext, but they are working on modernizing this method. They currently segment the news script and show the chunks as the program moves forward. This allows them to offer economical and simple captions. As for fiction, it offers captions through the teletext for those movies that have been previously broadcast on TV3 (channel belonging to TVC). From Monday to Friday, betevé also broadcasts the morning news at 8.55 a.m. through the terrestrial digital television (TDT) in CSL, which are later shared in their social media. This broadcaster also offers the opening address for the Barcelona Mercè Festival with CSL interpreting through the TDT and the Internet. As summarized in table 2, we can see that the volume of accessible content produced is insufficient to comply with Catalan Law 13/2014, of October 2014, on Accessibility, the law this local broadcaster should abide by.

Table 2. Overview of betevé accessibility services

Accessibility Service	Volume	Complies with the Law?
Percentage of programs with captions	1.2%	No
Hours/week of programs with CSL interpreting	0.4 h ^[6]	No

Source: Personal communication with J. Colom (2018)

2.3. El Punt Avui TV

El Punt Avui TV does not offer any accessibility service. As in the case of 8tv, this broadcaster does not comply with the Spanish General Law 7/2010, of March 2010, on Audiovisual Communication, which applies to private autonomic broadcasters. They also declined to be interviewed and likewise we have no information concerning their future plans for including accessibility.

2.4. IB3 TV

IB3 TV offers captions and sign language interpreting. The sign language used in the Balearic Islands is neither Spanish Sign Language nor CSL, but Balearic Sign Language, which experts claim is understandable for CSL users as well. IB3 TV captions all its news programs (at midday, in the evening, at the weekends and their rebroadcasts), 80% of the movies they broadcast and some prerecorded programs. During the course of the research we discovered that the captions IB3 TV was offering were not available to viewers in Catalonia, which was reported back to the broadcaster and is currently working on a solution. IB3 TV broadcasts the parliamentary session every Tuesday and the annual Ramon Llull Awards with sign language interpreting. As table 3 summarizes, the volumes of accessible content produced are insufficient to comply with the Balearic legislation mentioned, let alone the Spanish General Law 7/2010, of March 2010, on Audiovisual Communication, which is stricter.

Table 3. Overview of IB3 TV accessibility services

Accessibility Service	Volume	Complies with the Law?
Percentage of programs with captions	24.3%	No
Hours/week of programs with CSL interpreting	2 h/week ^[7]	No

Source: Personal communication with J.C. Martorell (2018)

2.5. Radiotelevisión Española (RTVE)

RTVE does not offer any accessibility services in Catalan, although it does offer captions, sign language interpreting and even audio description in Spanish. Given the focus of this study, these services were not analyzed or quantified. The lack of accessible content in Catalan is not the only problem RTVE has to deal with. As Quintanas (2017) reveals, the amount of accessible content in Spanish provided by RTVE as a whole also fails to comply with the Spanish General Law 7/2010, of March 2010, on Audiovisual Communication, which is the law that applies in this case ^[8].

2.6. Televisió de Catalunya (TVC)

TVC is the most complete broadcaster because it is the one that offers the widest range of sensory accessibility services, namely, audio description, audio subtitles, CSL interpreting and captions. Regarding the accessibility services for persons with hearing loss, sign language interpreting is offered in the midday and evening newscast from Monday to Friday. These time slots seem to be much more appropriate and convenient than those provided by other Spanish broadcasters, which tend to offer signed language interpreted programs very early in the morning or, in the majority of cases, very late at night (Gil & Utray, 2016). As in the case of betevé and IB3 TV, this service is essentially restricted to news programs, which is the type of TV program deaf persons prefer to be interpreted into sign language according to the study carried out by Gil & Utray (2016). They also found out that Spanish broadcasters offering Spanish Sign Language interpreting offer this service in other types of programs (such as entertainment), but this does not happen in the Catalan-language broadcasters covered in this study. In contrast, captions can be found in almost every program, with some exceptions, such as music and sports programs. This is the reason why TVC's channel Esport 3 barely offers any captioned content. Besides the wide availability of captions in the rest of its channels, there are five different types according to the genre of the program: captions on a deferred basis (for programs that are available with enough time before the broadcast); as-live captions (for programs that are available some time before the broadcast and the captions of which can be corrected, completed or edited live, such as the news); not previously prepared live captions (for instance, the weather forecast, football matches, etc.); live captions with literal transcription (for example, electoral debates, interviews, etc.); and VoD captions. TVC is currently working on incorporating captioning to live Internet broadcasts, which was expected by 2018.

This broadcaster has to comply with the Spanish General Law 7/2010, of March 2010, on Audiovisual Communication but it does not, based on the data provided for all of its channels (see table 4).

Table 4. Overview of Televisió de Catalunya accessibility services (2017)

Accessibility Service	Volume	Complies with the Law?
Percentage of programs with captions	ES3: 30,7% 3/24: 70,75% TV3: 85,76% CS3/33: 96,6%	Depending on the channel
Hours/week of programs with CSL interpreting	3/24: 9 h/week	No

Source: Personal communication with R. Vallverdú (2018)

2.7. Girona TV

Girona TV does not offer any accessible content, and so does not comply with the law. However, they did carry out a pilot project some years ago in collaboration with Girona's Deaf Persons Association, aimed at offering a news program in CSL. The project was comparable to the content offered in www.webvisual.tv, the first European digital TV in sign language that offers news related to the deaf world in sign language (Serrat & Fernández-Viader, 2013: 181). The problem for Girona TV were the high costs, which they could not afford: while willing to bear the technical costs, such as production, recording or editing, they needed the user association to pay for the CSL interpreter. The user association did not agree to this proposal on the grounds that such a program would not only benefit its members, but also other persons. Àlex Martí, Girona TV's Director, claimed that he is still interested in finding user associations willing to share costs, but also stressed that it needs to be understood that small private broadcasters face many difficulties to make ends meet. Another interesting fact is that some years ago they tried to produce automatic captions, but they were not satisfied with the quality. The interviewee also acknowledged that nobody insists on them producing accessible content, but this does not mean that they disregard the issue as they are very aware of the need to offer accessible programs.

3. Results of the questionnaires distributed among deaf and hearing-impaired users

The questionnaires were primarily designed to examine the informants' satisfaction with both the captions and the sign language interpreting offered by the three broadcasters that currently offer accessible content in Catalan, i.e., betevé, IB3 TV and TVC. However, IB3 TV was not included in this comparative study for three main reasons: (a) its captions are still not available in Catalonia; (b) the sign language spoken in that region is not exactly the same as CSL, and (c) it only offers sign language interpreting once a week, while the other two broadcasters provide this on a daily basis. A further consideration in the

questionnaire design was to find out whether users would accept non-professional services that would allow a wider availability of accessible content.

The profile of the signing hearing-impaired informants was as follows. Out of the 20 oralist informants, 55% were women, 35% men, while 10% of declined to answer the question regarding gender. The average age was 45.7. 50% of the informants stated that the highest educational level achieved was vocational training, 25% stated they had studied an undergraduate degree, while the rest had a varied educational background. The two main mother tongues of the informants were CSL (75%) and Spanish (60%) and this question allowed respondents to enter either or both options [9]. As for their hearing impairment, 55% suffered from congenital hearing loss, 45% had an acquired hearing impairment. 80% suffered from profound hearing loss, 15% had severe hearing loss and 5% moderate hearing loss.

The oralist hearing-impaired informants had a different profile. 61.9% were women, whilst 38.1% were men. The average age was 37.5. Almost half of the informants had an undergraduate degree (47.6%), 28.6% had undergone vocational training and 19% had a PhD. The rest had a varied educational background. When asked about their mother tongue, Spanish and Catalan were the two options which ranked highest (both with 57.1%). This question allowed respondents to choose either of both options. 52.1% of the informants suffered from an acquired hearing impairment, whilst 42.9% reported having congenital hearing loss. Regarding hearing impairment, 28.6% of the respondents suffered from moderate and profound hearing loss, 14.3% had mild hearing loss and 19% claimed to have a severe hearing impairment.

3.1. User satisfaction regarding captions

Regarding user satisfaction with captions, we worked from the basis of two questions: which of the two broadcasters currently offering them in Catalonia (betevé and TVC) satisfies hearing-impaired viewers the most in terms of quantity; and which in terms of quality. Since the two groups of informants (i.e., oralist and signing hearing-impaired) are both consumers of captions, we analyzed their answers together. According to the results of our first stage analysis, in both cases we expected TVC to be the preferred broadcaster.

Regarding the quantity of captions, the descriptive analysis returned the following results of our sample (see table 5). The Wilcoxon Signed-Ranks Test applied indicated that satisfaction was significantly higher in the case of TVC compared to betevé ($Z = -2.831$, $p < 0.05$, with 3 ties). The median difference was 2.

Table 5. Satisfaction with the quantity of captions

	N	Minimum	Maximum	Mean	Median	Standard deviation
Betevé	22	1	5	2.22	2	1.23
TVC	26	2	5	4.15	4	0.73

Regarding the quality of captions, the descriptive analysis returned the following results of our sample (see table 6). The Wilcoxon Signed-Ranks Test carried out indicated that the degree of satisfaction was significantly higher in the case of TVC compared to betevé ($Z = -2.57$, $p < 0.05$, with 5 ties). The median difference was 2.

Table 6. Satisfaction with the quality of captions

	N	Minimum	Maximum	Mean	Median	Standard deviation
Betevé	19	1	4	2.31	2	1.20
TVC	41	1	5	3.78	4	1.03

3.1.1. User satisfaction regarding Catalan Sign Language interpreting

Unlike the previous analysis, for obvious reasons, only the answers provided by the signing hearing-impaired informants were used in the tests related to CSL. In this case, we also worked from the basis of two similar questions: which of the two broadcasters currently offering CSL in Catalonia (betevé and TVC) satisfies hearing-impaired viewers the most in terms of quantity; and which in terms of quality. Based on the results of our previous analysis, we again expected TVC to be the preferred broadcaster.

Regarding the quantity of CSL interpreting, the descriptive analysis returned the following results of our sample (see table 7). The Wilcoxon Signed-Ranks Test carried out indicated that the degree of satisfaction towards the CSL interpreting of TVC was not significantly higher than that of betevé ($Z = -1.84$, $p > 0.05$, with 4 ties). The median difference was 0.5.

Table 7. Satisfaction with the quantity of Catalan Sign Language interpreting

	N	Minimum	Maximum	Mean	Median	Standard deviation
Betevé	8	1	4	2	2	1.07
TVC	18	1	5	2.66	2	1.32

Regarding the quality of CSL interpreting, the descriptive analysis returned the following results of our sample (see table 8). A Wilcoxon Signed-Ranks Test indicated that there was no significant difference between TVC and betevé as regards satisfaction with the quality CSL interpreting of captions ($Z = -0.37$, $p > 0.05$, with 4 ties). The median difference is 0.

Table 8. Satisfaction with the quality of sign language interpreting

	N	Minimum	Maximum	Mean	Median	Standard deviation
Betevé	9	1	5	3	3	1.58
TVC	16	1	5	2.75	3	1.29

Tables 5-8 reveal that there were always more informants giving feedback concerning TVC than betevé. One reason for this might be that TVC, and more specifically channel TV3, has been audience leader in Catalonia for eight consecutive years up until 2018 with a 13% share of viewers annually (Antich, 2018). Therefore, one can assume that viewers are more likely to consume, and are probably more familiar with, TVC's accessibility services than those offered by betevé.

3.2. User attitude towards non-professional alternatives

The informants were asked whether they would accept non-professional options: amateur captions, automatic captions, amateur sign language interpreters and avatars. Both oralist and signing hearing-impaired were asked about the first two options, but only signing hearing-impaired persons' opinion was taken into account for the last two services since it was assumed that oralist hearing-impaired users do not use CSL and therefore have little to say about it.

In these two cases we were testing for, on the one hand, the association between accepting amateur captions and automatic captions, and, on the other, for the association between accepting amateur sign language interpreters and avatars. We wanted to verify if users accepting, for example, amateur captions would also accept automatic captions or whether users ruling out avatars would also rule out amateur sign language interpreters. It was considered important to analyze this because it can say quite a lot about user attitude towards non-professional services in general.

3.2.1. Automatic captions and amateur captioners

75.6% of the respondents from the sample of the signing and oralist hearing impaired persons (N=41) answered this section. 48% of the informants accepted both automatic captions and amateur captioners, whilst 9.7% of the persons surveyed were unwilling to try out to any of the suggested options. 4.1% of the respondents were reluctant to have amateur captioners but would consider reading automatic captions. 12% of the persons that would accept non-professional captioners refused to use automatic captions to increase the offer of accessible content. The association was statistically reliable at the 0.05 level [$\chi^2 = 5.11$, $df = 1$, $p < 0.05$].

3.2.2. Non-professional sign language interpreters and avatars

70% of the respondents from the sample of the signing hearing impaired persons (N=20) answered this section. 15% of the respondents were in favor of both non-professional interpreters and avatars to increase the amount of accessible content, whilst 30% were reluctant to try any of the suggested options. 15% of the persons surveyed liked the avatar option but were against the idea of using non-professional sign language interpreters. Finally, 10% of the persons polled would not accept avatars, but liked the idea of using non-professional interpreters to have more accessible content available. The association was not statistically reliable at the 0.05 level [$\chi^2 = 0.933$, $df = 1$, $p > 0.05$].

3.3. User comments

The questionnaires also included some blank spaces in which to write comments if respondents deemed it necessary, the most relevant of which are detailed below.

Concerning captioning, the informants believed everything should incorporate this accessibility service, regardless of whether many viewers watch those programs or not. This is justified by their right to access information, just like everybody else. Another viewer expressed his dissatisfaction with music programs not including captions because this person considered it would be interesting to read the lyrics, know the name of the singer or the band, etc. They would also like captions to be verbatim, i.e., to include everything that it is said.

Regarding sign language interpreting, a user complained about the quality of the interpreting and asked for a group of sign language linguists to be set up in order to guarantee the quality of the service. Another user suggested broadcasting programs with, for example, journalists using sign language in order to give this group of users more visibility. In this regard it should be noted that there are already some audiovisual initiatives beginning with CSL and are captioned to grant access to hearing viewers. This is the case of, for instance, the web series *Peixos* ^[10], that offers captions in Spanish, Catalan and English.

Another comment was user dissatisfaction with delayed captions or the captions not being shown for long enough to read them. Broadcasters informed us that they cannot always be blamed for the malfunctions reported in the complaints received, because incidents are often related to technical problems caused by the viewer's television set.

4. Discussion and conclusions

After carrying out a quantitative and qualitative analysis of a sample of Catalan-language broadcasters and triangulating data from different sources of information, our results reveal that there is a clear breach of the current legislation. The percentage of captioning comes close to and even goes beyond the legal requirements only in the case of *Televisió de Catalunya* but varies between its different channels. In the case of Catalan Sign Language interpretation, however, the number of hours required is not reached, and in addition this service is limited almost exclusively to news content. Our findings show that different measures need to be taken to ensure compliance with the law, not just on legal grounds, but also ethical to address the rights of persons with functional diversity. Yet, it must also be highlighted that broadcasters' final goal should not just be offering all their content captioned or interpreted into sign language because "100% captioned" does not mean "100% accessible", as quality plays an important role (Neves, 2012).

Accessibility is, thus, still a pending question for Catalan-language broadcasters. What broadcasters seem to be unaware of is the fact that not only persons with hearing loss can benefit from captions, but also audience types, such as persons who want to learn a language (Matamala & Orero, 2008: 307). Yet, it must be admitted that despite the industry falling short of requirements, the situation has considerably improved in the past few years. This is equally true for other Spanish broadcasters, that have either begun to offer such services or increased the number of hours of signed programs since 2009 (Utray & Gil, 2014). Spanish laws concerning accessibility came into effect either when the economic crisis started or when it was suffering severely from it. The fact that broadcasters believe the lack of sensory accessibility services stems from budgetary limitations also needs to be borne in mind. Be it for economic or internal organizational issues, the only broadcaster from the sample that currently has both an accessibility department and offers the most accessibility services is TVC.

It was expected that users would feel most satisfied with TVC (even if they were not very satisfied) in terms of captioning and CSL interpreting. In the case of captions, informants were more satisfied with TVC than *betevé* as regards quantity and quality. However, it is surprising that no differences are detected between TVC and *betevé* as regards CSL interpreting given that TVC offers a larger volume of this service daily. This is probably due to the response rate.

As for new options that could provide more accessible content, it seems clear that a considerable number of users are open to accepting any option that could increase the volume of captions, since the association between the acceptance of these alternatives has proven to be significant. For example, 48% of respondents would accept automatic and amateur captions. Conversely, the percentage of informants who would accept non-professional sign language interpreting and avatars drops to 15%. In order to have more content available, the option of using an avatar was preferred over that of non-professional interpreters. Yet, accepting avatars is not dependent on accepting sign language interpreters, nor the other way around. Nevertheless, although the percentage of users that would accept new options is considerably high, not all broadcasters are in favor of doing so (TVC, for instance) because they believe

this could compromise quality. Nevertheless, some broadcasters that are currently not offering any accessible content, such as Girona TV, acknowledge they could consider it.

As regards avatars, EU projects such as Hbb4All have shown that avatars might not be the ideal solution since they lack facial expressiveness and their gestures sometimes can be hard to comprehend. They are recommended in contexts in which the vocabulary used tends to be the same, such as the weather forecast. This is not surprising: even human sign language interpreters are problematic (Serrat & Fernández-Viader, 2013; Wehrmeyer, 2014). This may also be the reason why sign language users state they are informed, mainly, via captions and the Internet (Serrat & Fernández-Viader, 2013).

The interviews revealed that, in general, broadcasters know little about media accessibility and there is a need to provide them with some training. For example, it was striking to realize that the interviewees in broadcasting companies that offered sign language interpreting were unable to answer questions on the topic in any depth, not even the question on what the characteristics of a good quality sign language interpreting should be. One such training course is the online course created as part of the Hbb4All project, which deals with the new ecosystem where media content is distributed in hybrid ways, such as broadcast and broadband ^[11]. This four-unit free course explains basic concepts and services of media access services (including captioning and sign language interpreting). It is addressed to users, policy makers, accessibility managers, broadcasters and the like. Another example is the accessibility guidelines developed in the same project (Hbb4All, 2017), which are key to any broadcaster willing to implement accessibility services on, in this case, HbbTV. The guidelines cover different services and for each one they provide useful advice on how to present the content to ensure it is fully accessible.

Oralist hearing-impaired users were in favor of captioning all types of content and adding verbatim captions, the latter finding having been already pointed out by Neves (2012). Yet, after carrying out some research on teenagers with hearing loss, Cambra *et al.* (2008) found out that captions do not provide enough support to understand television due to poor reading comprehension. In order to provide quality captioning, these researchers put forward two suggestions: first of all, not all images should include captions so that viewers with hearing loss have enough time to look at the image and, second of all, the heterogeneity of this group of users should be respected by offering captions with different levels of complexity. This diversity is also vindicated by Neves (2012), as well as the urgency to cater for everybody's needs. Signing hearing-impaired users also expressed their dissatisfaction with certain aspects related to the quality of the CSL interpreting provided. Nonetheless, our case study focused primarily on the quantity of captions offered by Catalan-language broadcasters, so all matters related to quality fall out of this paper's scope and should, therefore, be viewed as new paths of research to be explored. Future studies could start, for example, by revising how the captions' parameters taxonomized by Arnáiz-Uzquiza (2012) are dealt with.

Even though Spanish signing deaf persons have some media specifically targeted at them (www.webvisual.tv, for instance), they still have to interact with the media of the hearing society (Serrat & Fernández-Viader, 2013). However, a mediatic ghettoization needs to be avoided. There are various ways to go about this, be it investing more money in professional accessibility services or finding alternatives that, although costly, can be less of a financial burden while they alleviate the need of persons with hearing loss.

Although increasing the number of hours of sign language interpreting is advisable, it would be a challenge for broadcasters to offer content in CSL that could also be adapted to hearing viewers. The Spanish national broadcaster already offers this kind of program in Spanish Sign Language (RTVE's *En Lengua de Signos*), which incorporates deaf TV presenters and the content is exclusively related to the deaf community. This would better reflect the linguistic identity of the deaf community (Serrat & Fernández-Viader, 2013) and would increase the visibility of sign language users. Actually, Utray and Gil (2014) differentiate between a more assistive perspective of sign language interpreting –aimed at breaking communication barriers– and another that promotes cultural plurality and engages deaf persons in a more equitable way. However, we would also like to point out that hearing sign language interpreters should not be discarded or underestimated because, as Serrat & Fernández-Viader (2013: 192) stresses, they can be very useful for live broadcasts.

This study has its limitations. The sample cannot be considered random, and since the informants were in Catalonia, they did not have access to the captions provided by IB3. It would have been interesting to compare how satisfied users are with them in comparison with other broadcasters. Moreover, if the response rate had been higher, the results would have been more robust. Also, as previously stated, it was impossible to contact À. Media so we are unable to evaluate the broadcaster that represents another Catalan-speaking region in Spain. Whether they have any plans to implement media accessibility from the beginning –which would serve as a great example of accessibility not being an afterthought anymore– still remains unknown.

Be that as it may, this study attempts to raise awareness and help to break down attitudinal barriers to promote media accessibility and contribute to laying the foundations of a society that is not only tolerant towards persons who are different, but also inclusive.

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Notes

1. See goo.gl/TiB2BU [Retrieved 31 May 2018]

2. See goo.gl/pyLPcU [Retrieved 31 May 2018]

3. Catalan Sign Language is the official language of deaf persons in Catalonia and it spoken by around 25,000 persons.

4. The following quotation, like the rest that belong to Catalan laws, has been translated by the authors.

5. See goo.gl/BL5x42 [Retrieved 6 July 2018]

6. This is an estimation. It does not comprise the Barcelona Mercè Festival opening speech, which is also broadcast with Catalan Sign Language interpreting.

7. This is an estimation. It does not comprise the broadcast of the Ramon Llull Awards, which are celebrated once a year, with sign language interpreting.

8. Quintanas (2017) found out that only two of RTVE's channels offer the volume of captions in Spanish required by law.

9. It should be noted that both Spanish and Catalan are co-official languages in Catalonia and that since late 1980's everyone has received a bilingual education.

10. For more information, see goo.gl/SqwnnE. The series can be accessed at goo.gl/Dw724i

11. See goo.gl/Dn2XpM

