

Metrics and Evaluation Models for Accessible Television

Dongxiao Li¹ and Peter Olaf Looms²

¹ Zhejiang University, College of Media and International Culture, Hangzhou, PR China
80295230@qq.com

² Technical University of Denmark, Lyngby, Denmark
polooms@gmail.com

Abstract. The adoption of the UN Convention on the Rights of Persons with Disabilities (UN CRPD) in 2006 has provided a global framework for work on accessibility, including information and communication technologies and audiovisual content. One of the challenges facing the application of the UN CRPD is terminology. The interpretation of concepts such as ‘disability’ and ‘accessibility’ builds on national traditions and metrics. A second challenge is implementation diversity: different nations and regions have their own interpretation of how media can be made accessible. A third challenge is the increasing number of platforms on which audiovisual content needs to be distributed, requiring very clear multiplatform architectures to facilitate interworking and assure interoperability. As a consequence, the regular evaluations of progress being made by signatories to the UN CRPD protocol are difficult to compare. Using case studies from three emerging economies (Argentina, Brazil and China) as well as industrialized nations including Canada, Denmark, the United Kingdom and the USA), this paper examines the situation facing television accessibility. Having identified and discussed existing metrics and evaluation models for access service provision, the paper identifies options that could facilitate the evaluation of UN CRPD outcomes and suggests priorities for future research in this area.

Keywords: television, accessibility, access services, metrics.

1 Introduction

How can television be made accessible? For many practitioners in countries with decades of experience, the answer is self-evident: make sure that TV programmes are provided with access services. This paper argues that there is more to accessible TV than access service provision. Some clarification of media accessibility as well as the metrics to assess it will be required. Ideally, some overall evaluation model is needed to facilitate these efforts. What is already in place and what remains to be done in order to make television accessible?

One key instrument to promote television accessibility is the UN Convention on the Rights of Persons with Disabilities, UN CRPD [12]. The convention was adopted in 2006 and came into force two years later. Article 1 contains a broad definition of the scope of the convention: "Persons with disabilities include those who have

long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others." Article 2 continues with a clarification of key terms including "communication", "language", "discrimination on the basis of disability", "reasonable accommodation" and "universal design". Article 9, section 1b stipulates that the Convention applies to "Information, communications and other services, including electronic services and emergency services." In the same article, sections 2g and 2h make references to "the design, development, production and distribution of accessible information and communications technologies". Article 30, section b deals with participation in cultural life, recreation, leisure and sport and makes specific reference to the rights of persons to be able to "Enjoy access to television programmes, films, theatre and other cultural activities, in accessible formats".

As regards implementation and monitoring at national level, Article 33 stipulates that nation states "shall designate one or more focal points within government for matters relating to the implementation of the present Convention, and shall give due consideration to the establishment or designation of a coordination mechanism within government to facilitate related action in different sectors and at different levels." Signatories to the Convention and associated Protocol are subject to a regular review of their progress on the implementation of the CRPD, typically at intervals of four years.

The CRPD provides a global framework for media accessibility among governments. For public and private stakeholders, however, clarify what is required to make television accessible – typically the scope of accessible television, targets for access service provision and the means by which compliance can be assessed. Television is both national and international in flavour. While productions such as 'House of Cards' from Netflix have a global following, much of what people view on TV reflects significant differences in taste. The maturity of content providers including broadcasters varies a great deal, too. While broadcasters in some countries have been delivering their content with access services for decades, others have only recently begun to grapple with the issues, often compounded by the transition from analogue to digital distribution. The CRPD will require national legislation, regulation and other kinds of agreement to flesh out the details. The question is what experience has been gained to date and how this can be applied by those embarking on television accessibility?

This paper looks at examples of current practice and suggests areas where the experience gained in one country can be applied elsewhere. The first area to be analysed is metrics for television accessibility.

2 Metrics for Television Accessibility

The term 'metric' is a measure of performance in relation to desired outcomes. Ries (2010) [11] notes that the selection of metrics is crucial if they are to provide a multi-dimensional assessment of organisational or service performance. In addition he notes that "All metrics should be actionable, accessible, and audible."

National legislation and regulation governing media accessibility does, in some cases, contain metrics and Key Performance Indicators (KPIs) to assess the implementation of a given initiative. A good example of this for access services for individuals who are blind or have serious visual impairments is contained in the Twenty-First Century Communications and Video Accessibility Act, legislation from the US Congress. Section iii, items I to VII of the Act contain both ‘supply-side’ and ‘demand-side’ metrics – what programming is available with description and the use of this service by viewers. In essence it is a cost-benefit assessment. Nine years after coming into force, costs to all the key stakeholders in the media industry of providing programming with video description are to be weighed against the use and benefits to ‘consumers’ of such programming in the top 60 designated geographical areas. This will form the basis of a revision of the Act, new decisions to possibly modify video description and to extend it to further geographical areas. In this sense, the KPIs were an integral part of the accessibility legislation.

3 Supply-Side Metrics

Typical supply side metrics include:

- Applicability: broadcasters, channels and content genres
- Minimum thresholds for each access service
- Scheduling and,
- Quality metrics for each access service.

Each of these 4 metrics will be discussed in more detail.

3.1 Applicability: Broadcasters, Channels and Content Genres

In many territories, the applicability of television accessibility may depend on the distribution network. Terrestrial broadcasting is invariably covered, whereas the demands made of satellite, cable and Internet distribution via broadband or mobile networks may be different.

The television regulator in China, the State Administration of Press, Publication, Radio, Film and Television (SARFT), has accessibility metrics that apply currently to broadcast television but not to broadband distribution.

In the UK, the regulator OFCOM sets targets for both ‘domestic broadcasters’ based and delivering signals within the UK and to ‘non-domestic broadcasters’ that deliver signals via satellite from the UK to other European countries. The legal basis for this is the European Union Audiovisual Media Services Directive (AVMS) that contains some broad stipulations covering television accessibility.

The Federation Communication Commission (FCC) has phased in ‘network neutrality’ provisions when it comes to TV accessibility. The requirements for access services apply not only to network television but also to content delivered on demand, also on the Internet.

In many countries, there are exemptions for broadcasters based on their share of the television market (in the UK, channels with less than 1% market share). In other cases the criterion is urbanization: The FCC in the US exempts broadcasters or networks outside specific urban areas. Campedelli (2014) [4] reports that television access service requirements in Brazil apply “to all free-to-air TV in cities with more than 500,000 inhabitants”, an arrangement similar to in the USA.

In some countries, certain categories of TV channel are exempt. In the UK, there are exemptions for home shopping channels. Similarly, exemptions may exist for TV genres: most countries have targets for pre-prepared content but have waivers for the provision of audio or video description for live television programmes and some exempt captioning/subtitling for live programmes.

In territories where there is a tradition of providing captions/subtitles, live TV programming is no longer exempt. An example of such changes can be found at KBS in Korea. Han (2013) [7] outlines the timetable for the close captioning of live programming on terrestrial television and national and local level and on satellite TV and explains how the workflows have been adapted so that captioning for live broadcasts can subsequently be enhanced for reuse on other distribution platforms.

Sign language interpretation seems to be the only TV access service where no distinction is made between pre-prepared and live television programming. In Argentina, the president invariably addresses the nation with a sign language interpreter even though captioning of the same direct broadcast is not available. This has something to do with the way in which the two access services are produced.

3.2 Minimum Thresholds for Each Access Service

Access service provision is typically measured as a percentage of the output of a given channel or in terms of the number of hours of programming per day, week or month. In Brazil, Campadelli (2014) reports that “By 2013, television programming shall supply 112 hours weekly of closed captioning per channel.”

The introduction of targets for TV access service provision is usually phased in over a number of years. The FCC typically requires compliance within one or two years. OFCOM on the other hand gives broadcasters up to 10 years to reach the final thresholds for access services. The final targets for captioning/subtitles are typically 100% of output, whereas for video / audio description are far lower. In competitive television markets such as the UK, the presence of a public service broadcaster such as the BBC may lead to commercial broadcasters such as Sky exceeding minimum thresholds.

Until recently, compliance with such targets involved self-reporting by the broadcasters in question supplemented with spot-checks by the regulator. Brady (2013) [3] highlights the need for automating the compliance mechanisms not just to ascertain, say, that captioning was present but that it was the right captioning for the content in question. Often such systems are being developed as part of overarching compliance mechanisms being put in place to check advertising play-out.

3.3 Scheduling

Brazil and other countries stipulate not only thresholds for each access service but also when such services shall be offered. The regulator requires broadcasters to deliver captioning primarily from 6 am to 2 am. In the early hours, from 2 am to 6 am, broadcasters can provide the service but the regulator only requires two hours daily during this period.

In some countries such as Ireland and Poland, the targets for captioning/subtitles are stipulated separately for the first airing of a programme and subsequent repeats. The aim of this differentiation is to prevent channels meeting their targets by increasing the number of night-time repeats with access services to improve their overall compliance with access service provision.

Scheduling plays a role for TV content with access services, especially when it comes to the signing communities whose mother tongue is a sign language. As sign language interpretation is ‘open’ in the sense that it is an integral part of the TV picture, all viewers of a programme with sign language usually have to see it, whether they need sign language or not.

Broadcasters have to juggle the requirements of those needing sign language with complaints or outright resistance from a majority of viewers who do not. For this reason, sign language scheduling strategies include:

- Showing such programmes outside ‘prime-time’ on major channels;
- Simulcasting programmes with sign language interpretation on a niche channel; or
- Developing solutions to deliver sign language interpretation as a window overlaid on top of the television picture, allowing the viewer to turn the interpretation on or off.

3.4 Quality Metrics for Each Access Service

Following the successful introduction and scaling-up of an access service such as captioning/subtitles, the consolidation phase often leads to a formal review of how the quality of a given service should be assessed. In the case of Canada, there are quality metrics for closed captioning/subtitling, both for programming in French and English. CRTC (2012) [5] contains the metrics for English programming. These include:

- Lag time for live programming
- Accuracy rate for live programming
- Captions that block other on-screen information
- Correcting errors prior to re-broadcast
- Speed of captions during live programming and children’s programming
- Captioning of emergency alerts and
- Monitoring.

In Brazil, the two central documents governing TV accessibility are Portaria MC no 310 de 27 de junho de 2006 [10] and NORMA BRASILEIRA ABNT NBR 15290

[9]. Campadelli (2014) explains that “NBR 15290 contains stipulations for the synchronicity of closed captioning.

The requirements depend on whether the programming is live or pre-recorded. A delay of no more than 4 seconds is permitted for live content whereas pre-recorded content must be “frame-accurate”. There are no specifications on how delays should be measured or quantified by regulators, broadcasters and suppliers of closed captioning.” NBR 15290 requires verbatim captioning and stipulates a 98% accuracy threshold for live subtitling. No supporting arguments for these decisions are offered.

Other regulators offer more specific quality metrics for access services or include the rationale for their decisions. In the Spanish regulations for closed captioning, the AENOR 15390 [1] document specifies the so-called NER model as the basis for the metrics it has chosen. In the USA, NCRA mentions verbatim captions as a quality metric. Transcriptions using live stenography are recommended but are not mandatory. OFCOM in 2013 has been through a public consultation on quality metrics for subtitles for the deaf and hard of hearing (closed captioning) and the results of this process can be found on the OFCOM website.

Recent studies by the BBC indicate the need to examine the trade-offs between various quality metrics such as the accuracy rate and the lag time for captions/subtitles for live programmes. Armstrong (2013) [2] discusses the link between synchronicity and perceived quality by viewers. The experiments reported take into account differences in viewer preferences. Some viewers turn down the sound completely and rely exclusively on the captioning while others with impaired hearing make an attempt to follow the spoken narrative and use the captions to help in areas where the viewer finds it difficult to follow what is being said.

Synchronicity, or at least a reduction in the delay of the captioning in relation to the content it refers to, has a significant impact on perceived quality. Armstrong reports that “The clearest trend for timing was for people watching with sound where there was a strong and statistically significant increase in the quality score with improved timing (reduced delay). For the range of timings tested, each 1 second reduction in the subtitle delay gave just over 5 points improvement in the quality score.” The reduction in the delay is most important for those with some hearing and less important for those who watch with the television sound muted.

There is clearly a need for additional research into the perceived quality of access services so that policy-making and regulation can move from ad hoc decisions to an evidence-based approach around which consensus among key stakeholders can be built.

4 Demand-Side Metrics

While most regulators have targets for access service provision, few have metrics and KPIs for access service use. OFCOM in the UK has KPIs for audio description that came into regular service in 2003. As the targets only call for AD provision for 10% of programming, there was concern that those needing the service would not know of its existence. For this reason, OFCOM conducts regular surveys of AD awareness

and use in the UK. This is accompanied by campaigns organized by public service and commercial broadcasters. This allows the television industry to monitor the take-up of Audio Description over time.

Awareness of the existence of television access services among the population at large and the intended audiences is a key first step, a major prerequisite to making television accessible. Arguably, further steps will be needed to assess take-up, use and satisfaction as access services are launched and the provision of accessible TV is consolidated. Davis (1993) [6] provides a good model that could be adapted to monitor the performance of TV access services over time from a user perspective.

The expansion and refinement of an access service such as subtitles can move in unforeseen directions. A case in point is the provision of spoken subtitles on DR1, the main channel of the Danish Broadcasting (DR) in Denmark discussed on Looms (2014) [8]. Adding speech synthesis to Danish subtitles for news items and documentaries in foreign languages has improved the accessibility of these genres for new target audiences including viewers with cognitive impairments and those who are poor readers. In countries with a tradition of using subtitling rather than dubbing for content in foreign languages, spoken subtitles constitute a cost-effective means to make television accessible.

5 Conclusions

This paper has discussed the need to complement conventions and directives governing television accessibility with national legislation, regulation and guidelines so that all the key stakeholders can get a clear, overall picture of performance. There is a wealth of experience when it comes to supply-side metrics. Building consensus and the necessary buy-in from stakeholders can be promoted by the use of evidence-based metrics.

What the discussion of current supply-side metrics indicates is that, as access service provision grows and matures, what constitutes quality from the perspective of all the key players becomes a prerequisite for consolidation and progress. Demand-side metrics are a natural complement. An understanding of service awareness, take-up, use (and enjoyment) can provide an evidence-based foundation on which to optimize television accessibility.

References

1. AENOR (2012). Subtitulado para personas sordas y personas con discapacidad auditiva (Subtitling for deaf and hard-of-hearing people). AENOR Asociación Española de Normalización y Certificación. UNE 153010 Norma española, Madrid, Spain (May 2012)
2. Armstrong, M.: The Development Of A Methodology To Evaluate The Perceived Quality Of Live TV Subtitles. BBC R&D, UK, IBC 2013 (2013)
3. Brady, K.G.: Automated Closed Captioning And Descriptive Video Compliance At Turner Broadcasting. Turner Broadcasting System, Inc., USA, IBC 2013 (2013)

4. Campedelli, G.: Access Services for TV: Quality Metrics and Challenges in the Provision of Live Closed Captioning in Brazil. *浙江传媒学院学报* Issue 3. Journal of Zhejiang Institute of Media & Communications (in press, 2014)
5. CRTC. Broadcasting Regulatory Policy CRTC (2012), -362. Quality standards for English-language closed captioning (2012), <http://www.crtc.gc.ca/eng/archive/2012/2012-362.htm>
6. Davis, F.D.: User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *Int. J. Man. Mach. Stud.* 38(3), 475–487 (1993)
7. Han, S., Ha, M., Lee, B., Jung, B.: Capturing Into High Quality Subtitle Files For Multiple Applications. KBS Technical Research Institute, Korea, IBC 2013 (2013)
8. Looms, P.O.: Making TV accessible in the 21st century. In: Liu, Y.-L. (ed.) *The Digital Media and New Media Platforms: Policy and Marketing Strategies*. Routledge Press (in press, 2014)
9. NORMA BRASILEIRA (2005) ABNT NBR 15290, ABNT NBR 15290. Acessibilidade em comunicação na televisão (Accessibility in TV captions) Section 4.1.9 Sincronia. Secretaria Nacional de Promoção dos Direitos, Brazil, http://www.pessoacomdeficiencia.gov.br/app/sites/default/files/arquivos/%5Bfield_generico_imagens-filefield-description%5D_17.pdf
10. Portaria MC no 310 de 27 de junho de 2006, <http://www.mc.gov.br/portarias/24680-portaria-n-310-de-27-de-junho-de-2006>
11. Ries, E.: Entrepreneurs: Beware of Vanity Metrics. HBR Blog Network (2010), <http://blogs.hbr.org/2010/02/entrepreneurs-beware-of-vanity-metrics/>
12. United Nations. Convention on the Rights of Persons with Disabilities (2006)