# Media accessibility and accessible design

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# Introduction: accessible media and culture

The concepts of accessible and universal design are central to media and culture today, as are new forms of technology that are used to implement them. Accessible design is a design process in which the needs of people with disabilities are specifically considered. Universal design, by contrast, challenges stereotypical concepts of 'normality' and aims to ensure that the way products are designed makes them accessible from their inception to all users, regardless of their physical, mental or environmental conditions.

In translation studies, accessibility, media accessibility more in particular, became part of the remit of audiovisual translation (AVT) studies in the 1970s, with an initial focus on subtitling for the deaf and hard of hearing (SDH) also known as captioning. In the 1990s Audio Description (AD), which makes audiovisual products and other cultural products accessible to blind and visually impaired people, received a major boost. As Greco (2016: 11) argues, accessibility and accessible design are a proactive principle for achieving human rights in general, and Media Accessibility (MA) services are instruments that can increase access to a wide variety of human rights, such as the right to information and the right to culture. In today's highly mediatized society where audiovisual products are prevalent, the accessibility of audiovisual content is a central concern. This has led to the development of MA practice and research, a relatively young branch of AVT that aims to ensure access across linguistic and sensorial borders to all types of audiovisual products. The rapid evolution of technology through *digitization* and the rapid expansion and diversification of audiences due to globalization, henceforth D&G, have played a major part in this evolution (also see Díaz Cintas and Massidda in this volume). Depending on one's perspective, MA can be considered a form of AVT or the other way around and it is difficult to maintain a clear-cut distinction between the two domains. In this chapter, we will use the term Media Access or MA to encompass both and refer to AVT in specific cases involving interlingual translation only.

Current forms of MA either increase access to the *aural* modes of audiovisual texts or to the *visual* modes. As a result, this type of 'translation' has often been called 'intersemiotic, intermodal or cross-modal translation' (Braun 2008: 2): it does not only translate words

(the verbal mode) from one language into another, but also transfers sounds (the aural mode), or images (the visual mode) into words. The first forms of MA traditionally focused on SDH, a form of subtitling that works from the assumption that deaf viewers cannot hear the audio and therefore includes a verbal or visual rendering of important sound effects. AD for the blind and visually impaired, by contrast, is a verbal commentary providing essential visual information that helps blind and partially sighted people access audiovisual media or live performances (Fryer 2016: 1). Today, MA covers an array of services that either replace or complement these two basic forms.

All the services discussed below also cater for a varied group of users. While some need access services to overcome sensorial or mental barriers, such as people with an attention deficit disorder, others use them for entertainment or educational purposes. AD, to give but one example, was originally developed for the visually impaired, but it also helps people with Alzheimer's or can be used as teaching material for language learners (see Matamala and Orero 2016; Starr and Braun forthcoming).

The present chapter aims to map this rapidly evolving and varied field of study. In the next section we discuss key factors that have driven the development of the field. We then provide an overview of how research in MA developed under the influence of these factors. The final section ventures some concluding thoughts, including a discussion of how all the variables involved in MA might be studied.

# Key actants in the (historical) development of MA

Defining what translation is, has become an almost futile undertaking today. Tymocszko already pointed out that '[...] there are no necessary and sufficient conditions that can identify all translations and that at the same time exclude all non-translations across time and space' (Tymoczko 2007: 78). The causes that scholars name for this development, whether they are referring to translation more generally or to audiovisual translation or media accessibility more specifically (e.g., Díaz Cintas 2015, Pérez-González 2014) are the above-mentioned D&G. However, these two often cited engines of change are very general and abstract concepts that need further concretization.

The instability of the concept of translation is also pointed out by Marais (2015) who applies complexity theory to explain translation's current hybridity and to argue that translation is one of the factors through which societies 'emerge'. MA certainly confirms this: if one considers any society and its functioning before and after the widespread use of, for instance, AD, the picture one obtains is very different.

Many human and non-human factors are at play in these developments. A sociological approach that is not new to translation studies (e.g., Abdallah 2011; Buzelin 2005; Eardley-Weaver 2013; Folaron and Buzelin 2007; Risku and Windhaver 2013, also see Olohan in this volume), Latour's Actor Network Theory (ANT), offers a useful framework to study their interactions. ANT is congruent with Marais' conceptualization of translation as a complex and changeable phenomenon, but it edges closer to what could be considered a methodology. Latour counters approaches in sociology in which social aggregates or groups (e.g., in terms of economic classes) are used as a given to explain social processes. Instead, he considers 'social aggregates as what should be explained by the specific associations provided by economics, linguistics, psychology, law, management, etc.' (Latour 2005: 5). In other words, in ANT social structures are not seen as predetermined but as emerging from action and the relations of various *actants*, including both human players or *actors* and non-human players (see e.g., Abdallah 2011: 175). Within this conceptual framework,

MA and translation as 'social aggregates' can forever be changing and be produced by their many different actants. Since these actants can be human or non-human, they include the active impact of technology.

In this section we survey the main actants within D&G, first, in relation to the evolution of media accessibility in terms of the target groups of accessibility services, followed by the role of technology, and then the importance of lobbying and policy, before discussing legislation. To conclude, we illustrate how all these factors mutually influence one another, leading to new developments in the field of SDH and AD more specifically.

# Target groups

Some of the technological evolutions discussed in the previous chapters (in particular Díaz Cintas and Massidda) have led to a change in who consumes audiovisual translation. The millennial generation consists of netizens, technology and internet-savvy citizens who are also prosumers rather than only consumers. They make active use of the web and new technological opportunities to generate and translate content through fansubbing, fandubbing and, more generally, crowdsourcing, often with the help of freeware including machine translation (see Jiménez-Crespo in this volume). In addition, D&G combined have allowed population groups who used to have limited access to the information society due to their sensorial or other limitations, to become (more) active citizens, since also the new commercial forms of MA described in the introduction, continue to improve and proliferate.

Migration streams in combination with D&G have led to yet another type of diversification in both consumers and prosumers: they have become multicultural and multilingual, exerting a growing impact on the (audiovisual) products that are created, be it by users or more traditional producers. To date, such multicultural and multilingual products rarely comply with the requirements of universal design, which means that they must in their turn be made accessible for potentially, equally diverse target groups.

# Technology

Different players determining the course of technology constitute one group of *actants* that have contributed to the diversification in consumers of all types, but technology also makes it theoretically possible to cater for all, and in a targeted manner. In the past, AD could only be broadcast on analogue TV, which means that when the channel was activated, all people present in the room would hear it. Today, DVD, digital TV and web platforms, technically allow producers to supply a virtually unlimited number of different ADs (e.g., in different languages) via separate channels.

Technological developments in translation practice have also had an impact on the speed with which translations and media access services can be produced. Moreover, as a form of multimodal and intersemiotic translation, MA has always been at the fore-front of technological developments. Technology-based methods that are used both in MA practice and research include *respeaking* in which the subtitler, also called respeaker, listens to the TV audio through headphones, respeaks the audio input in a (slightly) edited form into a PC with speech-to-text software and subtitling software, sometimes edits the written output on the PC, and broadcasts the subtitle so produced (Romero-Fresco 2011). Also increasing are the use of machine translation with post-editing, digital (multimodal)

corpora and multimodal as well as linguistic concordancing (see the section '*New types of research tools*' below). All of these further confound the distinction between AVT and MA.

# Policy

The seemingly unlimited possibilities of technology are only implemented in countries that have the economic and technological capacity, and where users are sufficiently organized and empowered. Activism and active lobbying have led to the expansion of MA in the USA, Canada, Australia and a number of European countries (Reviers 2016), but it still needs to make much more headway in large parts of Europe, as well as Africa, Asia, Latin America and New Zealand (see e.g., the website of the New Zealand social initiative *Be. Accessible*).

The current progress has been made possible thanks to the active intervention of user organizations, including organizations defending the rights of blind and visually impaired people and the deaf and hard of hearing, but also organizations representing minorities and migrants. The importance and scope of current MA provision methods for the large numbers of 'new' citizens and migrants worldwide is yet to be explored. There is a large body of literature documenting the importance of different types of subtitling for both incidental and taught language acquisition (Ghia 2012), however, the potential of other forms of MA both for teaching purposes and incidental language learning as well as intercultural communication is largely uncharted. For this research to be carried out and for MA to fully come of age more legal provisions are required and hence, first, more lobbying (see also O'Sullivan 2016).

# Legislation

The Universal Declaration of Human Rights (1948), which also put the rights of people with disabilities on the international political agenda, laid the foundation for the development of universal design. The next big step was the UN Convention of the Rights of Persons with Disabilities, adopted by the UN in 2006, followed by *World Report on Disability* jointly released by the World Health Organization and the World Bank in 2011. As Greco (2016: 16–17) writes, this report was very significant since it 'depicts the reality of disability on a global scale' in many different sectors of society, such as health care, education and employment. However, literature on human rights is not unequivocal in its definition of 'accessibility', it may be more generally understood as a necessary *'instrument* for achieving human rights' (*ibid.*, our stress) rather than a human right per se. Nevertheless, legislation that ensures access to media, culture and information is continuing to make headway in different parts of the world.

Europe, the main focus of this chapter, is one of the regions that has seen a significant rise in legislation promoting accessibility services in the 21st century, particularly in the area of audiovisual media. In 2007 the EU issued a directive concerning television broadcasting activities, including accessibility services, such as subtitling and AD (European Parliament 2007). These events spurred the development of legislation in several European countries, even though its implementation and the degree of enforceability varies greatly from one member state to the next (Bachmeier 2014). Owing to the many different conditions and legal provisions prevailing in member states, only a few general observations can be made to illustrate the state of the art to date. First, Bachmeier's 2014 report for the European Audiovisual Observatory regarding media accessibility indicates that most EU member states recognize the importance of accessibility in their media regulations. More in particular, she identifies 16 member states that have legal accessibility standards: Austria, Belgium (the Flemish Community), Cyprus, Finland, France, Germany, Greece, Hungary, Ireland, the Netherlands, Poland, Portugal, Romania, Slovakia, Spain and Sweden. Some of their regulations, however, only provide very general recommendations which are not enforceable. They either simply encourage broadcasters to increase the access of their content (such as in Austria, Belgium, Bulgaria, Cyprus, Denmark, Croatia, Malta, Portugal or Slovenia) or, when more concrete stipulations are provided, policy makers fail to include penalties. This is the case in France, for instance (for more details, see: Muller 2012; CSA Rapport Accessibilité 2016).

In some other member states, though, regulations, including the implementation of timelines and quota, have made a significant difference. The UK, for example, has long been a pioneer, mandating access services on TV as early as 1996, imposing stringent quota and offering quality standards through the regulatory authority Ofcom. Spain is another example. It has a nation-wide legislation – the *General act on Audiovisual Communication* (*Ley 7/2010 General de la Comunicación Audiovisual*) and a recognized standard for best practices in access services (*Norma UNE 153.020*).

Second, Bachmeier's report and the results of the ADLAB project (see Reviers, 2016 for an overview) indicate that apart from national provisions, countries often implement sector-driven legislation. These include agreements with Public Broadcasters (such as in Flanders, Bulgaria, Croatia, the Czech Republic, Denmark, Italy and Slovenia) or laws pertaining to specific types of audiovisual content, such as web content (e.g., in the Netherlands).

A final type of policy framework that supports the development of MA services are funding schemes for specific sectors. While neither the German *Rundfunkstaatsvertrag* (Interstate Broadcasting agreement) nor the *Telemediensgesetz* (Telemedia ACT) provides legal obligations for media accessibility services in Germany, it is one of the leading countries in Europe when it comes to MA services. On the one hand, broadcasters are providing accessibility services on a voluntary basis, based on active promotion by local authorities, and on the other hand, the *Filmförderungsgesetz* (Film Support Act) grants funds only when German AD and German subtitles are provided with a feature film. A comparable situation is found in Belgium.

The above examples illustrate how the fragmented legislative framework in Europe leads to an unbalanced offer across and even within EU member states and between AD and SDH. Some countries that have no or very limited regulation enforcing the provision of AD, do impose quotas for subtitling and SDH (such as the Netherlands, Hungary and Romania). Outside Europe, some legislation has been implemented or is beginning to be rolled out as well, more specifically, in the USA (*the 21st Century Communications and Video Accessibility Act of 2010*), Canada (*1991 Broadcasting ACT*), Australia (*Broadcasting Services Act 1992*) and Brazil (Lei do Audiovisual Code of 1993).

All of this may not sound very encouraging. Nevertheless, governments *are* becoming increasingly conscious of the importance of legislation for the development of access services and it is to be expected that things will continue to improve on this front. The European Union reached a preliminary deal on a new Audiovisual Media Services Directive in May 2018 and the new EU Accessibility Act was adopted in April 2019, providing a broad legislative basis for accessibility services in Europe.

The legislative frameworks need to keep up with technological developments and include emerging types of access services. Until April 2019 much legislation still focused on TV broadcasting, while web content and streaming services were not always subject to the same quantitative or qualitative requirements. However, legislation covering access services for live events, such as theatre, opera, dance and sports, or for museums and cultural heritage sites, is moving at a much slower pace.

### Interactions

The combined impact of D&G continues to lead to increased diversification across the board and new technologies are central in this. However, they do not always 'simply' supplant old ones. Often, existing technologies are applied to new contexts or expanded for new needs and/or new target groups, revealing uncharted possibilities. Some of these developments are felicitous, some require more interaction between research, funding and lobbying. Below, we discuss SDH and AD.

# Subtitling for the deaf and hard of hearing

SDH started as a form of closed intralingual subtitling in many countries, around the time of the introduction of Teletext or Ceefax in the 1970s and 1980s (Remael 2007). Usually, these subtitles had slower reading speeds than open subtitles for the hearing audience, and included different forms of speaker identification, as well as information about sounds and music. Today, the quality of SDH across the globe and within Europe, and the way in which SDH is produced, remains very uneven and heterogeneous. This is in spite of the possibilities offered by digitization, which can support a more creative use of letter sizes, fonts and word placement, for instance, to suggest intonation, and, theoretically, the use of emoticons to express emotional states. More diversification in terms of audiences is now also possible, however, it is not yet clear whether all the variants that can theoretically be supplied are appreciated by their target audiences. The use of emoticons, for instance, is rather controversial. Next to intralingual SDH there is an increasing demand for interlingual SDH, and this too can be supplied thanks to new technological developments that allow for the inclusion of parallel subtitle provision, catering for different target groups.

On the one hand, the imposition of quotas in some countries (e.g., in the U.K. and Flanders) with the obligation to produce 100% intralingual subtitling of national language programmes, and the impact of regulating bodies such as Ofcom in the U.K., have led to a tremendous increase in subtitling and SDH. In other words, it has led to more quantity but not always to a concomitant increase in quality (Romero Fresco 2015). On the other hand, the increased demand has also led to the development of live subtitling. Without this form of subtitling quotas simply cannot be met. Today live subtitling with *respeaking* through speech recognition software, also known as speech-to-text software, is gaining ground (see Ciobanu and Secară in this volume). Meanwhile, the increased multilingualism of audiovisual productions is also leading to the rising demand for interlingual live subtitling. In this instance, SDH and subtitling, or MA and AVT become indistinguishable. In order to produce interlingual live subtitles, the respeaker not only paraphrases but actually translates/interprets the TV audio input, and the speech recognition software, linked to subtitling software, turns the translated aural rendering into a written subtitle (Remael *et al.* 2014).

The target audience for interlingual live subtitling is not entirely the same as that of intralingual live subtitling but different target groups seem to be in the process of becoming completely or partially conflated, at least in some contexts. The target audience of interlingual live subtitling consists of the general public (native speaker of language A) that needs subtitling for the foreign speaker of language B, but also comprises the SDH audience that needs both the written rendering of speech (e.g., with speaker identification) and its translation from B to A. Unfortunately, not all live subtitling provides the extra information that Deaf and hard of hearing people require.

#### Audio description

The interaction between the above described actants has also led to similar changes in the field of accessibility for blind and visually impaired people. AD started in the theatre as a form of live access, but quickly found its way into TV and cinema, now the most popular AD mode. In the cinema and in the case of other recorded performances, this additional narration, supplying the target group with the (visual) information they cannot access, is mixed with the sound track. A carefully timed AD script, written beforehand, and the subsequent sound mix, ensure that the AD and (film) dialogues do not overlap. Instead, dialogues, sounds and AD work in interaction to produce a new audio text (Fryer 2016).

Digitization caused a real surge in the provision of AD at the beginning of the 21st century. The arrival of digital TV made it much easier to broadcast AD without the need for users to buy additional set-top boxes to receive the audio-track. Technological advances have also made it possible to include AD with more different types of media and for different types of events, including live TV broadcasts. Text-to-speech technology for the delivery and recording of AD, and the development of web and mobile applications for the reception of AD, have made it possible to distribute it much more widely.

On AD too, multilingualism has had its impact. Depending on the context in which it is used, AD can be combined with Audio Introductions and/or Audio Subtitles (AST). Audio Introductions are continuous pieces of narration providing factual and visual information about a media product or performance *before* it is consumed, for instance on the TV channel's website. They can contain information about the technicalities of a film or performance and/or background information about the production, and hence provide a narrative framework giving support to the AD, which is itself delivered *with* the audio-visual product, when the time for additional information is limited. AST's are an aural rendering of the interlingual subtitles with a film, produced either by a human voice actor or artificial voices, like the AD itself. The AST, too, is mixed with the sound track of the original production (Braun and Orero 2010; Remael 2012, 2015).

Nevertheless, like for subtitling, many hurdles remain, especially regarding quality assessment. To date, AD remains a rather marginal phenomenon in society at large, partly because many fundamental questions remain to be answered before new services can be implemented. For instance: how to describe less evident text types – dance, live TV broadcasts, political debates and seminars –, how to create an AD script that caters for the varied needs of the extended target groups, or how to effectively integrate descriptions with sound effects, both in terms of scriptwriting and sound engineering? At the same time the rapid (technological) developments are constantly introducing new and challenging issues with which the industry must keep up, such as the provision of AD for foreign language or multilingual films, combining AST with the (semi-automatic) translation of AD and text-to-speech technologies (see Ciobanu and Secară in this volume).

In brief, the technological developments that have made the rapid advancement of the field possible, simultaneously constitute one of the mayor opportunities and challenges for MA service providers and many of these issues benefit from and even require researchbased grounding, which will be the topic of the next section.

#### Research and methodological issues in media accessibility

In this section, we discuss how some of the actants identified in the previous section impact on MA research. First, we focus on studies into the emerging types of MA that sometimes coincide with AVT services. Then we look at how technology influences the way in which research is being conducted.

## Research on new accessibility solutions

#### Product-oriented research

From a product-oriented point of view, we pointed out earlier how technological advances have increased the number of distribution platforms for audiovisual texts, requiring new accessibility solutions but also offering new opportunities. MA research and practice therefore develop in interaction. On the one hand, access solutions for online content and mobile devices must be found. This means adapting existing services such as subtitling for mobile apps and hand-held devices, since such devices have different spatial and technical requirements (see Tai 2016, Stanke 2016). However, this also means that new tools need to be developed to be able to offer, for instance, individualized subtitles and ADs via Apps or technologies like Smart Glasses (e.g., Earcatch, MovieReading, WhatsCine – Matamala 2017, Matamala and Orero 2016).

On the other hand, new access solutions can also be tested in other environments. Online platforms, for instance, allow the implementation of creative, integrated subtiling solutions that meet the needs of different users, such as the deaf and hard of hearing, by positioning subtiles closer to the person who is speaking on screen (Fox 2016, 2017, Romero-Fresco 2019). Digital TV and cinema have created the need for 3D subtiling or subtiling for virtual environments and potential for the creation of immersive audio description (ImAc project), whereas digitization has also spurred the provision of AD for non-fiction content disseminating specific information (such as corporate or governmental video's), which remained limited in the era of TV broadcasting.

#### Process-oriented research

Today's developments in the MA domain have stimulated more process-oriented research, since making the current surge in audiovisual content accessible can only be achieved with the help of technology. The newly developed platforms and their users require the accessibility services to be produced faster than ever before. Online videos, for instance, need to be accessible within a timeframe of only a few days or even hours after they have been posted online and providers such as Netflix aim to include subtitles and AD in several languages simultaneously upon the release of a new feature. As a result, some MA and AVT research explores how technology can improve the (cost) efficiency of the translation processes while maintaining high quality standards. A few examples are considered below.

Respeaking has become the standard for providing intralingual live-subtitling. Research into this type of subtitling first focused on describing and analysing the functioning of the process (Remael *et al.* 2014, Van Waes *et al.* 2013) and the development of models for

quality analysis, the most widely used model being Romero-Fresco's NER model (Romero-Fresco, 2015, also see Ciobanu and Secară in this volume). This model, in which N stands for number of words in the subtitle, rates the number of edition and recognition errors produced in intralingual live subtitling with speech recognition. Meanwhile, interlingual live subtitling, in which the respeaker is expected to interpret or translate as s/he respeaks, is on the rise. As a result, the NER model has been adapted to this new variant, yielding the NTR model, in which the E for edition errors has been replaced by a T for translation errors (Romero-Fresco and Pöchhacker 2018, Robert and Remael 2018). This development has also led to the collaboration of MA scholars and interpreting scholars, and to the development of a joint project aiming to map the new MA/interpreting profile (ILSA, Interlingual Live Subtitling for Access) (Pöchhacker and Remael forthcoming, Robert et al. forthcoming; also see Braun in this volume). In the same context, research into Automatic Speech Recognition (ASR), speaker-independent speech-to-text software, which makes the respeaker superfluous, is being conducted (Fuchs and Oetting 2014). In a different development, speech recognition software is also being used for automatically generating subtitles for online systems such as YouTube, whereas research into clean audio as a tool to improve access to audiovisual content for hearing impaired audiences also fits in the context of these research developments (Matamala 2017).

The opposite process, converting text into speech (TTS) or speech synthesis, is mainly researched and applied for voicing scripts in the field of AD (Szarkowska 2011, Fernandez-Torné and Matamala 2015, Kobayashi *et al.* 2009). To date, most studies indicate that TTS solutions are not preferred by all users and often deemed suitable for non-fictional programmes such as documentaries or news broadcasts (Matamala 2016: 264). However, as research continues and technologies improve, this will no doubt change. The technology is already applied successfully for the voicing of AST, where research has pointed out that the preference for human voices is limited to specific genres. AST can also be applied in live settings such as theatre and opera, where it is usually incorporated in the AD and voiced live by the describer (Remael and Reviers ongoing research) – but here too new research is looking into the options for recorded theatre AD with voice synthesis (soundfocus.nl) (also see Ciobanu and Secară in this volume).

A third set of research developments comprises text-related technologies for MA, which includes the use of Translation Memories and Machine translation systems. In the field of AVT, and by extension MA, research is limited. As Diaz-Cintas (2015) has pointed out, the potential of computer aided translation tools (CAT tools) for subtitling has received little attention, and the same is certainly true for SDH. In this context, Hanoulle et al. (2015) has investigated the usefulness of automatic terminology extraction software as a support to subtitlers, and large projects like the SUMAT project developed systems for the (semi) automatic translation of subtitles (also see Diaz Cintas and Massidda in this volume). Research is also investigating the possibilities of MT for AD (see Matamala 2016 on the ALST project) in view of the growing need for AD translation. More research is needed on the context in which such MT is feasible as well as the amount and type of post-editing required, besides reception research.

A final development in process-oriented research is the cutting-edge field of image related technologies in AVT, which, it is hoped, will alleviate the task of audio-describers on the one hand, and sign language interpreters, on the other. The two most prominent examples are the automatic description of images (already implemented, for instance, for static images on Facebook) and automatic sign language translation and signing avatars (Wolfe *et al.* 2015; Pérez-Ugena *et al.* 2010; Content4All, also see Llewellyn-Jones in this

volume). The Horizon 2020 project MeMad, launched in January 2018 aims to use audio description for time-aligned semantic extraction of objects and the recognition of action sequences.

Whereas many of the above technology-based research projects focus on finding more economical and efficient solutions for *making* AVT products *accessible*, some headway is also being made in universal design for MA. Examples are research into accessible filmmaking, AD for the theatre and the development of inclusive audio guides for museums (Romero-Fresco 2013, 2019, Fox 2017, Branson 2017, Roofthooft ongoing research, Szarkowska and Jankowska 2015). Accessible filmmaking and in-production research for theatrical AD integrates accessibility concerns in the filmic or theatrical production process, whereas inclusive audio guides for static arts target the public at large.

#### *New types of research methodologies and tools*

Technology also influences *how* MA research is being conducted. This has meant a move from traditional Descriptive Translation Studies approaches or Functionalist approaches, often on the basis of limited case studies, to more empirical and systematic approaches. Four important developments are: (i) the introduction of corpora in MA; (ii) the related focus on the study of multimodal aspects of audiovisual texts and their translations; (iii) the importance of reception research, and finally, (iv) new instruments for the study of MA translation processes.

A first important innovation is the application of corpus-linguistic techniques and (semi) experimental research designs that take the multimodal nature of the object of study into account. The first corpora in AVT focused on the linguistic analysis of audiovisual texts and their translations. The Pavia Corpus of Film Dialogue is a case in point (Freddi 2013). Another example is the Television in Words (TIWO) corpus, the very first AD corpus, comprising over 90 transcriptions of audio described English films. More recent projects, however, try to incorporate the systematic analysis of audiovisual data in addition to linguistic data in the corpus design. Examples are the Corpus of Screen Translation (Valentini 2009), the TRACCE project, which is currently the largest AD corpus project and a true multimodal corpus with its own multimodal annotation tool called Taggetti (Jiménez and Seibel 2012, Jiménez and Gallegoa 2013). The most recent AD corpus initiatives are the Visuals Into Words (VIW) project - the first comparative AD corpus (Matamala and Villegas 2016) - and the Dutch AD corpus, including AD transcriptions and a multimodal concordancing system (Reviers 2018a and 2018b). One of the main challenges in multimodal corpus development, however, is the integration of a sound theory on multimodal meaning making in audiovisual texts and their translations. Multimodality research is an emerging paradigm and a fragmented field of study that requires more systematic development (Baldry and Thibault 2010, Tseng 2013, Reviers 2018b, Reviers 2018c).

A second technology-driven development in MA research is the exponential growth of reception research. User-centred studies have been around in MA since the beginning, in the form of interviews and questionnaires, but new techniques make it possible to consult audiences more systematically and empirically. State-of-the-art technology has also shifted the focus of reception research from investigations into audience preferences and experiences to the study of their cognitive processing of audiovisual materials. Eye tracking research is applied in both subtitling/SDH and AD (see Jakobsen in this volume). It is used to study reading speed and presentation formats in subtitling in order to test generally accepted but under-researched assumptions about how people read moving text (Perego, 2008, 2012; Romero-Fresco 2015, Szarkowska and Gerber-Moron 2018). In AD

it is contributing to the study of how people watch films and what types of information attract their attention, which contributes to deciding how to prioritize information in AD (Kruger 2012, Orero and Vilaro 2012) but also to determining AD reading rates or how much aurally received text the target audience can process (Jankowska *et al.* 2017)

A final and experimental set of instruments comes from psychology and monitors electrophysiological reactions (such as heart rate, EEG, or galvanic skin response). These instruments can be used in combination with eye tracking to study the cognitive load required to process (accessible) audiovisual material (Kruger 2019) but also to measure the extent to which the audience is immersed in a film or performance (Ramos and López 2014, Ramos 2015, Fryer and Freeman 2012, 2014). The availability of such instruments also impacts on the research questions that can be asked and provide a new inroad into monitoring quality: not only is research interested in whether accessible design helps its many target audiences to 'access' culture, it now also wants to find out whether or to what extent they can actually enjoy culture. The expansion of reception-oriented research is important given the diversification of the audiences and their diverse needs. In addition, research projects making use of mixed-methods designs investigating the comprehension, preferences and degree of immersion of diverse audiences always involve the consumers themselves, ensuring their expertise is incorporated in research and practice.

In this context, experimental research methods and technologies are also used to study the translation process from the point of view of the audiovisual translator. We mentioned the new technology of respeaking earlier; a sector in which the use of keystroke-logging research is common. Such process research into live subtitling often makes use of logging software (e.g., Inputlog or Translog), which can be installed on the respeakers' computers and registers all their keystrokes, mouse movements, internet searches and aural verbal input. The data so generated are usually incorporated in a mixed-methods design, including post-task interviews with the respeakers immediately after their performance and sometimes eye tracking.

The above survey of MA research has demonstrated how central a place technology occupies in it today but also how truly interdisciplinary it has become. This interdisciplinarity is due to the many domains on which MA operates: they cannot be covered by the expertise of 'isolated' researchers, nor can research be limited to academic approaches. Interaction with other disciplines and with the (audiovisual) industry as well as other stakeholders is essential if good progress is to be made. What started as research that could broadly be categorized as Descriptive Translation Studies, based on the study of small corpora, is evolving into predominantly technology-driven research dominated by empirical investigations, often carried out by teams within the context of national or international projects.<sup>1</sup>

# Concluding thoughts: variables and emerging issues

The differentiation and proliferation of varied forms of MA have been a constant, as discussed in this chapter. What is more, it seems difficult to predict in which direction MA and/or AVT will develop since they seem to be developing in all directions at once. This multifarious process takes place due to the activities and impact of many different actants in the field, be it in academia, the industry, on the side of the users and stakeholders or 'technology' itself. It has become clear that how certain forms of MA develop and are or could potentially be used, depends largely on the type of audiovisual product to be made

accessible, the context in which it is to be deployed, by whom, for whom and for what purpose. The ultimate aim is universal design but we have not yet fully reached that goal.

MA, like translation, is likely to become increasingly difficult to pin down. It may therefore be advisable to study it as a process rather than a given and to try and understand its complexity and constant development in terms of Latour's actants and relations between actants, with a focus on analysing processes rather than products in order to account for the hybrid character of the latter (see also Buzelin 2005: 196).

Particularly interesting for MA is the way in which Latour's ANT includes non-human and human agents as the driving forces behind processes of change: the push and pull of all actants together determines where translation is going. Interaction between practice and interdisciplinary research in its turn keeps the ball rolling, giving rise to more change, innovation and the adaptation of existing access forms.

A central emerging issue is the need to develop understanding of how MA will be used in the future and what users in different contexts will expect. Because of the diversity of MA (and translation) today, it seems to have become as difficult to define what 'quality' means as to define what 'translation', is without considering the actants that determine and use it in different contexts. The very context in which translation is used, has therefore itself become an important actant. Turning to the increased multiculturalism and multilingualism of the persons involved in the production and consumption of audiovisual material, it seems improbable that a multilingual film with three or four different idioms would manage to juggle the translations of all these languages, combine them with AD and AST, and still produce a coherent audio text or audiovisual text. However, with equally multilingual netizens and prosumers as users, who are happy to be interactive and fill in the gaps for themselves, a full and fully coherent translation may not be required. Some recent research points in that direction (Kraemer and Eppler 2018). In addition, as Berger (2010: 211) has indicated: filmmakers making documentaries about migration issues who want 'to maintain the linguistic habits of the speakers in order to confer authenticity on the multicultural societies being visualized', are themselves confronted with translation and access issues for their primary and probably multicultural target audience. Translation thereby moves up a notch on the production ladder, and of necessity, itself becomes an actant in the further emergence of universal design.

#### Note

1 A list of some major projects is provided separately with annotations.

## **Further reading**

- Pérez-González, L. (ed.) (2018) The Routledge handbook of audiovisual translation. Routledge: London and New York. | This book provides an overview of recent research topics and perspectives in audiovisual translation studies, including different forms of media accessibility, with theoretical and interdisciplinary as well as applied contributions.
- Matamala, A. and P. Orero (eds) (2016) Researching audio description. London: Palgrave Macmillan. Starr, K. and S. Braun (eds)(forthcoming) Innovation in Audio Description Research. London and New York: Routledge.| Both publications on audio description and related forms of intersemiotic translation are collections of articles offering an excellent introduction to innovative trends in audio description research.
- Rose Connell, B.; Jones, M.; Mace, R.; Mueller, J.; Mullick, A.; Ostroff, E.; Sanford J.; Steinfeld, E.; Story, M. and Vanderheiden, G. (1997) The principles of universal design. Available online: https://projects.ncsu.edu/design/cud/about\_ud/udprinciplestext.htm [Last accessed