15 Audiovisual translation and assistive technology: towards a universal design approach for online education

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Abstract

Audiovisual Translation (AVT) and Assistive Technology (AST) are two fields that share common grounds within accessibility-related research, yet they are rarely studied in combination. The reason most often lies in the fact that they have emerged from different disciplines, i.e. Translation Studies and Computer Science, making a possible combined approach quite a demanding task due to their interdisciplinarity and the need for exploration of various parameters. Moreover, by focusing on certain needs and modes, several angles are added to the investigation. At the same time, due to their specific characteristics, the possibility of practical and applicable proposals towards the achievement of accessible education can be high. This paper aims to present some basic connections between the different disciplines involved in the 'Accessible Online Education Research', whose goal is to provide a theoretical framework for the joint investigation of AVT and AST-based approaches to accessible online education, and suggest possible implementations of the two disciplines for the creation of universal educational environments.

Keywords: audiovisual translation, assistive technology, universal design, online education.

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1. Defining the research cluster

Since the understanding of this paper lies in the establishment of connections among more than one field, it is important to explain the meanings they carry within the particular research.

As a branch that has gained its place within the field of Translation Studies since the 1990s, AVT "is often defined as translation of text that (1) is transmitted through two simultaneous and complementary channels (acoustic and visual) and (2) combines several signifying codes" (Martínez-Sierra, 2008, p. 29). AVT consists of several translation practices, among which are Subtitling for the Deaf and Hard-of-hearing (SDH) and Audio Description (AD) for the blind and visually impaired, which are used mainly to serve their intended audiences. SDH is interlingual or intralingual subtitling that adheres to different norms from those of conventional subtitling with regard to reading speed and syntax. It includes additional information that is necessary in order for the audience to receive all the auditory elements initially provided by the source material. AD, on the other hand, "provides a narration of the visual elements" – "the visual made verbal" (Snyder, 2011, p. 1). Although other AVT practices have also proved their function as access services (e.g. voice-over), the current analysis focuses on these two as they are considered the basic forms of AVT used for such purposes and their morphology could allow for further application of research outcomes to other practices.

AST has been assigned various definitions, among which is "any item, piece of equipment, or system, whether acquired commercially, modified, or customised, that is commonly used to increase, maintain, or improve functional capabilities of individuals with disabilities" (ADA, 2004, Section 508). Although in the past AST was synonym to hardware, it has gradually started to encompass a variety of software used by disabled users with the aim to either substitute or facilitate hardware, while in many cases AST appliances move further to provide new innovative ways of access or satisfy emerging needs. Further categorisation of AST also varies, with the example of Cook and Hussey's (1995, pp. 6-12) differentiation between assistive and rehabilitative or educational technologies,

low to high technology, hard and soft technologies, appliances and tools, minimal to maximal technology, general or specific, and commercial versus custom technologies.

'Computer-assisted education' and 'computer-based instruction' are two terms that have been used to describe the initial phases of educational computing (Alessi & Trollip, 1991; Gibbons & Fairweather, 1998). Through several stages dating as far back as the 1960s, when the first virtual classroom was formed in the University of Illinois, we have now come to what is called Online Education, e-Learning or Online Learning. Aggarwal (2000) differentiates between three models of Web-based learning: Web-support for information storage, dissemination and retrieval; Web-support for two-way interaction; and Web-based teaching. Instances of these models can be found in the practices followed by the various dominant players in education, from traditional (non-) profit universities to distance or e-learning organisations around the world, and Online Education is now studied separately from the general field of education in many aspects due to its distinctive characteristics.

2.   Accessibility on web material through AVT and AST

Within this context, accessibility refers to the availability of online products, services or material to people with disabilities – physical, cognitive, mental, sensory, emotional, developmental or a combination of the above. This paper discusses accessibility from the point of view of sensory impairments, although the notion of accessibility is quite often seen as 'unintentionally' flexible and inclusive, since what has once been designed to cater for the needs of the deaf may also be used for other disabilities through its development.

Having been established as one of the main means of communication, information and entertainment, the Web has become part of people's lives. According to Dutton, Blank, and Groselj (2013), OxIS, one of the most recent surveys on disabilities and the Internet, found that over half (51%) of British people with a

disability use the Internet, although in half of these cases their disability limits its use. The vast movement of the last decade towards an accessible Web has emerged from several sources following various directions, while focus on audiovisual material has already dominated different discussions of standards related to accessible online material. Nowadays, the most recent version of the AST Act of 2004[2], the Europe 2020 Initiative (European Commission, 2010) of the European Commission along with the e-Inclusion and e-Accessibility Policies engaged under the i2010 framework of the EU, combined with Web accessibility standards, the most prominent being the W3C Web Accessibility Initiative, bring the need for equal access to the Web to the surface.

Due to its nature as a branch within Computer Science, AST has been present in Web accessibility considerations during its own development. However, what began as a set of 'plugged-in' assisting tools is now acquiring a more integrated form, with the example of websites designed based on screen reading requirements. In their account of the fundamental approaches to sensory aids, Cook and Hussey (1995) identify two primary intrinsic human enablers in sensory communication, sensing and perception, the limitation or absence of which demands the use of AST. They distinguish between augmentation and substitution methods for limited or absent senses respectively. While such a definition seems to emerge from medicine and has been used to refer to aids, such as magnifiers and speech-to-text converters, it is interesting how this also applies to AVT. SDH and AD are also destined for users with partial loss. With the gradual development of software that can be used for navigation and speech-to-text or text-to-speech conversion, often combined with physical aids, the Web has somewhat automatically developed the feature of accessibility, with such demands putting pressure on governments and developers.

In parallel to that, although SDH and AD are commonly known as traditional features of television or cinema, with the more accessible Web, audiovisual material inevitably follow in the queue of 'online wealth' that needs to become

2. One Hundred Eighth Congress of the United States of America; Assistive Technology Act of 2004. H. R. 4278. U.S. Government Publishing Office.

accessible. As a result, with the latest World Wide Web Consortium (W3C) guidelines developers are requested to provide alternatives for time-based media on their websites. These alternatives include equivalents for pre-recorded audio-only and video-only media, captions, conventional or extended/descriptive audio description for pre-recorded media, as well as live captions for live audio content in synchronised media, allowing SDH and AD to establish their role as access services in online contexts. With the HTML5 <video> and <audio> elements, this process becomes easier for developers. This demand proves the necessity of both AST and AVT practices for the accessibility of online environments. What is more, the BBC has published Accessibility Guidelines aiming at the provision of accessible editorial content and user experience, including the provision of caption/subtitles and the USA Government has incorporated a New Video & Multimedia Accessibility Guide under Section 508 including guidance on both captioning and AD with the use of 508-compliant players.

It is important to notice a transfer of duty towards providers in general with regard to Web content, with a possible aim to free the users of the need to buy different software and equipment since AST is often reactive in design and advances very fast, making a priori implementations more functional and necessary. Another parameter that needs to be considered is that non-accessible online environments might discourage users, which can also be argued based on the results of research conducted by Dobransky and Hargittai (2006) suggesting that "while over half of people without disabilities use a computer at home, less than a third of those with disabilities do so" and "while over half of people without impairments access the network in their homes, just over a quarter of those with disabilities do so, highlighting considerable disparities" (p. 14). Finally, although AST and AVT might seemingly have little in common, it could be argued that under the scope of accessibility, they supplement each other, while it is not rare that they exchange routes throughout their development. For example, re-speaking, speech recognition and text-to-speech conversions as well as speech processing, synthesisers and automatic translation have been developed through both fields, maybe with a different approach and at a different pace and mode, making the joint study of findings in both fields a unique research opportunity.

3.   Online education: accessibility and universal design

Not much research has been conducted in Online Learning with regard to accessible online environments. The reason often lies in the fact that such a study alone requires consideration of several aspects and a variety of theoretical approaches, since education itself is a multidisciplinary field of research. Teaching methodologies, learning environments, strategies, curriculum development and management, evaluation and assessment are only a few of the parameters considered in the design of a teaching process. When such a process is transferred from the traditional classroom to the Web, a new series of parameters that need to be considered is automatically included in the design process. According to Kearsley (2000), the elements of Online Learning include email, threaded discussions, forums, real-time conferencing, transfer of material, application software, etc. The requirements for Online Learning, e.g. computer literacy, managements of behavioural or learning difficulties, etc., also affect the choice of methods applied. In any case, training and technical support by the hosting body are a prerequisite.

When aiming at Accessible Online Education, taking the design of complete online courses or supplement material as a model case, requirements grow, since more needs have to be satisfied. With regard to sensory impairments, we could briefly refer to the need for the hosting online environment to be fully accessible, while its content and design should be following accessibility standards (including navigation, alternative texts, cross-platform application, alternative texts, etc.). Tools to enhance students' performance should be provided through the online environment. In 2010, The 'DARE to Care: Disability Accommodations tRaining Environment' project website provided tips for best enhancing accessibility of online training courses. Other American universities, including the George Washington University and the University of Colorado, formed guidelines for accessible online courses based on Section 508. More recently, CANnect (2014), a non-profit consortium with the aim of raising awareness on the needs of disabled Internet users, published a detailed guide on Accessible Online Learning Content, including both AST and AVT practices.

In the last two decades, several attempts indicate the move towards accessible online environments, both on commercial and research bases. This paper discusses holistic attempts, i.e. complete educational environments rather than specific tools, such as the SSTAT. Among the commercial platforms available, Panopto, Tegrity, MediaSite and Echo306 belong to the most popular choices of universities as systems which form learning environments that capture video, audio and screen activity, support captions and other editing features. Interesting recent research projects include DELE, a fully-iconic e-learning environment through which tutors can "define, generate and test e-learning courses for deaf people, which are automatically managed, published and served by the system itself" (Bottoni et al., 2012, p. 780), and MVP that can be used by students in class to edit lecture visuals through their own devices or cooperate in groups. European projects, like ClipFlair and the Accessible e-Learning Platform for Europe indicate the realisation of the need for holistic educational environments. Finally, open-source platforms like Moodle and LANCELOT might provide some accessibility features, yet they were not initially designed to that end. With the integration of several AST tools, Moodle attempts to offer an accessible online environment. Assessing the accessibility level of a sample online course based on principles of Universal Instructional Design, Elias (2010) indicates the lack of AST and AVT tools available to students, stressing the need for integration of tools within the platform.

It is not rare that through technological advancements, barriers might be erected where solutions should be given. As happens with websites, platforms and other online educational environments need to integrate accessibility features in their structure. This idea could capture the essence of Universal Design (UD), that is, "the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life" (NCSU, 2012, n.p.), as introduced by architect Ronald L. Mace. UD in education "goes beyond accessible design for people with disabilities to make all aspects of the educational experience more inclusive for students, parents, staff, instructors, administrators, and visitors with a great variety of characteristics" (Burgstahler, 2012, p. 1). According to McGuire, Sally, and Shaw (2006), educational applications of UD include UD

for Learning, UD for Instruction and Universal Instructional Design. Through their discussion on the framework of Considering Alternative Paradigms based on Shaw, McGuire, and Scott (2004), it seems that principles like universally designed instruction available to all students, inclusive curriculum and alternative methods for accessing teaching materials that have evolved from the reauthorisation of the IDEA Act have brought about significant changes in Education (McGuire et al., 2006).

UD has already been discussed within Online Education. In most cases, evaluation of accessibility in terms of UD is based on the principles discussed above, with alterations for application to the different mode of provision, the Web. Boyd (2006) combines UD principles and Web Accessibility guidelines, adding more elements for Web instruction in order to present an account of Guidelines for Accessible Design in Online Education. This proves that the issue of Online Education is rather complex due to the many parameters that need to be considered for the design and effective use of online educational environments. However, usability being the aim of UD seems to have the potential to provide the required educational framework for this research. AVT offers specific techniques to access services and AST tools can focus on the Web and educational aims, offering their own account in a potential combined theoretical background for Accessible Online Education. However, such an account can never be inclusive of all the aspects related to such tasks (e.g. physiological, medical, sociological, etc.).

The process of creating material for the purpose of Accessible Online Education is another step that involves adherence to various norms in order for the material itself to be accessible to all students. According to de Macedo and Ulbricht (2013), the most common deficiencies found in web access include visual and auditory deficiencies. Digital learning objects, i.e. "any digital or not entity, that can be used, reused and referenced during learning supported by technology" (IEEE-LTSC-LOM, 2005), include media content, instructional content, software, and software tools, which should be made accessible within a holistic educational context. Towards that end, de Macedo and Ulbricht (2013) have employed UD principles, as well as the W3C and IMS guidelines for accessible identical or

equivalent content based on the idea that "learning objects built considering the factors of accessibility and universal design can be used by people with disabilities just as effectively as if used by any other user" (p. 185).

4.   Considerations and conclusion

The complexity of research in Accessible Online Education due to various parameters of consideration makes such an attempt hard, but also unique. Several more aspects need to be considered, including the use of automated language processes, quality in the use of AST and AVT practices, training of the subjects interacting through the education process, or the value of AVT practices for the development of learning skills, just to name few. Yet, it cannot be denied that the future of Online Education is bright and the need for accessible contexts that will allow universal access by most potential users is a necessity. Accessibility of the whole educational context as well as the learning objects need to be the focus of the task, while a solid background for the implementation of AVT and AST practices seems to be able to form a flourishing ground for relevant studies through the successful combination of theories within the various fields involved.

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