

UNIVERSITAT AUTÒNOMA DE BARCELONA

Departament de Traducció i d'Interpretació

Doctorat 'Traducció i Estudis Interculturals'

**SUBTITLING FOR THE DEAF
AND THE HARD-OF-HEARING:
SOME PARAMETERS AND THEIR EVALUATION**

TESIS DOCTORAL

Autora:

Verónica Arnáiz-Uzquiza

Directoras:

Dra. Pilar Orero

Dra. Paula Igareda

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(Ivarsson & Caroll, 1998; Kirkland, 1999)² – have progressively and simultaneously reconfigured today's uneven subtitling panorama, turning it into little more than a collection of various – and differing – styles and guidelines available on the market. Having said that, most of these guidelines are the result of arbitrary conventions 'coined' through practice and, in many cases, as is the case with the 6-second rule,³ the guidelines are based on unknown or, for the most part, non-existent research.

Subtitling for the deaf and hard of hearing (SDH), currently one of the most relevant disciplines aimed at achieving accessibility, is directly affected by such a heterogeneous panorama. In Spain, SDH first appeared on television screens in the 1990s. Yet, it was not until 2003 that the first initiatives for harmonising this growing industry came into effect with the issuing of a non-binding UNE Standard.⁴ However, due to its non-binding nature, to the fact that it was restricted to analogue television, and to the lack of empiric validation of all parameters gathered, the accuracy and validity of this subtitling standard has been questioned since its conception (Arnaíz Uzquiza, 2008; Pereira & Lorenzo, 2005).

Similarly, as Kirkland (1999) points out, current SDH standards throughout the world are based on relaxed and open criteria for the application of specific parameters relating to character identification, context information description, colour definition, orthotypographical conventions or reading speeds. Now that analogue television is progressively being replaced by digital television and we are moving towards new technological possibilities and audiovisual products, traditional subtitling standards also need to be revisited since they were specifically developed

2 Kirkland (1999) summarises the current state-of-the-art as follows: "[...] The current style of captions is affected by the limitations of analog television technology and decoder capabilities. Within these technical limits, various captioning practises and policies evolved, creating a "style" of captioning that utilizes a subset of the features provided by the technology. [...] there are several options that relate to these matters of style that could be varied to best meet the needs of people who are deaf, hard of hearing, learning English, learning to read, or otherwise able to benefit from captions." (p. 251)

3 "[...] This rule [6-second rule] is being applied in all countries that use subtitles, although no one seems to know why." (Gielen & d'Ydewalle, 1992, p. 248).

4 UNE 153010: *Subtitulado para personas sordas y personas con discapacidad auditiva. Subtitulado a través del teletexto* (Subtitling for Deaf and Hard of hearing People. Subtitling by teletext) issued by AENOR (Spanish Association for Standardisation and Certification) (2003).

for teletext production and the ongoing adoption of these standards seem outdated and vague.

Under this distorted panorama, institutions, professionals, scholars and users have continuously put forward a set of initiatives to update and review the SDH production scene, including surveys, training and regulatory bodies.⁵ Finally, in 2005 the Spanish National Centre for Subtitling and Audiodescription (CESyA) was created and its aim was to promote and harmonise accessibility in Spain. But much has yet to be done and research is still being carried out to try to establish a basis for more standardised development in the near future.

It is this context into which the SUBSORDIG project fits. The project tries to look for the necessary framework to analyse current styles by following a bottom-up methodology. A close look at the results obtained, first from a pilot study, and then from the body of research, highlights the importance of data collection and analysis.

The growing evolution of multidisciplinary studies and the need for further research on perception studies within audiovisual translation and accessibility have led us to new technologies. New tools such as eye-trackers can now help us bridge the gap between long-lasting subjective SDH practices and increasing calls for empirically based, standardised guidelines.

2. SUBSORDIG: The project

The SUBSORDIG project was initially envisaged for the research and development of criteria for subtitling for the deaf and hard of hearing in digital television. Its aim is to analyse current subtitling production, comparing examples from the Spanish scene with different practices and styles which are used in other countries. Examples of subtitling guidelines were taken from Australia, Belgium, Canada, France, Ireland, Italy, Spain, Swit-

5 Some examples of these initiatives were the issuing of the subtitling standard UNE 153010 (AENOR, 2003); state-of-the-art studies by CMT (Pardina i Mundó, 2000), and the *Real Patronato sobre Discapacidad* – "Estudio de Viabilidad del Centro Español de Subtitulado: FASES I y II" (RPD, 2004–2005).

zerland, the United Kingdom and the United States (see Appendix 1), whereas further information or real production was found in the *Comparative Subtitling* project carried out by the European Association of Studies in Screen Translation (ESIST).⁶

The project, designed for implementing SDH for digital television, focuses on the most important parameters involved in current SDH production on the audiovisual market. It examines the adequacy of a set of local, national and foreign conventions applied to some technical, stylistic and linguistic parameters in subtitling. Examples of parameters are font type and font size, character identification, subtitle placement, linguistic strategies in use – verbatim subtitling versus condensation or reduction –, etc.

Once the desired parameters have been identified, they are applied to the subtitling of different short videos that are presented to three different groups of users – twenty deaf, hard of hearing and hearing viewers per group – for both adult and child audiences. Volunteers are subsequently asked to fill in different personal questionnaires and preference and comprehension questionnaires. This procedure, repeated in a number of cities across Spain (Barcelona, Madrid, Vigo and Burgos), aims to detect and analyse whether differences can be identified depending on the local development and social reality of deaf users within their local communities. Bilingual communities such as Catalonia (Barcelona) and Galicia (Vigo) were represented in the test together with monolingual ones, such as Madrid or Castile.

3. SUBSORDIG: Pilot study

All the data gathered in the SUBSORDIG project aimed to shed light on the formula for the elaboration of perfect – non-customised – subtiles. Therefore, in order to outline the final test and avoid unexpected results, it was first necessary to launch a pilot study with the goal of identifying general mistakes and weak areas within the tests to be conducted.

⁶ For more information on the *Comparative Subtitling* project and ESIST turn to <<http://www.esist.org/projects.html>> (Retrieved 7 May 2008).

The pilot study – ‘control group’ in our research – was carried out with a sample audience – five users per group – in Barcelona and the *Asociación de Implantados Cocleares en España* (AICE).

The three groups⁷ which participated in the pilot study were shown the videos and given the questionnaires. Their answers, together with their feedback, were vital in detecting problems and preventing further disruptions in our study. At the same time, new areas of interest concerning SDH elaboration and perception arose when examining the data.

The first problem that arose, and a basic example of subsequent reorganisation which was carried out, concerned the identification of age groups. Throughout our pilot study we were able to confirm the differences between younger and older audiences in terms of subtitling preferences – and even perception – already exposed in previous research projects.⁸ Adult viewers – aged 21 to 65 – showed particularly varied choices for the first visible part of subtitles: characters and fonts.⁹ Deaf, hard of hearing, and hearers under 50 showed their preference for Verdana whereas older viewers – 50 to 65 – preferred Arial or Tiresias in all three groups. This fact, unexpected when the project was first outlined, led us to redefine age groups within the existing categories. Was this difference caused by habit, cultural or perceptual – sight – reasons? Questionnaires, previously thought to provide useful background information on each viewer’s socio-cultural profile, revealed vague answers that frequently did not match results derived from comprehension or preference tests. It was by analysing and processing all the data gathered that the second main difficulty came to light: subjectivity and sociocultural inference.

The direct influence of subjective responses in data collection is perfectly described by Schiessl, Duda, Thölke, and Fischer (2003), who sum-

⁷ Each group consisted of five deaf, five hard of hearing and five hearing adults.

⁸ D’Ydewalle and Gieflen (1992), Kirkland (1999) and Peli, Goldstein and Woods (2005) conducted different experiments to trace reading and perception patterns in young and old audiences. In all cases, common patterns and differences were identified between the major age groups.

⁹ Technologically restricted by analogue teletext restrictions, font types have traditionally been taken for granted and their application has been limited without questioning their functionality. New audiovisual technologies have brought new possibilities, making further analysis essential. Furthermore, the great differences implied in font type variations make the study of such variations compulsory for any possible modification of current SDH parameters.

marise the problems that these sort of studies encounter when dealing with people's reactions as follows:

Another well known major validity problem using conventional usability methods arises when testing subjects in an artificial environment, such as a usability lab. Subjects are aware of the test situation. The description and verbalisation of their own behaviour might be biased in terms of social expectations, political correctness or simply to give a good impression. (p. 9)

Although in our case subjects were not confined to a proper usability lab, conditions were far from being those found in real life. This might also have influenced their responses.

As we can see, the presence of subjective thinking might condition research output, making it essential to develop scientific tools that help us to differentiate between instinctive and acquired – or pretended – behaviour in subtitle reading. However, further research is still required to determine the steps and methodologies to be applied for obtaining 'sterilised' data.

4. Further research: Perception studies and eye-tracking

As early as 1992 Gielen and d'Ydewalle (1992) confirmed that

[...] this strategy [information processing: subtitles + images] is already being developed in childhood and because of long-standing experience it is largely based on automatic processes. Some observations, however, indicate that the reading of subtitles should not be considered as a purely automatically elicited type of behaviour [...] (p. 257)

Thus, taking into account a partly automatic nature, it is then essential to analyse common patterns in reading behaviours to determine a set of basic elements in further research on the topic.

Some other researchers also remark on the lack of information on this abnormal type of 'reading'. Jensema (2000) claims the following that

[...] Over the last 20 years, closed captioning has evolved from a PBS engineering development project to an established part of the overall television system in the United States. Millions of dollars are spent each year providing captioning services,

but it is still not known exactly where people are looking when they watch captioned television (e.g. at the captions, at the picture) and how their eyes scan the screen to absorb the information. (pp. 275–276)

This statement, also valid for most European countries in which SDH ('captioning' overseas) is practised, describes the real situation of the SDH practice. It becomes essential to adopt technologies that enable researchers to make complete recordings of the viewers' perceptions of the audiovisual product. Nevertheless, ongoing projects are still trying to define successful procedures that help to remove all subjective, individualised, conditioned or acquired behaviours that have progressively marked the subtitling produced today.

This was traditionally questioned, first in film, then in psychology, and now in accessibility studies, and has allowed scientific tools such as eye-tracking technologies – currently used in other disciplines such as psychology, gerontology, marketing and medicine – to enable further research based on objective analysis. Its long-lasting presence in such diverse fields of study provides us with a reliable example of its potential application in SDH. In our project, eye-tracking technology formed the basis for confronting existing SDH parameters with real objectives and instinctive reading behaviours.

Eye-tracking studies date back to 1890 (Jacob & Karn, 2003), although technological developments in search of an accurate methodology for data collection did not make their effective application to subtitle reading possible until the 1970s (Jensema, 2000).

As De Graef, Van Rensbergen and d'Ydewalle (1985) describe:

[...] The eye movement pattern and the attention shift between the image and the subtitles are measured with the use of the pupil-center corneal-reflection method. This method allows the determination of the subject's point of regard by employing a vector, which is continually being calculated between the center of the pupil and the corneal reflection. (p. 5)

Nowadays eye-tracking technology may be found in many different areas and in recent years different fields of research have turned their attention to the use of this technology in perception studies. Publicity, computing, psycholinguistics, medicine and usability are some of the areas to have recently adopted such an accurate tool and applied its results in a number of ways. Within the field of psychology and its psycholinguistic variant, a

number of studies have been conducted with a focus on the reading and perception of simple stimuli with ordinary texts or pictures. Within audio-visual disciplines, there have been several projects that have applied eye-tracking to different studies in film perception, revealing frequency patterns in TV and film viewing (e.g., d'Ydewalle, Warlop & Van Rensbergen, 1989; Peli, Goldstein & Woods, 2005).

But, as eye-tracking studies evolve and their research possibilities increase, studies are multiplying, adapting and adopting various stimuli into their projects. Different authors such as Chapdelaine, Gouaillier, Beaulieu and Gagnon (2007), d'Ydewalle & Van Rensbergen (1987), d'Ydewalle, Warlop & Van Rensbergen (1989), d'Ydewalle, Praet, Verfaillie & Van Rensbergen (1991), Jensema (2000) and Kirkland (1999) have applied this tool to analyse SDH perception in recent decades. However, the amount of information derived from all these pilot studies makes further research necessary in the field. Whereas in 1987, d'Ydewalle & Van Rensbergen (1987) claimed that "[...] switching between the visual image and the subtitle obscures to a certain extent the normal patterns of eye movements in reading" (p. 321), three years later Jensema (2000) stated that "[...] In general, people who view a particular video segment have similar eye movement patterns. The addition of captions to a video results in a major change in eye movement patterns, and the viewing process becomes much more of a reading process" (p. 284). Furthermore, later studies based on eye-tracking application to SDH subtitling and conducted by CRIM¹⁰ in Canada have revealed that

[...] Impaired viewers had different strategies not only for reading caption but also for watching the visual content [...] We found that they spent significantly less time reading caption than hearing viewers and time allocated would vary not only upon caption rate, but also motion level in images. So any assessment made by hearing human on caption rate while captioning may be inaccurate if based on reading speed only (quoted in Chapdelaine, Gouaillier, Beaulieu & Gagnon, 2007, p. 10)

So, as we can see, although perception, comprehension and reading behaviours have traditionally been the principal key to this type of studies, differences emerging from these projects reinforce the idea that further research is still necessary, especially with regard to SDH and deaf audiences.

10 For further information consult <http://www.crim.ca/fr/index.html>

5. Conclusions

The current international scene for SDH is the result of a wide range of different styles and practices in use. Research projects such as the SUBSORDIG project are highlighting how these practices, however diverse, (in)adequate or (il)logical they may be, are always preferred – within their specific areas of influence – to other possible implemented styles.

Previous and ongoing research methodologies applied to test subtitle reception have traditionally been based on personal interviews and questionnaires on user preferences, but, as we have seen, results derived from such data collection methods cannot be over-analysed as a result of the imprecise nature of the data. The tight bond between practices and preferences, the lack of accuracy and certainty in conventional usability research methods, together with the generalised lack of empirical evidence behind any of the isolated parameters configuring the different subtitling guides, make it essential that we harmonise production styles by following identical guidelines based on parameters obtained through scientific research.

In recent years, the growing inter- and multidisciplinary and the emergence of new technological methodologies have provided the fields of audiovisual translation and accessibility with empirical tools that can help eradicate subjectivity from the existing SDH guidelines. Eye-tracking, tracing perception through the analysis of eye movements, offers the possibility of gathering accurate and precise data that could help us to maximise – and to increase – reading speeds; to identify 'best practises' in subtitling; to adjust existing parameters, and for the most part, to standardise a practice which, at the time of writing this contribution, remains arbitrary.

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Appendix I

Subtitling guidelines analysed in the SUBSORDIG project

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PABLO ROMERO-FRESCO

D'Artagnan and the Seven Musketeers: SUBSORDIG travels to Europe¹

The imminent analogue switch-off and the move to digital TV in Europe have pushed an increasing number of audiovisual translation scholars to work closely with broadcasters and users in projects aimed at providing accessible contents in the digital medium. This is the case of DTV4ALL, a EU-funded project involving broadcasters, providers and universities that attempts to facilitate the availability of access services on digital television in Europe. The aim of this article is to present D'Artagnan, the part of DTV4ALL dealing with subtitles for the deaf and hard of hearing (SDH). First of all, a description is provided of the rationale, methodology and timescale of the project, which attempts both to ascertain the viewers' preferences in relation to a given set of subtitling parameters and to obtain objective data through the use of eye-tracking technology. This contribution also includes a discussion of the first results obtained in the UK and Spain, where groups of Deaf, hard of hearing and hearing viewers were shown excerpts from the film Stuart Little 2 with different types of SDH and were asked to express their opinions regarding formal parameters such as font, size, position and character identification. These preliminary findings point to the existence of some common patterns but also to the existence of many discrepancies between viewers, both across and within countries, which highlights the difficulty involved in the harmonisation of SDH in Europe.

1 This paper is part of the EC research project DTV4ALL (<<http://www.psp-dtv4all.org/>>).

Notes on contributors

VERÓNICA ARNAÍZ UZQUIZA has a BA in Translation and Interpreting and an MA in Specialised Translation, both from the Universidad de Valladolid in Spain. In addition, she also has an MA in Audiovisual Translation from the Universitat Autònoma de Barcelona. She is currently employed as a lecturer at the Universidad de Valladolid in the official postgraduate master in Professional and Institutional Translation. Her fields of interest are audiovisual translation, subtitling for the deaf and hard of hearing and accessibility. She is a member of the research group Transmedia Catalonia.

INMACULADA BÁEZ MONTERO, a graduate in Spanish Philology from the Universidad de Salamanca (1983), has a PhD from the Universidad de Santiago de Compostela (1995). She is currently a senior lecturer in the Spanish Language department at the Universidade de Vigo. From the academic year 2004–2005, she has coordinated the PhD programme *Language and the Information Society: Linguistics and its applications* (with MEC Quality Award 2004/00215), which consists of, among other modules, a sign language oriented module. She is also responsible for the Sign Language and Spanish as a Foreign Language courses at the Universidade de Vigo. She has published several works on grammar, research methodology, sociolinguistics and the history of sign languages. She has also been in charge of research aimed at developing sign language in people with developmental difficulties with therapeutic outcomes. She has co-supervised Ana Fernández Soneira's thesis and several Diplomas of Advanced Studies on bilingualism and subtitling for the deaf. She has been the chief researcher in different state-financed research projects carried out by the Sign Languages Research Unit at the Universidade de Vigo since the unit was founded in 1992.

EDUARD BARTOLL is an audiovisual translator, who translates mainly from English and German, but also from French, Portuguese and Italian, into Catalan and Spanish. He has subtitled more than 500 films and he translates plays too. He works at the Universitat Pompeu Fabra, in Barcelona, as a lecturer in translation (German into Catalan), and in the Master in Audiovisual Translation, at the Universitat Autònoma de Barcelona, also in its online version. His PhD on subtitling will soon be published in Catalan. In addition, he is a member of the research group Transmedia Catalonia.

JEAN-FRANÇOIS BEAUMONT was a research assistant at the Centre de recherche informatique de Montréal (CRIM). He has a degree in electrical engineering from the École de technologie supérieure (ÉTS) and an MA in Computer Engineering from McGill University.

MARYSE BOISVERT is a research assistant at the Centre de recherche informatique de Montréal (CRIM). She is trained in the field of statistical learning, specialising in natural

10.6.7

'A comprehensive bibliography on subtitling for the deaf and hard of hearing from a Multidisciplinary approach', in Matamala, Anna and Pilar Orero (Eds) *Listening to Subtitles: Subtitles for the Deaf and Hard of Hearing*, Bern: Peter-Lang. (2010). (163-174)

This book is the first monographic study on subtitles for the deaf and hard of hearing from a multidisciplinary perspective, from engineering to philology. The book departs from studies, analyses, tests, validations, resulting data, and their application from the nation-wide research on accessibility and usability of subtitles carried out in Spain.

Tests and further analysis were carried out paying attention to users' hearing profiles, the many formal features of subtitles – size, font, colour, position, etc. –, and the syntax of the subtitle. The book also contains articles which discuss present and future research on subtitles for the deaf and hard of hearing carried out in Canada and across Europe: Belgium, Denmark, Italy, Poland, Spain, and UK. It provides an outlook for the implementation of the European Guidelines on Media Accessibility.

Anna Matamala and **Pilar Orero** lecture at UAB (Spain), where they coordinate two MA Degrees in Audiovisual Translation: <http://www.fti.uab.es/audiovisual/> and <http://www.fti.uab.es/onptav/>. They have a wide experience as professional translators for broadcasters such as TVC, TVE and BBC and are authors of many publications and coordinators of research projects regarding Media Accessibility such as the European DTV4ALL. They belong to TransMedia and lead TransMedia Catalonia.

Anna Matamala & Pilar Orero (eds)

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Contents

Introduction	11
PETER OLAF LOOMS Prologue: Digital television for some or for all?	19
INMACULADA C. BÁEZ MONTERO, ANA M ^A FERNÁNDEZ SONEIRA Spanish deaf people as recipients of closed captioning	25
CARMEN CABEZA-PEREIRO The development of writing and grammatisation: The case of the deaf	45
FRANCISCO UTRAY, BELÉN RUIZ, JOSÉ ANTONIO MOREIRO Maximum font size for subtitles in Standard Definition Digital Television: Tests for a font magnifying application	59
EDUARD BARTOLL, ANJANA MARTÍNEZ TEJERINA The positioning of subtitles for the deaf and hard of hearing	69
ANA PEREIRA Criteria for elaborating subtitles for deaf and hard of hearing adults in Spain: Description of a case study	87
ANA PEREIRA Including Spanish Sign Language in subtitles for the deaf and hard of hearing	103
LOURDES LORENZO Subtitling for deaf and hard of hearing children in Spain: A case study	115

LOURDES LORENZO Criteria for elaborating subtitles for deaf and hard of hearing children in Spain: A guide of good practice.....	139
CLARA CIVERA, PILAR ORERO Introducing icons in subtitles for the deaf and hard of hearing: Optimising reception?	149
VERÓNICA ARNAÍZ UZQUIZA SUBSORDIG: The need for a deep analysis of data	163
PABLO ROMERO-FRESCO D'Artagnan and the Seven Musketeers: SUBSORDIG travels to Europe	175
GILLES BOULIANNE, JEAN-FRANÇOIS BEAUMONT, MARYSE BOISVERT, JULIE BROUSSEAU, PATRICK CARDINAL, CLAUDE CHAPDELAINÉ, MICHEL COMEAU, PIERRE OUELLET, FRÉDÉRIC OSTERRATH, PIERRE DUMOUCHEL Shadow speaking for real-time closed-captioning of TV broadcasts in French	191
ÁLVARO PÉREZ-UGENA, RICARDO VIZCAÍNO-LAORGA, DEBORAH ROLPH Subtitles for the deaf and hard of hearing within a virtual avatar environment: ULISES	209
ANA PEREIRA, VERÓNICA ARNAÍZ UZQUIZA A comprehensive bibliography on subtitling for the deaf and hard of hearing from a multidisciplinary approach	219
Notes on contributors	229

ANNA MATAMALA, PILAR ORERO, ANA PEREIRA

Introduction

This book is one of the outcomes of the project *Research and development of the criteria regarding the creation of subtitles for the deaf and hard of hearing for digital television*.¹ The project was a research collaboration between lecturers who come from an interdisciplinary background and who are active at the following Spanish universities: Universidade de Vigo, Universitat Autònoma de Barcelona, Universidad de Deusto, Universidad Carlos III, and Universidad Rey Juan Carlos. The book also publishes some results from the R + D project,² which was financed by the Spanish Ministry of Education and which is considered to be a first step in the new international pilot project financed by the European Commission entitled *Digital Television for All*.³

The aim of all three projects is the improvement of the quality of audiovisual accessible material whose users have hearing problems of an either age-related or illness-related nature. These collaborations are a first step towards a European comprehensive scientific study, which may serve as point of departure for drafting new guidelines for subtitling for the deaf in digital television. These new guidelines, which may be or become part of local legislation, should be seen as an attempt to standardise subtitles in different platforms, a claim which Spanish deaf and hard of hearing users have been requesting for years.

- 1 The project was originally drawn up under the Spanish title *Investigación y desarrollo de criterios para la elaboración de subtítulos para sordos en la televisión digital* and was financed by the Spanish Ministry of Work and Social Affairs. [reference: SUBSORDIG 76/06]
- 2 The project was originally drawn up under the Spanish title *La subtitulación para sordos y la audiodescripción: Primeras aproximaciones científicas y su aplicación* (English translation: *Subtitles for the deaf and hard of hearing and audio description: First scientific approaches and their application*). [reference: HUM2006- 03653FILO]
- 3 Digital Television for All (DTV4All) [reference: 224994], which is part of the EC Competitiveness and Innovation Framework Programme. ICT Policy Support Programme (ICT PSP), ICT for accessibility, ICT PSP/2007/1 PILOT TYPE B.

4. Conclusions

The project, in adding to the contributions made by previous developments, presents the challenge of integrating sign language into a system which would generate the signs automatically. Technically this is possible, even though it may require adjustments in both the mode of generating transitions and impact by means of reducing redundant information both visual (contextual images) and textual (subtitles).

In addition to being a system which provides assistance, ULISES is, above all, an acknowledgement, a way of making the deaf community visible by means of the contribution of a system. Although, at first glance, the system may be considered of use exclusively for a small community, it could be of use to anyone, especially with regard to emergency warnings and basic information. The development of a system with semi-universal comprehension is the goal of the system that is trying to use avatars as a way of humanising channels of information.

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ANA PEREIRA, VERÓNICA ARNAÍZ UZQUIZA

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1 This paper is part of the research project *La subtitulación para sordos y la audiodescripción: Primeras aproximaciones científicas y su aplicación* (Subtitling for the Deaf and Hard of Hearing and Audiodescription: First scientific approaches and their application) (reference HUM2006-03653FILO) funded by the Spanish ministry of education.

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