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Using Multimedia Materials in the Teaching of Scientific and Technical Translation[1]

Contents

Abstract

Information technology has changed the professional environment of scientific and technical translators, who must understand the meaning of texts relying on non-textual information, new formats and channels of information, before translating them appropriately. To meet these new challenges, translation teachers must place special emphasis on the importance of pictorial, graphic and acoustic information in texts, and must adopt a more dynamic approach towards audiovisual translation (AVT).

In this paper, we argue for the inclusion of multimedia texts as objects of study in AVT. In particular, we present the results of a research project aimed at designing teaching materials for audiovisual, scientific and technical translation. The materials developed increase students awareness of the potential benefits of audiovisual resources for all users, including those with disabilities (accessibility), in the acquisition of field knowledge and terminology. Students also learn to take into account the constraints imposed on translation by visual and acoustic material in ever-changing formats. In line with other traditional forms of AVT, multimedia translation requires creativity, a deep understanding of intercultural aspects, and the selection of relevant information.

1 New perspectives in audiovisual translation: new formats and channels of information

In the same way as information technology has changed the competences of scientific and technical translators, it has also widened our perception of Audiovisual Translation (AVT), which is no longer limited to subtitling, dubbing and voice-over. Nowadays, AVT includes

[1] This research is part of the project PUERTOTERM: knowledge representation and the generation of terminological resources within the domain of Coastal Engineering, BFF2003-04720, funded by the Spanish Ministry of Education.

new formats and new channels of information, since, as Neves and Remael (forthcoming) state, "AVT is mingling with multimedia translation and localization, channelling our access to information and entertainment that are today, more than ever linked".

Consequently, we argue for the inclusion of multimedia material in the translation classroom as a valuable means for students to become familiar with emerging forms of translation which highlight the knowledge of the subject field and its conventions, combined with some knowledge of audiovisual formats. The impact of the multimedia scenario has led to the appearance of the field of **audiovisual localization** as a theme for forthcoming conferences (i.e. Languages and the Media 2006).

This study has been carried out within a R&D project financed by the Spanish Ministry of Education aimed at the generation of terminological resources within the domain of Coastal Engineering. The methodology and results of this project are also useful for the design of teaching materials in the context of Scientific, Technical Translation (Localization), and Audiovisual Translation at university level (Tercedor and Abadía 2005; López *et al* (forthcoming). Our students are 3rd and 4th year students working from English to Spanish and from Spanish to English in the BA in Translation and Interpreting of the University of Granada[2].

Our pedagogical approach is **social constructivism** and **collaborative learning** (Kiraly 2000, González Davies 2004). As opposed to the traditional translation classroom where knowledge would pass from the teacher to the students, in the collaborative classroom, the teacher acts as facilitator in the learning process, and the classroom is not separated from the real world. The translation brief is carried out under real-world conditions: there is a client and an expert in the subject field, and students work in groups and rotate their roles.

The first aim of this paper is to argue for the inclusion of multimedia contents as objects of study in AVT. We propose that AVT should be extended to entail more than just film translation for subtitling or dubbing. Our second aim is to design multimedia teaching materials that will enable students to:

- Assess potential internationalization and localization problems of a multimedia text in multiple subject fields
- Become acquainted with the tools available to manipulate multimedia objects and their use
- Increase their awareness of, and sensitivity to, complex translational problems in multimedia scenarios
- Strengthen their skills to work in teams and cooperate with others
- Become aware of accessibility as a new requirement for web and multimedia contents

These multimedia materials can be used in two different ways in the scientific and technical translation classroom: (a) as objects of translation (in localization, dubbing or subtitling) or (b) as instructional resources when translating a scientific written text.

[2] These teaching materials have been proposed in an innovation action called *Localization of multimedia texts: creation of teaching resources in the scientific and technical classroom.*

2 Theoretical and methodological framework: dynamic images and text, knowledge representation and creative translations

The interaction of image and words in audiovisual material facilitates the comprehension and learning process, knowledge representation and the translation process, as shown in the following section.

2.1 The role and functions of multimedia objects in knowledge representation

An important issue regarding knowledge representation is the need to include information in other formats different from the most common verbal codification, in order to enhance textual comprehension. Despite its significant role in the transfer of information, the use of multimedia materials, especially pictorial elements, is still relatively infrequent, and occurs mostly in areas such as knowledge and science popularization or in educational contexts. Some language technologists argue that multimedia increases costs due to the complexity in producing pictorial interfaces. However, images are a means of information representation and transfer which promote the reader's understanding of how a scientific system works (Mayer and Gallini 1990). The **contiguity principle** (Mayer and Anderson 1992) proposes the extended use of graphic information, especially of dynamic resources (different formats of video and animation) and illustrations that promote interpretation processes in educational multimedia environments since the effectiveness of multimedia instruction increases when words and pictures are presented contiguously (rather than isolated from one another) in time or space.

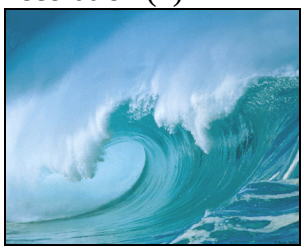
Pictorial elements help to retain information in the working memory, to store it in the long-term memory and to recall conceptual relations for further categorization and problem-solving processes (Parrish 1999). This is particularly relevant when both systems, verbal and pictorial, are presented as an interrelated whole. The principle of contiguity derives from the **dual-coding theory** (Paivio 1971, 1990), according to which information clusters are stored in the long-term memory both in the form of verbal propositions and of mental images. Paivio assumes the existence of two different information-processing systems which involve a dual codification of knowledge: verbal and visual. Such a dual system is linked by means of the visual superiority effect to a visual memory module which contributes to a higher retention rate in comparison to lexical memory. As a result, categorization and the sub-processes involved (retention, storing, recall and eventually understanding) are easier when information appears in a doubly encoded interface containing linguistic and graphic representations.

Most research on dynamic images have used educational movies and have concluded that animations, involving movement and audio have very positive effects in the learning process, mainly when they are aimed at the representation of essential characteristics of a concept or its complex procedural nature (Anglin et al 2004; Faber et al 2005).

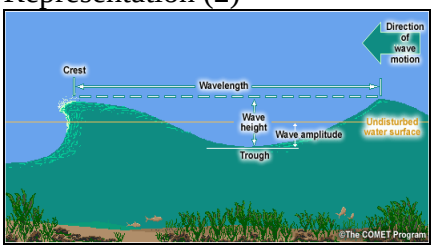
Levin (1981) and Mayer and Gallini (1990) identified five prose learning functions in text-embedded images (Tab. 1). They can also be applied to multimedia resources containing dynamic elements and audio.

The decoration function is associated to images which are not relevant to the text but make it more attractive. Image 1 represents the concept WAVE but it does not add anything new to what it is verbally conveyed, except for an adornment. On the contrary, representational images are normally intended to convey the significant elements in the text. In this regard, Image 2 shows the most important concepts in the ANATOMY OF A WAVE and their interrelations, highlighting their verbal description. The organizational role contributes to create internal coherence and to build up an integrated structure.

Decoration (1)

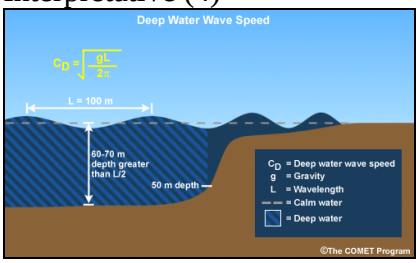


Representation (2)

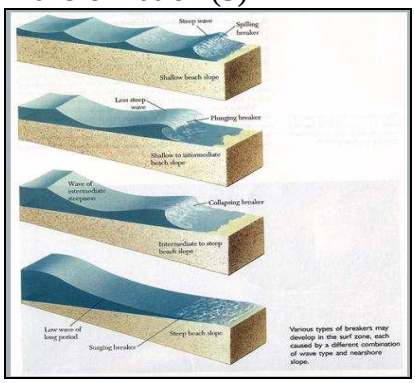


Organization (3)

Interpretative (4)



Transformation (5)



Tab. 1: Image functions and examples

Image 3 represents the concept HYDROLOGIC CYCLE and describes the different stages which make up the whole process creating a coherent unit jointly with the verbal explanation of the water cycle and its progression. Interpretative images enhance the clarification of passages and concepts difficult to understand. Image 4 shows the concept DEEP WATER WAVE SPEED by means of the representation of its mathematical traits in the form of symbols and the water depth in the form of iconic elements. The combined use of iconic and non-iconic pictorial elements reflects its conceptual complexity. The transformational function present in Image 5 is linked to special pictorial elements acting as a mnemonic technique. The representation of the different types of BREAKERS (surging, plunging, collapsing and spilling) is an aid to recall the information which depicts each type and the differences between them.

2.2 A process-oriented Frame Semantics' approach to knowledge representation

Considering that the coastal engineering domain is clearly dynamic, knowledge representation entails becoming aware of the actions and the participants described in specialized texts. Faber *et al* (2005), in line with Barsalou (2003), claim that any representation of specialized knowledge must be dynamic and process-oriented with goal-derived categories that provide mappings from roles in action sequences to instantiations in the environment. These conceptual mappings will only occur in the minds of our students, if we conveniently exploit

audiovisual material in the classroom. More specifically, we have to ask our students to manipulate the material (Asher 1982)[3], to connect images to words, and to relate conceptual categories to their previous knowledge or some sort of general event, following a Frame Semantics perspective (Fillmore 1985).

The *frame* notion can be a means for grasping the meaning of the text and establishing links between concepts and specialized terms because a *frame* (Fillmore 1976) is a system of concepts interrelated in such a way that one concept evokes the entire system. Semantic networks are divided into domains, the domains into frames, and the frames into interrelated concepts. Therefore, we provide students with a conceptual frame representing the main processes involved in coastal engineering: the **Coastal Engineering Event** (Faber *et al* 2005).

2.3 Visualization and creativity

Images and multimedia objects facilitate not only the learning process, but also the translation process. According to Kussmaul (2005) visualizations may lead to creative translations, in other words, translations that show changes when compared with the source text, thereby bringing in something that is novel.

The new formats of scientific translation (that include more than ever audiovisual material in line with the notion of *infotainment*) have widened the scope both of scientific and audiovisual translation. Translators are now faced with new constraints (and possibilities) as well as with translation problems that demand increasingly creative solutions. And we believe that creativity is aroused in a collaborative classroom (Kiraly 2000) with authentic materials that combine images and texts.

Therefore, we ask students to describe and compare in the target language the visual material provided in order to facilitate the *visualization* process, the activation of words belonging to the *frame*, and the linking of verbal and visual information in long-term memory. They record this verbal description in the target language using Windows Movie Maker or the record mode of an MP3 player. In this way, they will have a register of their first impressions, and of what they consider to be the prototypical elements of the scene. These informal *Thinking Aloud Protocols* will allow students and researchers to better understand the mental processes involved in the comprehension of audiovisual material and in translation.

3 Working with accessible multimedia contents in the translation classroom

The shift from static materials to multimedia contents is becoming commonplace in all fields of knowledge and text genres. Translating multimedia materials can be quite a challenge since length and duration restrictions apply to tasks such as script translation for captions/subtitling and dubbing purposes. However, there is a new context of work for translators in multimedia scenarios: working with accessibility in mind. Some translation scholars (Orero 2005; Neves 2004 *inter alia*) have defended the inclusion of accessibility in translation studies as a response to the 'Design for all' program of the UE. In such a context, e-accessibility is defined as "the integration of all users into the Information Society, i.e. older people, people with disabilities and also people placed in *impaired environments*".

Furthermore, multimedia is understood as the combination of text, graphics, video, animation, and sound. Therefore a given piece of multimedia content should be presented in

[3] Asher (1982: 64) claims that optimal learning takes place when students construct a new reality through the direct manipulation of people, places and things.

such a way that it complies with the access needs of each media type represented. Since a multi-modal presentation of information can be easier to grasp, multimedia can be useful for many groups of users.

Consequently, we believe that accessibility can be fostered in different tasks in the translation classroom at various levels. We argue for the enhancement of accessibility in the translation classroom, both to give response to a social need and to bring students closer to a commonplace professional environment.

3.1 Accessibility and the W3 Consortium

Internet is an inexhaustible source not only of didactic and entertainment texts, but also of freeware and shareware programs to manipulate these texts. In the context of translating for the Web, according to the W3 Consortium, web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web.

Nevertheless, accessibility is not only about providing information to people with disabilities. The new multimedia formats suggest that information is suited to a variety of users, as regards level of expertise. In such a context, translating with accessibility in mind implies providing alternative formats, and knowing how to respond to the various information needs as regards to the level of literacy/expertise. Therefore, web accessibility also benefits other users, including those with low literacy.

One of the aspects dealt with in web translation is the provision of text equivalents for images. Discrete text equivalents –when rendered by players or assistive technologies to the screen, as speech, or on a dynamic Braille display– allow users to make use of the multimedia object, even if they cannot make use of all of its content. For instance, providing a text equivalent of an image that is part of a link will enable someone with blindness to decide whether to follow the link or not, as stated in a W3C recommendation (see Section 3.2.).

Following the Guideline 1.1 of the WCAG 2.0, we base our work on the basic rule of providing text alternatives for all non-textual content, providing text for multimedia material, and for audio-only and video-only material.

3.2 Film Translation: a pedagogical tool for learning the recommendations of the W3 Consortium

In the context of audiovisual scenarios, and according to the W3 Consortium, accessibility problems include the lack of captions, transcripts or audio descriptions in digital videos. Two special equivalents that promote accessibility are captions and auditory descriptions. A caption is a text transcript of spoken words and non-spoken sound effects that provides the same information as a presentation's audio stream and is synchronized with the video track of the presentation. Captions benefit people who are deaf, hard of hearing, or who have auditory learning disabilities. They also benefit anyone in a setting where audio tracks would cause disturbance, where ambient noise in the audio track or listening environment prevents them from hearing the audio track, or when they have difficulties in understanding spoken language.

Just as developers are working to enhance the accessibility of multimedia for all users, translators are faced with the new challenge of adapting or providing captions, transcripts and audio descriptions within the multimedia formats they work with.

The recommendations of the W3 Consortium include enhancing accessibility for text, audio and images, since multimedia can combine all of these elements. We propose a progressive introduction of accessibility features in the translation classroom, from text equivalents for images, to definitions of specialized terms for the non expert, or the provision

of captions in videos. With this in mind, we try to exploit our material in such a way that students are able to carry out other translation-related tasks such as summarizing translations to fit in voice-over tasks, building up multilingual multimedia glossaries from a video or doing subtitles for accessibility purposes.

4 Materials and activities to integrate AVT in the teaching of scientific and technical translation

Multimedia materials can be used in two different ways in the teaching of scientific and technical translation. They can appear as objects of translation (in localization, dubbing or subtitling) or as instructional resources when translating a scientific written text.

Illustrations, especially those which fulfil at least one the functions explained in section 2.1., are particularly useful for instructional purposes and contribute to the sub-processes involved in the learning process, which is facilitated by the inclusion of these types of illustrations as multimedia materials in educational contexts.

In this section, we will use different multimedia texts available at a mouse-click, and will show how they can be manipulated and exploited in the scientific and technical classroom. The following set of activities contains different multimedia elements which are supported on the contiguity principle and highlight the five functions described by Levin (1981). The activities include a series of multimedia elements which focus on terminology, and are aimed at the translation of html, subtitling, audiodescription and voiceover.

a. Pre-translation activities:

- Transcripting an audio script for knowledge acquisition
- Making a list of key terms from transcript with the aid of a Corpus tool such as WordSmith Tools
- Distinguishing between focalized and topicalized information
- Identifying the functions of images in relation to text (Paivio 1971; 1990);
- Summarizing the information for different purposes
- Gap-fill and multiple-choice activities to deepen terminological/phraseological knowledge in the subject field (Half-baked software 1997-2006, http://hotpot.uvic.ca)

b. Translating multimedia

Translating html documents: a gate to multimedia

- Translating the complexity of web including text, images, forms, sounds and such
- Knowing how to assess different text types in the same page
- Becoming acquainted with the multiple formats in a web document
- Becoming aware of the importance of hypertext writing for different users in a way that all text hyperlinks are written so that they make sense when read out of context
- Providing text alternatives for images in an accessible multimedia environment

c. Subtitling and audiodescription

- Making specialized films accessible by assessing the audience
- Assessing the needs of the hard of hearing in the AVT classroom. Subtitles for the hard of hearing
- Assessing the needs of different age groups. Introducing subtitles for children in documentaries

d. Voiceover

- Adapting transcripts to fit the shortened/extended audio duration of the target language
- Translation of scripts/transcripts for voiceover purposes
- Recording voiceover

In the following sections, we will develop some of these activities in more detail and will present a summary chart where activities are ordered according to difficulty.

4.1 Pre-translation activities and self-evaluation

The main objective is to introduce students to the terminology of the subject fields being translated, HYDROLOGY AND COASTAL ENGINEERING, and to the methodology proposed in this type of multimedia translation through simple activities which involve pictorial and audio elements. The self-evaluation feature helps students check the score achieved on their own, so that they can assess the knowledge acquired in the pre-translation stage. Every activity has been designed using HotPotatoes v6 (Half-baked software 1997-2006, http://hotpot.uvic.ca) and they complement each other in providing background knowledge prior to the translation stage.

4.1.1 Visualization activity to increase environmental concern

ACTIVITY: WATER CAMPAIGN I

The following video has been chosen by the Andalusian regional government to illustrate a campaign to save water in domestic use. View the video campana_h2o.mpeg and answer the following questions:

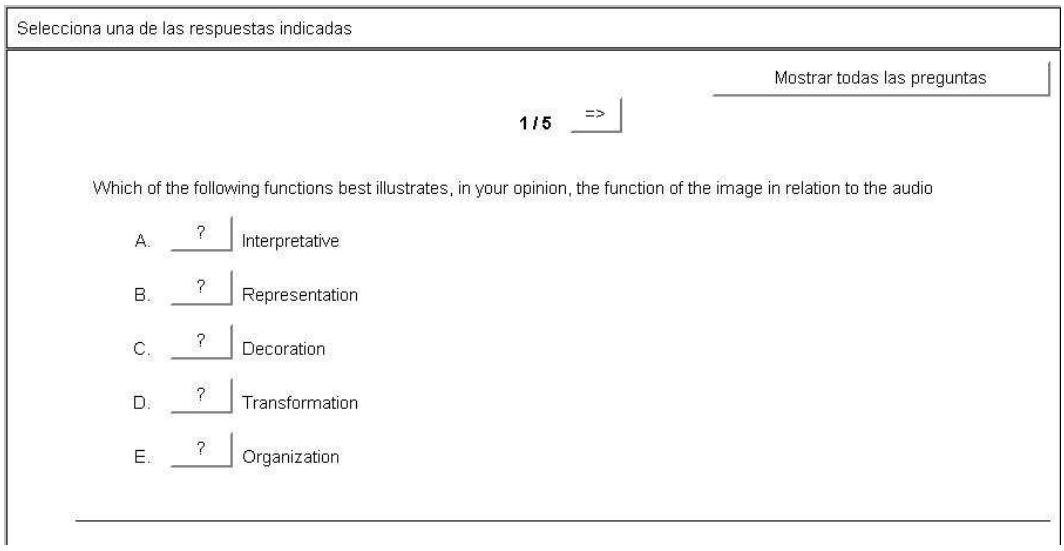


Fig. 1: "Multiple choice" Water Campaign Activity I

4.1.2 Activity to get familiar with TYPES OF WAVES

ACTIVITY: TYPES OF WAVES I

In this activity, students hear a scientific narration, and must fill in the missing words in a written version with gaps (Fig. 3). Such words are actually terms belonging to the subject field (WAVE TYPOLOGY). This exercise can be presented in the form of a dictation or as a different passage to be completed according to the information offered in the audio.

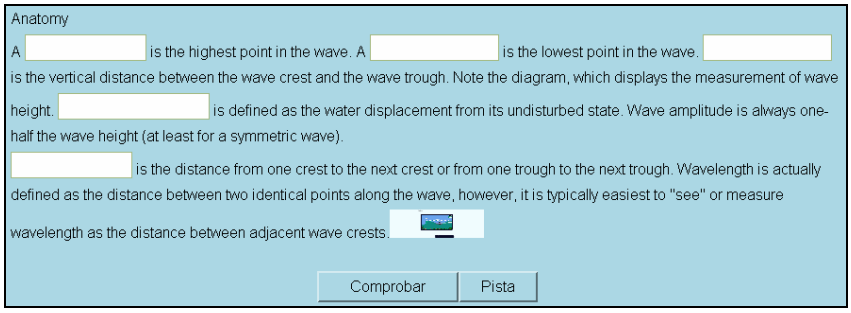


Figure 2: "Gap-fill" activity 1

Next, we propose a multiple-choice exercise. Students are intended to answer the questions by choosing one of the three possible answers according to what is said in the audio, which lasts 2 minutes. They have three minutes in total to complete the exercise.

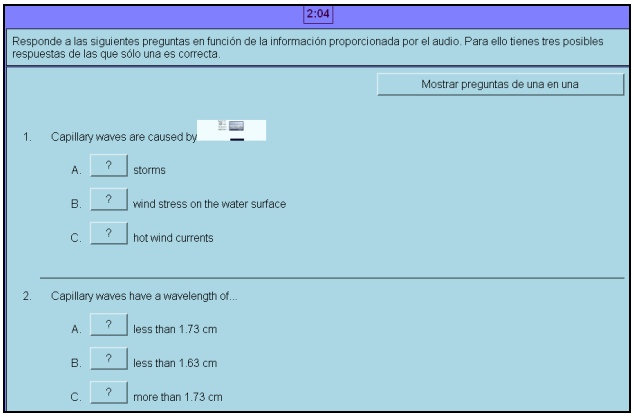


Fig. 3: "Multiple-choice" activity 2

The last pre-translation task to get familiar with WAVE TYPOLOGY consists of a matching exercise in which, according to the audio, students must choose one of the items proposed to complete a syntactically and semantically correct sentence. This exercise is also timed since one of the objectives in the pre-translation stage is to help students acquire some knowledge on the field but under stress conditions in order to simulate a real translation process in which translators must normally learn the basics of a scientific subject to understand what they are supposed to translate.

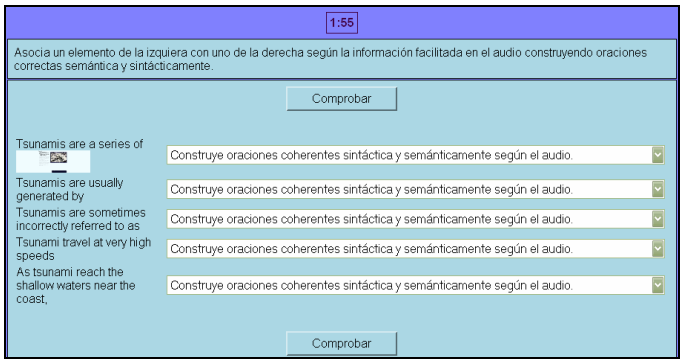


Figure 4: "Complete the sentence" activity 3

4.2 Translating html documents: a gate to multimedia

4th year students enrolled in an optional e-learning course in Localization and Audiovisual Translation were faced with an assignment consisting in translating several web pages for a corporate site. No particular indications with regard to specific tools or formats were given. Of the 82 students enrolled, 52 translated the pages using beginners' tools that protect the code (Catscradle), only one used a CAT tool (Tag Editor) and 6 used an editor such as Textpad or Notepad.

When asked about the reasons that led them to make that choice, most of them agreed that the tools were chosen on the basis of usability, pointing at things like "you don't have to worry about tags".

This data is of course neither conclusive nor exhaustive but gives us an idea of the areas of improvement that have to be the focus of AVT teaching. Translating html documents in the translation classroom is a task that requires from students a shift from the procedures of other formats:

- Understanding the complexity of web contents defined as the information in a Web page or Web application, including text, images, forms, sounds, and the like (W3 Consortium)
- Knowing how to assess different text types in the same page
- Becoming acquainted with the multiple formats in a web document;
- Becoming aware of the importance of hypertext writing for different users in a way that all text hyperlinks are written so that they make sense when read out of context

4.3 Audio transcription and script translation

Once students have finished the pre-translation stage and thus acquired the basics of WAVE TYPOLOGY they must transcribe the audio in the html files (contained in Flash animations) in the form of a script from which they should produce the Spanish translation.

The script should be adequate to the textual conventions commonly used in the Spanish written language and to the accessibility requirements proposed by the W3C, according to which a web page or multimedia resource must include a textual description for every audio or pictorial element (W3C 2000), so that it facilitates the access of prospective users with impaired vision or hearing. Despite the activities proposed, the possibilities of using multimedia materials in the audiovisual translation classroom are endless. For example, the translated script could be narrated again by using recording software such as Windows Movie Maker in order to produce a voice-over product.

ACTIVITY: TYPES OF WAVES II

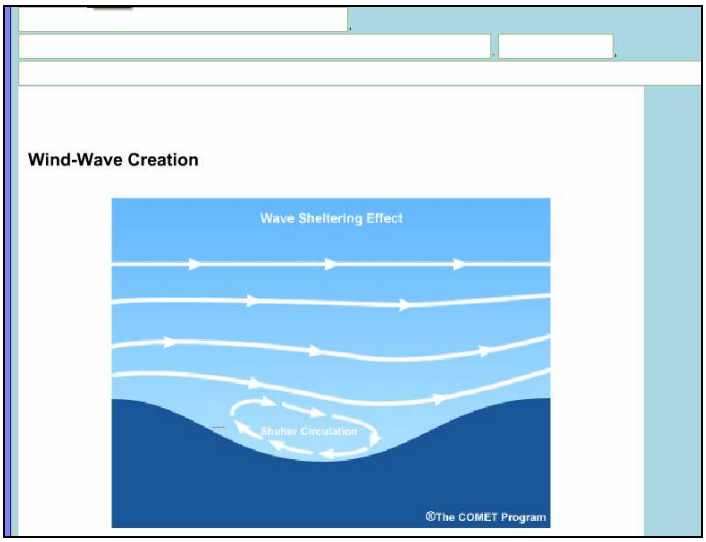


Fig. 5: Audio transcription interface

4.4 Audio transcription and subtitling: interaction of images and text

ACTIVITY: WATER CAMPAIGN II

In this activity, students will transcribe the audio material of the video presented in 4.1.1. (WATER CAMPAIGN). They can assess their transcription with the following self-evaluation activity:

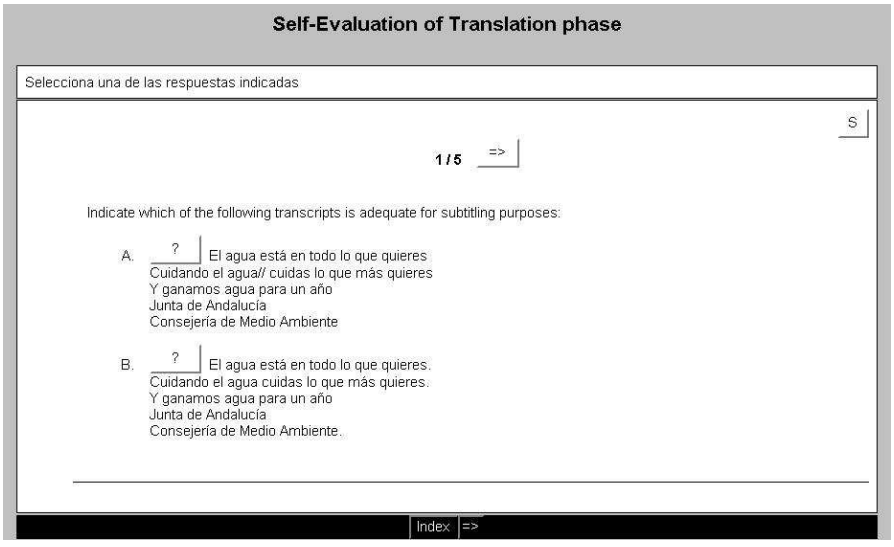


Fig. 6: Water Campaign Activity II

Then, they will subtitle the video in English using Subtitle Workshop. To that end, they have to take into account the interaction between images and text, and the time and space constraints imposed on their target text.

SOURCE TEXT	**TARGET TEXT (with Subtitle Workshop)**
El agua está en todo lo que quieres	00:00:00:00 00:00:00:00
Cuidando el agua cuidas lo que más quieres	[Water dripping]
Y ganamos agua para un año	00:00:00:00 00:00:00:00
Junta de Andalucía	Caring for water,
Consejería de Medio Ambiente	you are caring for what you love
	00:00:00:00 00:00:00:00
	And we will be saving water
	for a whole year

Tab. 2: Subtitling with Subtitle Workshop

Then, they will subtitle the video in English using Subtitle Workshop. To that end, they have to take into account the interaction between images and text, and the time and space constraints imposed on their target text by Spain's standard conventions with regard to closed captions.

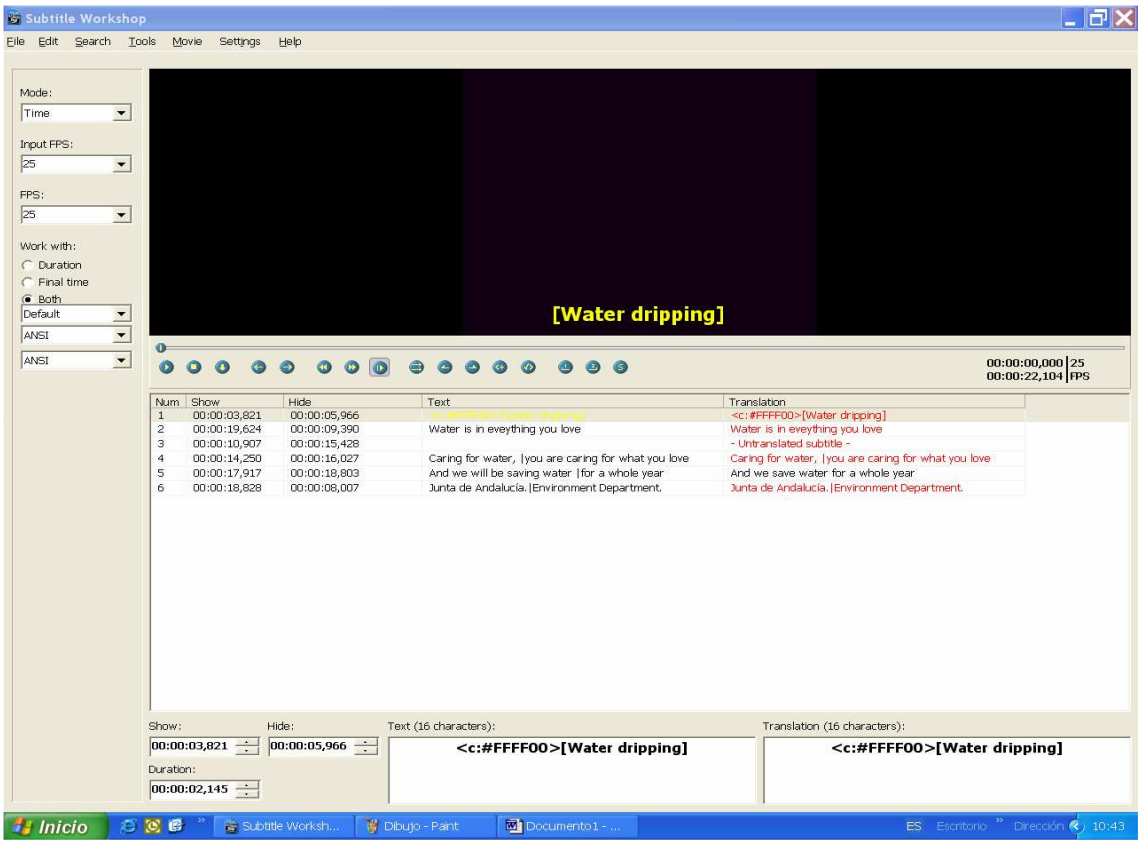


Fig. 7: Screenshot of subtitling task in Subtitle Workshop[4]

[4] Subtitle Workshop is freeware and students can make use of colors –a common feature in subtitling for the hard of hearing. Modifying dialogs in a way that they are shortened is a very useful task to develop translation strategies for other types of AVT such as videogames localization or dubbing.

4.5 Summary of tasks carried out in the scientific and technical classroom

Finally, we propose a chart with the progressive tasks our students are enrolled with, the technical tools needed and the competence they develop.

CARRIED OUT WITH STUDENTS IN:	**TASKS**	**TECHNICAL TOOLS**	**COMPETENCES DEVELOPED**
All years	Transcribing the video		
Scientific translation (3RD and 4TH years) Technical translation (3RD and 4TH years)	Extracting keywords from the transcript	Corpus WordSmith Tools	Learning to identify key information.
Scientific translation (3rd and 4th years) Technical translation (3rd and 4th years)	Compiling a bilingual glossary at different levels of expertise	Multiterm	Focusing on the pragmatics of terminology management.
Scientific translation (3rd and 4th years) Technical translation (3rd and 4th years) AVT (4th year)	Provide audio description describing essential visual elements for video content		Describing strategies.
AVT (4th year)	Interlinguistic Subtitling/captioning	Fab Subtitler, winCaps, Subtitler Workshop	Following technical and format constraints Following accessibility guidelines: Synchronized transcripts of dialog and important sound effects. Captions provide access to multimedia for people who are deaf or hard of hearing.
AVT (4th year)	Dubbing/voice-over	Windows movie maker	Adapting script to fit extended audio in the target language.
AVT (4th year)	Combination of captions/audiodescription		Consider the importance of the timing of media contents when planning access features. For example, a "talking head" video may need only a stand-alone transcript of the audio, but a documentary including graphics and other important visuals may require captions in order to maintain the link between visuals and narration.

Tab. 3: Summary of translation tasks

5 Conclusions

In this paper we have shown that it is possible to exploit multimedia documents in the scientific and technical translation classroom, since recent changes and advances in Information Technology have enhanced the role of multimedia in AVT. Our proposal of activities considers multimedia contents from two points of view:

1. as pedagogical resources that will enable students to become familiar with the subject field, and to build a sound foundation for knowledge representation
2. as objects of translation meeting the requirements of accessibility. The translation of audiovisual documents activates the link between images and text, enables visualization, and triggers creativity.

Therefore, when introducing audiovisual material in the scientific and technical classroom**,** we provide our students with valuable tools to meet the new challenges of the translation market, increasingly influenced by new audiovisual scenarios.

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