

# ACCESSIBILITY OF MULTIMEDIA RESOURCES IN WEB

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**Keywords:** Multimedia accessibility, usability, user interfaces, user needs, adaptability, caption, audio description.

**Abstract:** This paper emphasises the importance of providing accessibility of Web-based information resources for everybody, not only for people with disabilities. Due to the continuous technical and social changes of the Web, it is necessary to have in mind that new scenarios and user behaviour are appearing. Nowadays, most of Web sites use multimedia resources and it is indispensable to provide accessibility not only to the resource content, but the access to the resource in the Web site. This work summarises some items to take into account in order to make accessible a multimedia resource and present some best practices including on-line multimedia resources in a Web site.

## 1 INTRODUCTION

Due to the obvious increment in the use of information technology, such as Internet, it is necessary to have in mind accessibility issues when new elements are included in the Web, as audiovisual contents. Nowadays, most of Web sites include audiovisual resources (audio, video, animations etc.). Moreover, thanks to the convergence of Internet with television, mobile telephones, videogames, etc., which is transforming the areas of communication, we can find Web-sites collections as “Web 2.0” (O’Reilly, 2005) where the majority of the Webs are based on a shared collection of visual and audiovisual resources (p.e. Flickr (Flickr, 2006), Youtube (YouTube, Inc. 2006), etc.). The presence of these new technological elements in the Web when accessibility issues are not taken into account increments the digital breach and creates access barriers not only for disabled people but for all of us.

## 2 TECHNOLOGIES FOR DEVELOPING ACCESSIBLE MULTIMEDIA CONTENTS

Technological resources are useful for developing and using accessible contents. For instance, user agents give access to the Web information; software for developing and editing accessible contents; or authoring tools for making easier the production of accessible resources or adapting non-accessible contents

Assistive technologies are very useful for accessing Web resources. As far as research in accessibility issues in technology is concerned, we can highlight the potential of the eXtensible Markup Language (XML) (W3C, 2006b) with the use of metadata. This language is able to provide adaptability of contents according to the user profile. This is a good solution and it goes beyond the Web accessibility in the multimedia contents.

On the other hand, inclusive and standard methodologies (Lawton, 2006) are also useful for developing accessible products. For instance, World Wide Web Consortium (W3C) (W3C, 1994) provides standards for becoming the Web a universal space of information. Different standards

can be applied, as the markup languages: *XML*, *eXtensible Hypertext Markup Language (XHTML)* or *Cascading Style Sheets (CSS)*.

Specifications about audiovisual accessibility can be applied too, as the *Synchronized Multimedia Integration Language (SMIL)* to synchronize audio and video (see section 3.2); *Scalable Vector Graphics (SVG)* to describe XML Graphics; or the *Web Accessibility Initiative (WAI)* which develops guidelines to accessibility for different components. Multimedia and audiovisual contents are specially treated in WCAG 1.0 (W3C, 1999a). Nowadays, they are working in the WCAG 2.0 (W3C, 2006a), it demands alternative contents (caption, audio description, extended audio descriptions and sign language interpretation) to achieve different levels of accessibility.

Nowadays there exist a great number of tools oriented to the development and support of multimedia on the Web. In this way, authoring tools help us to create audiovisual contents integrating caption and/or audio description, or help us to edit them so that prerecorded multimedia can be included (NCAM, 2006).

Due to these possibilities (languages, players, editors, etc.) are not always compatible some with others that the task of making multimedia accessible is sometimes really difficult, but it is not impossible.

### 3 ACCESS TO MULTIMEDIA WEB CONTENTS

Going back to the accessibility definition, a multimedia content is accessible when a user can access that content, regardless whether his access characteristics and context of use. Sometimes we can find in Web-sites accessible contents (offering alternatives as captions and/or audio description), but non-accessible resources because they are reproduced via a control that does not appear in every navigator. Or vice-versa, sometimes it is possible to access the multimedia resource, but the resource's content is not accessible because it does not offer alternative contents. In conclusion, we need to ensure two different requirements for accessibility:

- That the multimedia content is accessible
- That the access to the multimedia resource is accessible.

Moreover, we can not forgot the necessity of integrate the multimedia contents in an accessible

and usable user interface (Web page, player, etc.). Then, the contrast of colours, accessible buttons for control (alternative texts), etc. in the interface must be taken into account. Furthermore, the user should be allowed to interact with every hypermedia element in the interface, controlling them device-independently.

## 4 CASE STUDY

The case of study has been carried out in "The Spanish Centre of Captioning and Audio description (CESyA)" (CESyA, 2005). One of the main goals of this centre is to study how to integrate accessible multimedia resources in the media. This paper presents some experiments studying the best way to integrate a multimedia resource (a video called "Nicolás") in Internet in an accessible way.

This section describes how to make accessible the video's content and how to integrate the video in the Web interface maintaining the accessibility. Making accessible the video's content means to follow the current Web Content Accessibility Guidelines (WCAG) and to provide synchronized alternative contents such as caption and audio description. Two different options can be implemented for making accessible the video:

**1. Video with open audio description and caption.** This option permits to create accessible videos, but it has a big inconvenience: the user will have not possibility of controlling the resource reproduction, choosing if s/he prefers or not to play the video or audio means separately in each moment.

**2. Video with closed audio description and caption, separating audio and text.** There are different options to create and edit a resource in different formats. In this case, the system provides the control to the user, allowing to adapt the reproduction of the video according to his/her current necessities.

This second option is more usable, because it provides more control of the video reproduction and adapts better to the user necessities.

Our studies implement this option. We have used SMIL (W3C, 2006c) for the implementation, following the recommendations of W3C, and the video edition has been performed. The first step of the edition was to separate the soundtrack from the video.

Table1: Advantages and Disadvantages implementing accessibility in multimedia resources.

Access	Method	Advantages	Disadvantages
Player integrated into the Web page	- <object> or <embed> - <object> in Flash - <object> in XHTML - <object> in SMIL	- Compatible with any player	- No control of the reproduction - An integrated player is needed - <object> or <embed> are not completely accessible
Flash + player	- <object> in XHTML	- Compatible with most of navigators - An integrated player is not needed	- Flash is not public-domain software - The adaptability and reproduction control depends on the resource design
SMIL+XHTML	SMIL+XHTML profile	- Provides adaptability by controlling the video reproduction	- Currently only user agent Internet Explorer can reproduce it
External player	SMIL	- Provides adaptability by controlling the video reproduction	- Each player detect different characteristics of SMIL

Next, we put our attention in finding a compatible format for captions and finally, the accessible video was created with SMIL.

#### 4.1 Integrating the Video Resource in an Accessible Way

The experiment being carried out here has been defined in a Inclusive Design methodological framework, with the application of techniques such as User Profiles, Person, Scenarios in order to contemplate access characteristics and contexts of use with every kind of users when accessing the multimedia Web resources. This research is based on fictions users but with real information. As a result of this analysis it was decided to implement the following possibilities as alternatives to make easier the accessible access to the multimedia resources which are going to be shown next and summarised in Table 1.

**1. Integrate a multimedia resource associating it with a player integrated by a control found on the Web page.** This implementation option is independent from the resource format. The most common method to include multimedia elements on a Web page is using the element <embed> (Clark, 2004), but it does not form part of the specifications of the HyperText Markup Language (HTML) or XHTML. If <embed> is used on a Web page, the code is not accessible according to WCAG. Most of Web designers prefer to use the element <object>

(W3C, 1999b) to add multimedia fulfilling guideline of WCAG. But there are navigators that are not able to correctly interpret this element. There is another option to include multimedia using this design (McLellan, 2002) and is frequently used by the Web designers. This technique edits the code so that the video can be reproduced as a Flash resource. Finally, the implementation option studied in our experiment used SMIL and the element <object> to include multimedia into the Web page.

**2. Integrate an audiovisual content using Flash in the browser without having an associated player.** The implementation of this option can be done editing the video with Flash (Adobe, 2006) having in mind the accessibility criteria given by Adobe Macromedia Flash. Although Flash is not a public-domain software, this software is compatible with most of the navigators. This option permits to use the connector integrated without the necessity of installing a new player. Moreover, Flash allows to define captions and reproduce them.

**3. Integrate an audiovisual content with SMIL in the code XHTML.** Other implementation possibility is to use the profile SMIL+XHTML de SMIL 2.0 (W3C, 2002). This option has a problem: currently, this profile can only be reproduced using user agent Internet Explorer (version 6.0 and higher), but it is supposed that in the future other navigators will permit it too. On the other hand, this implementation has a big advantage: it can be

directly integrated in the XHTML code without any player associated via the <object> element.

**4. Associate the reproduction of an audiovisual content to an external player.** In order to include adaptability to the user, providing him/her some control on the reproduction of the video, we can use SMIL combined with any external player compatible with this language. In our experiment, we have use RealPlayer (Realnetworks, 2006) as external player. The implemented interface shown in Figure 1 provides different alternatives for the video reproduction (including audio description, captions, both or none).

The user can choose in every moment of the interaction which media want to reproduce, adapting him/herself the interface according his/her current necessities of access. Nowadays, we are still working on the Web page design, improving its usability and accessibility.



Figure 1: Interface of implementation SMIL with the user control in RealPlayer.

As a conclusion, different implementation options have been studied for integrating accessible videos into Web pages. All the implementation options provide high level of accessibility to the multimedia resources, but there exist different accessibility advantages and disadvantages when different technology is used. Table 1 summarizes this information.

This work has been partially supported by the “The Spanish Centre of Captioning and Audio description (CESyA)”.

## REFERENCES

- Adobe, 2006. *Flash Macromedia*, [http://www.adobe.com/devnet/flash/articles/flash8\\_bestpractices\\_09.html](http://www.adobe.com/devnet/flash/articles/flash8_bestpractices_09.html)
- CESyA, 2005. *The Spanish Centre of Captioning and Audio description (CESyA)*, <http://www.cesya.es>
- Clark, J., 2004. *Using embed and object with valid code*, <http://joeclark.org/access/captioning/bpoc/embed-object.html>
- Flickr, 2006. <http://www.flickr.com/about/>
- Lawton, S., 2006. *Accessibility in the User-Centered Design Process*, [www.UIAccess.com/accessuc/](http://www.UIAccess.com/accessuc/)
- McLellan, D., 2002. *Flash Satay: Embedding Flash While Supporting Standards*, <http://www.alistapart.com/articles/flashesatay/>
- NCAM, 2006. *Accessible Digital Media, Design Guidelines for Electronic Publications, Multimedia and the Web*, <http://ncam.wgbh.org/publications/adm/>
- O'Reilly, Tim, 2005. *What Is Web 2.0. Design Patterns and Business Models for the Next Generation of Software*, <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>
- Realnetworks, 2006. *RealMedia Player*, [http://www.realnetworks.com/products/media\\_players.html](http://www.realnetworks.com/products/media_players.html)
- W3C, 1994, W3C, *The World Wide Web Consortium*, <http://www.w3.org/>
- W3C, 1999a. *WCAG Web Content Accessibility Guidelines 1.0*, <http://www.w3.org/TR/WCAG10/>
- W3C, 1999b. *The OBJECT element, HTML 4.01 Specification*, <http://www.w3.org/TR/html401/struct/objects.html#edef-OBJECT>
- W3C, 2002. *XHTML+SMIL Profile*, <http://www.w3.org/TR/XHTMLplusSMIL/>
- W3C, 2006a. *Web Content Accessibility Guidelines 2.0*, <http://www.w3.org/TR/WCAG20/>
- W3C, 2006b. *Extensible Markup Language (XML)*, <http://www.w3.org/XML/>
- W3C, 2006c. *The Synchronized Multimedia Integration Language (SMIL)*, <http://www.w3.org/AudioVideo/>
- YouTube, Inc., 2006. <http://www.youtube.com/>