

USING MULTIMEDIA PRESENTATIONS ON WEB

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Abstract: The paper investigates a platform-independent solution to build more attractive and interesting educational Web sites by using multimedia presentations conceived in different XML-based languages such as *SMIL (Synchronized Multimedia Integration Language)* and *XHTML+TIME (Timed Interactive Multimedia Extensions for XHTML)*. In order to provide certain design features for each educational Web site, the paper proposes a solution for building a meta-interface based on *XUL (Extensible User-interface Language)*.

Keywords: Multimedia, Educational Web site, XML, User-Interface.

1. INTRODUCTION

The use of the World Wide Web modern technologies in the teaching process has become a current reality. In 2001, over 98 percents of American and Canadian schools were connected to Internet. In all kinds of schools, the Internet became an object to study and a bibliographical / imagistic source equally in teaching and in home works preparation (Jalobeanu, 2001). The actual society invests enormous in the IT training of all specialties tutors.

Actually, there are many Web educational sites available. An educational Web site has a very complex structure, involving a public section – that can provide an informative content –, a section used by students, another one for teachers and one section giving the possibility to administrate whole information of the site.

On the Web site server shall be stored and managed the teaching materials (different kinds of resources), information about students, results of tests, etc. The teaching staff section suffers continuous changes,

every instructor having his/her individual style in preparation of the public materials, adopting a particular way to expose the information. However, the general representation (structure) of the educational Web site must remain unitary. An important particularity which must be considered by the manager of that site is the great mobility of the teaching staff and of the students.

One key issue is to make possible a *friendlier user experience* that involves multimedia and hypermedia presentations published on a given site. An educational Web site consists of diverse Web pages that must integrate various forms of information: text, still photographs, line drawings, mathematical formulae, audio, and video materials. Users need flexibility, accessibility, and quality from their actual Web interfaces, especially in the e-learning context.

The WWW space was conceived for human consumption and the Web user interfaces must offer the same facilities of the classical user interfaces: *functionality, usability, isolation from application, adaptability, and consistency*, especially in the case of an educational Web site (Buraga, 2002, 2003).

The paper investigates a solution to build more attractive and interesting educational Web sites by using multimedia presentations conceived in different XML-based languages such as *SMIL (Synchronized Multimedia Integration Language)*, *XHTML+TIME* or *XUL (Extensible User-Interface Language)*, detailed in the next sections.

2. SMIL (SYNCHRONIZED MULTIMEDIA INTEGRATION LANGUAGE)

2.1 Short presentation

SMIL (Synchronized Multimedia Integration Language) is an XML-based language developed since 1998 by the World-Wide Web Consortium in order to facilitate the creation of interactive multimedia presentations directly on Web (van Osssenbruggen *et al.* 2001; Buraga, 2001).

SMIL enables authors to describe the temporal behavior of a multimedia presentation, to associate hyperlinks with various media objects or to describe the layout of the presentation on a screen, in a platform independent manner.

A SMIL presentation consists of several components, each including different media types, such as audio, video, image or text streams, and could be executed in a sequential, parallel or combined way. Control buttons such as “stop”, “fast-forward” and “rewind” allow users to interrupt the presentation and to move forwards or backwards to another point in the presentation.

SMIL 2.0 – the actual version of the language – is defined as a set of reusable markup modules. This allows reuse of SMIL syntax and semantics in other XML-based languages, in particular inside those that need to represent timing and synchronization. For example, SMIL 2.0 components are used for integrating timing into *XHTML (Extensible HyperText Markup Language)* (W3C, 2003; Buraga, 2001) – the next generation of HTML – and into *SVG (Scalable Vector Graphics)* (Bowler, 2001).

These advantages lead in designing of more interactive and spectacular Web pages without the use of various commercial and proprietary solutions such as Flash presentations or ActiveX components.

Even Dave Raggett, one of the important HTML developers, approves that SMIL is great for timing media clips, *e.g.* presenting an HTML document along with an audio commentary and accompanying images.

Actually, different special players for SMIL are available, developed by different companies. The general trend is to give support for SMIL even in the Web browsers: *Internet Explorer* version 5.5 and later is able to render and play *XHTML+SMIL* presentations, Apple’s *QuickTime* version 4.1 and later supports SMIL 1.0 and Adobe’s *SVG Viewer*

gives support for SMIL animations integrated into SVG documents.

Example The SMIL multimedia presentations are easy to be written and do not require sophisticated authoring tools, because there are simply text XML-based files. As an example, a short SMIL document is listed below. The presentation will split the computer screen into two regions, a movie (in the Real Media format) and a text file being displayed in parallel for 20 seconds, each in a specific region, while in the background a sound file is playing:

```
<!DOCTYPE smil PUBLIC
"-//W3C//DTD SMIL 2.0//EN"
"http://www.w3.org/TR/REC-smil/SMIL20.dtd">
<smil xmlns=
"http://www.w3.org/2001/SMIL20/Language">
<head>
<layout type="smil-basic-layout">
<!-- a region that will display
the video document -->
<region id="VideoPlace" top="5" left="25"
width="875" height="650" />
<!-- a region that will display
the text content -->
<region id="TextPlace" top="655" left="25"
width="875" height="20" />
</layout>
</head>
<body>
<par>
<!-- the multimedia content
will be rendered in parallel -->
<audio src="presentation1.rm" dur="30s" />
<video region="VideoPlace"
src="videos/course1.rm" dur="20s" />
<text region="TextPlace"
src="docs/course.html" dur="20s" />
</par>
</body>
</smil>
```

2.2 XHTML+TIME – an alternative to SMIL

Another proposed approach is the *XHTML+TIME (Timed Interactive Multimedia Extensions for XHTML)* language (Smitz *et al.*, 1998; Buraga, 2001)

that was developed by the Microsoft, Compaq and Macromedia companies in order to make possible the addition of time-based presentation effects into the Web pages, instead of using an external XML-based document. Thus, XHTML+TIME extends XHTML standard by adding a set of time-based attributes (constructs) to its already existing markup (tag) set.

For example, an identical set of attributes could be applied to a paragraph, an unordered list and a table, which shall be displayed in parallel each for 4 seconds, but starting at different moments:

```
<!DOCTYPE HTML PUBLIC
  "-//W3C//DTD HTML 4.01 Transitional//EN">
<html>
<head>
<!-- using CSS mechanisms
  to include a temporal behavior -->
<style type="text/css">
  .time {
    behavior: url(#default#time2);
  }
</style>
</head>
<body>
<div class="time" repeatCount="5"
  dur="10" timeContainer="par">
  <p class="time" begin="0" dur="4">
    A line of text shall appear first.</p>
  <ol class="time" begin="2" dur="4">
    <li>After 2 seconds, an ordered list</li>
    <li>...having 2 elements</li>
  </ol>
  <table class="time" begin="4" dur="4"
    cols="2" rows="1" border="1">
    <tr>
      <td>A table with 2 columns</td>
      <td>appears after 2 more seconds </td>
    </tr>
  </table>
</div>
</body>
</html>
```

The goal of the education Web site is to offer an easy way to store and to manage the multimedia

information regarding the teaching materials. Each member of the educational group could be able to contribute with information and multimedia documents to be included into his/her presentations or other types of Web pages. For this purpose, the materials of each author shall be placed in a special subdirectory in the location destined to a certain course, the author being the single person having modifying rights for that subdirectory (Brut, 2003).

Moreover, a SMIL presentation can play only in a particular fragment of a site, having no interaction with the rest of the Web page; even it is included into it. By contrast, using an XHTML+TIME-based solution, all the elements of the multimedia page can interact with each other, participating in the presentation. For the organizational model of the education Web site, it is strongly recommended for the presentations to be independent with the rest of the company site, so SMIL is the best suited solution (Brut, 2003).

3. USING XUL TO BUILD A WEB META-INTERFACE

To provide a certain functionality for each multimedia presentation, a meta-interface can be designed and built in *XUL (Extensible User-interface Language)*, an XML-based language defined as a part of the Mozilla project (Oeschger, 2000; Buraga, 2001).

Because XUL is a platform-neutral language, the Web graphical user interfaces designed in XUL shall have the same look and behavior on different operating systems or graphical architectures (for example, standard Motif architecture from XWindow System). XUL provides various types of widgets used to build complex graphical interfaces that can be a valuable advantage in designing and implementing an e-learning Web environment. These widgets are very similar with the current approaches used in graphical user interface development environments such as Borland *Delphi* or *Kylix*, *Glade*, *Qt Designer* or Microsoft *Visual Studio .NET*.

A short example of an XUL interface follows (Buraga, 2003):

```
<?xml version="1.0" ?>
<!-- a window with a tabbed dialog -->
<window title="XUL"
  xmlns=
    "http://www.mozilla.org/keymaster/
    gatekeeper/there.is.only.xul">
  <tabcontrol>
    <tabbox value="Documents" />
    <tabbox value="Images" />
    <tabbox value="Sounds" />
```

```
</tabcontrol>
</window>
```

The XUL documents have no reference or direction as to how it should be displayed. In Mozilla browser, this is the task of the Gecko internal engine, which takes XUL constructs and adds a “skin” to the XUL skeleton to proper display the elements’ interface in a platform-independent way. By using *XSL (Extensible Stylesheet Language)* stylesheets (W3C, 2003; Buraga, 2001), it is straightforward to transform XUL elements into XHTML or SMIL pages, according to the Web designer needs.

This advantage leads to adopt a flexible solution to easily build effective educational Web sites, using exclusively open-source technologies.

Presently, only a few clients (*i.e.* Mozilla or Netscape browsers) may directly support XUL. Different “proxy” programs can be implemented to automatically transform XUL documents into SMIL or XHTML+TIME multimedia presentations. In fact, XUL documents can act as containers (Buraga, 2003) for multimedia-rich synchronized elements annotated in other XML dialects such as SMIL, XHTML+TIME or SVG languages.

4. CONCLUSION AND FURTHER WORK

The common characteristic of the involved technologies presented in the present paper is the XML meta-language. Using this approach, XML-based solutions were investigated to design and build educational Web sites in order to assure usability, accessibility, modularity, consistency or adaptability, giving visitors the possibility to easily manipulate the user interface’s elements and Web designers the opportunity to concentrate mainly on the Web site design by separate interface from the logic’s application.

The paper was presented two languages that can be used to synchronize multimedia elements by providing a rich hypermedia experience – SMIL and XHTML+TIME. The advantages are the following:

- all involving technologies and software components are freely available;
- SMIL and XHTML+TIME are standardized and do not imply any commercial restrictions or the use of proprietary formats;
- the presentational part of the document is based on existing CSS mechanisms or features of the HTML language;
- the authoring process is very easy (the temporal scenario can be written as a structured XML document).

To facilitate the design process of the on-line course’s multimedia presentation and to assure the

consistency of the site, a Web meta-interface can be specified by using an XUL document. By adopting this solution, the entire educational Web site can be implemented and managed very easily, in a flexible manner.

The proposed solution needs to be effectively put in practice and several experiments are intended to be accomplished in order to show the existing advantages or/and disadvantages.

Another future direction is to analyze and to implement different tools for multimedia searching activities using XML-based query languages, following the studies presented in Buraga & Brut, 2002 and Buraga & Rusu, 2000.

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