

THE CONDUCTOR'S WEBSITE, PART II

An Interactive Qualifying Project Report

submitted to the Faculty

of the

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

by

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May 1, 2007

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1. Chorus
2. Music
3. Website

Abstract

Working with the director of on-campus choral programs, the strengths and weaknesses of WPI's choral program web portal are analyzed from both functional and aesthetic standpoints. Using this analysis, pointed revisions are made to the website to provide a final product that is not only informative and functional, but also reflects the standards of professionalism supported by WPI.

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Introduction

Up until recently, the WPI chorus groups lacked any unified web presence. An IQP completed recently culminated with the publication of a choral homepage, containing information universal to all of the groups, as well as links to each individual group's website. It was my task to evaluate this website's strengths and weaknesses, translate them into real-world needs, and update the choral homepage appropriately. This report details the steps I took to complete this task, beginning with background research and ending with pointed revisions to the existing portal to provide an informative, functional, and aesthetically pleasing final product.

Background Research

There are two main facets to my background research. The first facet is the previous choral website, its contents, and its final realization. In completing this research, I obtained an understanding of the previous author's motives in the creation of the site, and also the site's strengths and weaknesses. The second facet is the technical information relevant to the creation and updating of the web portal. From researching the technical specifications of each tool available to me, I determined what I was able to accomplish with each of the tools.

Existing Choral Web Portal

I began my background research by examining, in depth, the choral website that I was to update. The site provides a central hub for accessing information regarding all school-sponsored choral groups. The site itself had very little content, but instead directed the user to group-specific websites for information. What content the site did have was universal to the choral groups. This included two calendars, one for public events and one for rehearsals, as well as a small list of announcements. A screen capture of the website is available in Appendix A.

At this point in my research, I spoke with both the Director of Choral Music at WPI, John F. Delorey, and the group that created the original choral website about the goals of the IQP that yielded this website. They both indicated to me that the front-page calendars and announcements were strengths of the website, and should continue to be a part of the portal through any renovation that I perform. My interview with the Director also provided me with his view on the weaknesses of the website. He felt that, while the choral website matched the theme of most WPI-related pages, it was not aesthetically pleasing, and that it should look more like the newer WPI homepage instead of following the old WPI theme.

Relevant Technical Information

After my superficial examination of the website, I began my exploration of the code that generates it. The choral website has its roots in Hypertext Markup Language (HTML), and Cascading Style Sheets (CSS). The World Wide Web Consortium maintains and develops both CSS and HTML. HTML specifies the basic formatting of most web sites, providing the means to embed images, text, and other elements within pre-defined formatting. By means of a "style sheet," CSS allows additional formatting options over existing HTML tags. A style sheet is,

essentially, a list of HTML tags paired with any number of formatting elements. Each of these languages works to format the content of the website, but they do not themselves specify content. The choral website uses Perl and MySQL to generate its content.

Perl is a dynamic programming language known for its strong string processing capabilities. Using the Common Gateway Interface (CGI) module, Perl is also adept at generating HTML pages with content specified by the programmer. In this case, Perl is loading data from a MySQL database and formatting it with HTML, returning a fully visible website to the client. MySQL is a multithreaded SQL database management system, utilizing a Structured Query Language (SQL) to create, modify, store, and retrieve large amounts of data. The choral webpage uses this database to store calendar events, announcements, and the front-page picture so the Perl scripts can dynamically load and format them.

The events and rehearsal calendars also use a variant of JavaScript to load calendar events when the client places their mouse cursor over an appropriate date. This variant is called AJAX, short for Asynchronous JavaScript and XML. AJAX is best used in situations where data needs to be sent back and forth between the client and server “behind the scenes” of a webpage. Each time a client moves their mouse cursor over a date with a rehearsal or performance event, the client’s browser makes a hidden call to the MySQL database to retrieve the appropriate event information. While this may be a tad inefficient with regard to bandwidth, given the tools available on WPI’s network, it is a logical and appropriate solution.

Finally, to ensure the security of the website, the original developers utilized a protected directory. WPI uses the Apache web server, which allows web developers to specify security settings on a per-directory basis. These security settings exist in files known as “.htaccess” files. Any Perl script with the capability to modify the MySQL database resides within one of these protected directories, and requires a valid username and password to execute.

Each of the tools used by the previous IQP group to create the choral webpage was appropriate. HTML and CSS provide ample formatting options and aesthetically pleasing styles, while Perl runs the backend MySQL database to handle dynamic content loading. However, it is important to note that the original web developers had little choice in which programming languages they used to construct the website. Perl is the most flexible server-side scripting language available on WPI servers, but not the ideal language for this situation. WPI’s web servers run a limited number of scripting languages, two of which are Perl and Python, but

disallow a number of other options. This restricted from using arguably better languages for web development, such as PHP, to generate the choral website.

Methods and Results

At this point, my research was complete, and I began to update the website. My first concern was the performance of the Perl scripts that were generating the page. While they were functional, they were somewhat “barebones” and needed some robustness and debugging. Once I performed my updates on these scripts, I moved on to the overall aesthetics of the page, adding a theme and overall cohesion. Finally, I added the capability for the Director of Choral Music to add streaming music and musical scores to the webpage.

Improved Script Functionality

One of the ideas I discussed with the Director of Choral Music was implementing a system that kept a database of pictures, and randomly switched between them each time the page reloaded. This was the first change I implemented.

The original site had the capability to save one picture as binary data within the MySQL database. Perl scripts then retrieved and displayed this picture, which became the centerpiece of the front page. The script could only handle one picture at a time, so if the client were to upload a new picture; the script deleted the old one. After slight modifications to the picture upload script, the MySQL database could save any number of pictures for future viewing. This capability prompted the creation of a picture management interface, to allow for easy removal of unwanted images.

Due to limitations in Perl, the only way to retrieve a random picture from the database and display it on the screen was to create a second script. This script displays a single picture from the database corresponding to the identifier passed to the script by the parent function. The main site randomly determines which picture to display, and calls this script in the same fashion that it retrieves any image.

Before proceeding any further with site modifications, I tested the website extensively for any remaining bugs. The largest bug I found was present in Perl’s Database Interface module (DBI). It is a documented bug that, DBI handles the ampersand character improperly. In order to restore proper functionality to the site, and ensure that a poorly placed ampersand would not cause the code to error, I used a regular expression to filter out any instances of the ampersand

character, and replace it with its proper HTML escape character. Convinced that all of the Perl scripts were stable, I moved on to improving the overall aesthetics of the website.

Aesthetics

Between the Director of Choral Music's observations about the aesthetics of the website, and its noticeable lack of ties to WPI's main web portal, it was apparent the choral website needed a complete aesthetic overhaul. With the choral Director indicating that he would like the site to be more like WPI's homepage, I worked toward that goal.

The first step in this process was to move the main elements of the site into more appropriate locations. I removed the teal-colored images, and replaced the image-based links with much simpler text-based ones. With just a working skeleton of a website, I moved the content into locations approximating those located on WPI's homepage. This included a main navigation bar on the top of the site, with a smaller one on the leftmost edge. In the main division, I centered the picture and the two calendars below the top navigation bar. With the basic framework in appropriate locations, I began to migrate the formatting from the WPI homepage style sheet into the style sheet of the choral web portal.

Both the left and top navigation bars are simply unordered lists with large amounts of CSS formatting applied to them. This formatting gives them their color scheme, rectangular shape, mouse over characteristics, and spacing. I moved the announcements division to several different locations, before settling on the bottom of the left panel as an appropriate location. Once the spacing was correct, I added the WPI emblem above the left navigation bar and a choral division image above the top navigation bar to complete the aesthetic overhaul of the site. A screen capture of the finished product is available in Appendix B.

Additional Content

The Director requested additional pages for both streaming music and posting musical scores. I prepared these pages for any future web development, but they do not currently have any content. Should there be content to add in the future, the pages are available and linked from the main site. The future web developer needs only to add the appropriate links and descriptions in simple HTML, and the CSS style sheet will take care of the stylistic formatting.

Analysis and Conclusions

With the improvements to their website complete, the WPI choral groups have a functional and informative web portal. It has several tools, allowing the site administrator to disseminate information relevant to all chorus groups in one location. The website now has clear thematic ties to WPI's homepage, and no longer suffers from the aesthetical problems of the previous iteration. It shares the same top and side navigation bar as the WPI homepage, allowing for easy navigation between chorus groups. Despite its similarities to the WPI homepage, however, it still maintains its individuality with the choral-specific images, calendars, and announcements.

The website fits the needs that the Director of Choral Music outlined to me, and addresses the problems that became apparent to me from an in-depth examination of the original site's source code. I feel that I succeeded in developing a usable, informative, and aesthetically pleasing website that will function as the Choral program requires it to.

Recommendations

There is no doubt in my mind that, as it stands now, the choral web portal will function as it needs to. If this project were to be continued, however, I would recommend the following improvements. First, the website's code could use some minor revisions to make it easier to follow. In developing the website, it was easy to integrate my changes with the original incarnation. However, as time goes on, and more people add their changes, the code will get cluttered and hard to follow as the coding style changes from line to line. To prevent this, any authors should add appropriate comments for any change in the source code.


Secondly, it would benefit the choral program as a whole if all school-sponsored choral groups followed the same website format. It would be best if each other group used the same template as the choral web portal. This is a simple matter, as I have completed the bulk of the work in completing this website. It is only a matter of adopting the template with the appropriate information in the main division, replacing the picture and calendar, and changing the links on the left sidebar as appropriate, keeping the top navigation bar the same for each of the pages.

Finally, a change in the theme of WPI's homepage may prompt a change in the choral web portal in order to keep a coherent theme. It may not be necessary, but if the choral website strays too far from the WPI homepage, it may lose its thematic connection, prompting a revision.


Appendices

Appendix A: Original Choral Webpage

WPI Choral Homepage



Festival Chorus
WPI Men's Glee Club
Alden Voices
Student-Run A Cappella Groups:
Audiophiles
Simple Harmonic Motion
TechniChords
MyWPI
Contact Director



WPI Men's Glee Club, Parthenon, Athens, Greece

Announcements

The new choral website is now live!

Rehearsal Calendar	Events Calendar
<- APRIL 2007 ->	<- APRIL 2007 ->
SUN MON TUE WED THU FRI SAT	SUN MON TUE WED THU FRI SAT
1 2 3 4 5 6 7	1 2 3 4 5 6 7
8 9 10 11 12 13 14	8 9 10 11 12 13 14
15 16 17 18 19 20 21	15 16 17 18 19 20 21
22 23 24 25 26 27 28	22 23 24 25 26 27 28
29 30	29 30

(Athena Legend)

Appendix B: Final Choral Webpage



Choral Division

- Festival Chorus
- Men's Glee Club
- Alden Voices
- Vocal Performance Lab
- Contact Director

Student-run Groups
Audiophiles
Simple Harmonic Motion
Techni Chords
Music
Music
Scores
Scores

Announcements
The new choral website is now live!



WPI Men's Glee Club, Parthenon, Athens, Greece

Rehearsal Calendar

<- APRIL 2007 ->

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Events Calendar

<- APRIL 2007 ->

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Appendix C: WPI Choral Site User's Guide

The site administrator updates the database-driven content of the choral website from the site control panel (<http://users.wpi.edu/~choral/edit.cgi>). You will likely be presented with a login dialog, so enter your username and password before continuing. Once at the control panel, choose which element to modify.

The first element on the control panel is the calendar-editing interface. To add a new event to either calendar, simply click on the appropriate date. A dialog like the one in figure 1 will appear.

The screenshot displays two calendar views and a dialog box. The top calendar is titled "Rehearsal Calendar" and shows the month of June 2007. The bottom calendar is titled "Events Calendar" and shows the month of April 2007. A dialog box titled "Add an entry on June 30:" is overlaid on the right side of the Rehearsal Calendar. The dialog box contains the following fields:

- Title:
- Hour & Minute:
- Description:
- [submit]

Figure 1: Calendar-edit Interface

Enter the title, time, and a brief event description and click submit to add the event to the calendar. To remove an event, click on the appropriate date, and click the remove link as shown in figure 2.

The screenshot shows a dialog box with a red background. At the top, there is a button labeled "[delete]" followed by the text "Event title goes here on" and a button labeled "[x]". Below this, the date and time "2007-06-30 08:00:00" are displayed. At the bottom of the dialog box, the text "Add an entry on June 30:" is visible.

Figure 2: Calendar Delete Button

To edit the front-page announcements, click on the 'Edit Announcements' link from the control panel. This leads to a page depicted in figure 3.

Add or Remove announcements:

Note:

The new choral website is now live!

Figure 3: Announcements-edit Interface

This interface is very straightforward. To add a new announcement, simply enter your announcement in the text box and click the 'Add Note' button. To remove an old announcement, use the delete buttons below the text box.

Finally, to edit the pictures that appear on the front page, click the 'Edit Front-page Picture and Caption' link. This brings you to the page shown in figure 4.

Change front-page picture and caption:

Pictures should be less than 664 pixels wide.

Caption:

Picture:

WPI Men's Glee Club, Parthenon, Athens, Greece

Figure 4: Picture-edit Interface

To add a picture, enter a caption in the larger ‘Caption’ text box, and copy the path of the picture file into the smaller ‘Picture’ text box. If you do not know the path, click the ‘Browse’ button and navigate to the file, select it, and click the ‘Open’ button. It is important that only pictures of type *.JPG or *.JPEG are uploaded to the website in this fashion, uploading other picture styles may produce unexpected results. In addition, pictures should be less than 664 pixels wide to preserve the formatting of the page.

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