CrossConnect: A Cross Registration Tool

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CROSSCONNECT
SEARCHING DONE SIMPLE

Abstract

Colleges of the Fenway (CoF) is a joint effort of five neighboring Boston-based colleges in the Fenway area. Cross registration enables students of the CoF to register for courses offered in the other institutions. However, current search functions of the cross-registration system lack key features, such as searching by number of credits, categories of classes, or searching by a specific school. In order to offer these features, we propose a new user-friendly website named CrossConnect. CrossConnect uses the Bootstrap framework and responsive Ajax library to connect and query the course databases across all CoF institutions. CrossConnect allows students to perform enhanced queries and provides a user-friendly search interface.

Keywords — Cross registration, User Friendly Design, Real World Project.

1. Introduction

Students who attend any of the five Colleges of the Fenway schools (which consist of Wentworth Institute of Technology, Emmanuel College, Simmons University, Massachusetts College of Pharmacy and Health Sciences, and Massachusetts College of Art and Design) are eligible to register for and attend classes at any of the other schools within the consortium. This process is called cross-registration. The Colleges of the Fenway (CoF) office hosts a web tool that is intended to aid students with the cross-registration process [1]. The current web tool is supposed to help students find specific courses that they would be able to take at other colleges.

However, the current setup of the web tool provides very limited options to search available courses. It offers the student with six fields including Select Semester, Search By- All or only on Institution option, Departments, Day of Week, Time of Day, and Key Word/Phrase to narrow down what type student is looking for. Among them, four of Search By fields such as Departments, Day of Week, Time of Day, and Key Word/Phrase do not provide any options or available list students can take. For example, as shown in Figure 1, there is a text field for students to enter what department they are looking for a course in. However, most students would be unfamiliar with the specific departments at another college. Furthermore, the students do not know what department the class they are searching for, falls under. Additionally, corresponding course credit information is not provided.

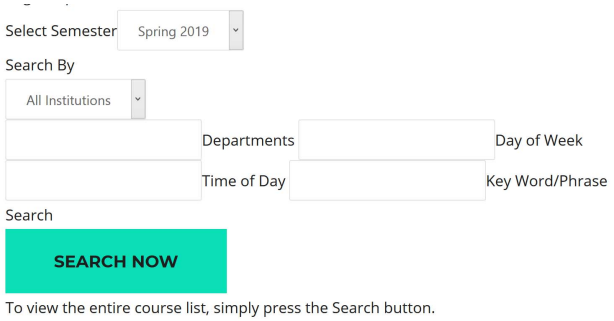

Figure 1. Current CoF Course Search Tool

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Since the current search functionality is so limited and is not helpful to narrow down the course that the student is looking for, the output of this search tool provides a long list of course matches at the student. As shown in Figure 2, the search result is a long list of available courses based on School name. Most students who have dealt with this system expressed their frustration because the system does not help them perform the intended task.

In this paper, we address those concerns by using Bootstrap [2] to create a user-friendly website. We also use CrossConnect that provides responsive search feature using Ajax and more guided search specification settings.

Section 2 describes our proposed design and implementation details. Section 3 summarizes our achievements and outlines ideas for future work.

Cross Registration Spring

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School	Department	Days/Times	Course Title	Course #	Details
EC	ACCT	Monday 10:00AM-10:50AM Wednesday 10:00AM-10:50AM Friday 10:00AM-10:50AM	Financial Accounting (QA)	ACCT1201-01	VIEW
EC	ACCT	Monday 01:25PM-02:40PM Wednesday 01:25PM-02:40PM	Financial Accounting (QA)	ACCT1201-02	VIEW
EC	ACCT	Monday 12:00PM-01:15PM Wednesday 12:00PM-01:15PM	Managerial Accounting	ACCT2201-01	VIEW
EC	ACCT	Monday 01:25PM-02:40PM Wednesday 01:25PM-02:40PM	Managerial Accounting	ACCT2201-02	VIEW
EC	ACCT	Monday 09:00AM-09:50AM Wednesday 09:00AM-09:50AM Friday 09:00AM-09:50AM	Intermediate Accounting II	ACCT2204-01	VIEW
EC	ACCT	Monday 12:00PM-01:15PM Wednesday 12:00PM-01:15PM	Advanced Accounting	ACCT4201-01	VIEW
EC	Art	Monday 12:00PM-01:15PM Wednesday 12:00PM-01:15PM	Survey of Art I (AI-A)	ART1201-01	VIEW
EC	Art	Monday 02:50PM-04:05PM Wednesday 02:50PM-04:05PM	Survey of Art II (AI-A)	ART1202-01	VIEW
EC	Art	Wednesday 01:25PM-04:05PM	Introduction to Art Therapy	ART1301-01	VIEW
EC	Art	Thursday 01:40PM-04:30PM	Basic Drawing I (AI-A)	ART1401-01	VIEW
EC	Art	Friday 09:00AM-11:50AM	Basic Drawing I (AI-A)	ART1401-02	VIEW
EC	Art	Wednesday 05:00PM-07:50PM	Basic Drawing I (AI-A)	ART1401-03	VIEW
EC	Art	Thursday 09:25AM-12:05PM	Vis. Lang.Design & Comm(AI-A)	ART1407-01	VIEW
EC	Art	Wednesday 09:00AM-11:50AM	Vis. Lang.Design & Comm(AI-A)	ART1407-02	VIEW
EC	Art	Tuesday 09:25AM-12:05PM	Vis. Lang.Design & Comm(AI-A)	ART1407-03	VIEW
EC	Art	Tuesday 03:05PM-04:20PM Thursday 03:05PM-04:20PM	Modern Art (AI-A)	ART2215-01	VIEW
EC	Art	Wednesday 09:00AM-11:50AM	Design and Composition(AI-A)	ART2403-01	VIEW
EC	Art	Thursday 09:25AM-12:05PM	Design and Composition(AI-A)	ART2403-02	VIEW
EC	Art	Thursday 05:00PM-09:00PM	Intro. to Printmaking(AI-A)	ART2411-01	VIEW

Figure 2. Sample output of a Search Query

2. CrossConnect

CrossConnect is a website that builds upon the current design concerns by implementing a user-friendly interface that does what the user wants it to do. The site is structured in a format where only one dropdown menu is displayed at a time to reduce confusion on the user's end. This not only makes it easy to use, but also makes the site user-friendly and aesthetically pleasing to the user, as we experience in modern websites [3].

Figure 3. Homepage video loop.

As shown in Figure 3, the homepage introduces users to the site through a video loop. It displays various locations around the CoF Institutions and greater Boston area. This is intended to get users excited about the opportunities the cross-registration of the CoF brings. After the homepage, CrossConnect displays the main Filter Option as shown in Figure 4. By using a jQuery library, scrollify.js, users are given predetermined options such as which semester they are trying to register which in turn makes site navigation easier for phone/desktop users with Bootstrap's container format. Once the user scrolls down from the video loop display, they will see a brief description that explains what the site is and how to use it as shown in Figure 5.

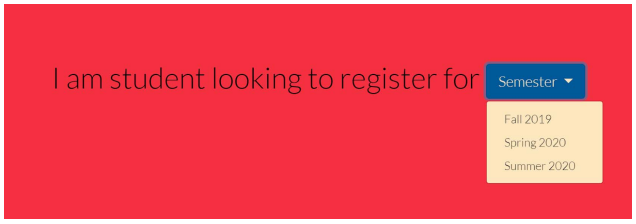

Figure 4. Starting Filter Option

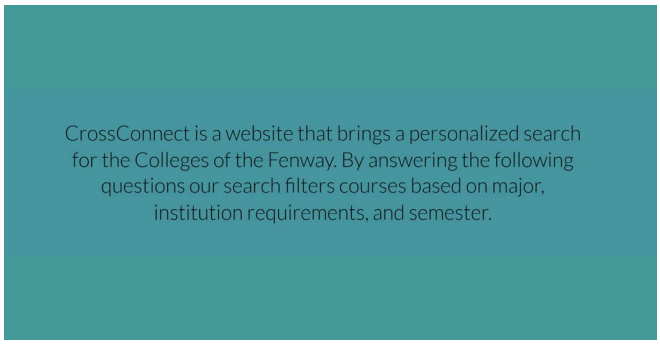

Figure 5. Site Description Display.

2.1. Front-End Implementation

Bootstrap and Scrollify, a jQuery library, compose the main framework used in creating CrossConnect as positive User Interface (UI) design that is responsive, and dynamic for users on mobile or desktop browsers. The design revolved around creating a student's experience that takes away from the complexity of having fields in where the user types what they are looking for. By creating predefined drop downs a user will just have to click on what they want to filter without the complex task of typing, and mistyping, in text fields.

```
<button class="btn btn-primary btn-lg dropdown-toggle" type="button" data-toggle="dropdown
    aria-haspopup="true" aria-expanded="false" id="dropdownMenuButton">
    Semester
    <ul class="dropdown-menu" id="menu1" aria-labelledby="dropdownMenuButton">
        <li><a class="dropdown-item" id="option1">Fall 2019</a></li>
        <li><a class="dropdown-item" id="option2">Spring 2020</a></li>
        <li><a class="dropdown-item" id="option3">Summer 2020</a></li>
    </ul>
</button>
```

Figure 6. Drop-down Code Format.

```
$(function() {
  $.scrollify({
      section:".panel",

      scrollbars:false,

      before:function(i,panels) {

      var ref = panels[i].attr("data-section-name");

      $(".pagination .active").removeClass("active");

      $(".pagination").find("a[href=\"#" + ref + "\"]").addClass("ac
    },
    afterRender:function() {
      var pagination = "<ul class=\"pagination\">";
      var activeClass = "";
      $(".panel").each(function(i) {
        activeClass = "";
        if(i===0) {
          activeClass = "active";
        }
        pagination += "<li><a class=\"" + activeClass + "\" href=\"#
      });

      pagination += "</ul>";
```

Figure 7. Scrollify library: Creating a unique scroll effect.

With Bootstrap implemented, accessibility across devices was achieved with a responsive design to follow. To make the most of this responsive design, all the initial filters are a single dynamic web page that uses java-script for a scrolling effect that provides a seamless transition on mobile or desktop devices. The code shown in Figure 6 is uniform for all drop-down menus implemented such as, Semester, Institution(s), Course Type, and Credits.

As shown in Figure 7, the jQuery library's, Scrollify, code offers a simple, modern, and user-friendly experience. It was created to contrast that of the solution already in place. Feedback from test users showed the new UI was aesthetically pleasing and straightforward due to its dynamic nature.

2.2. Back-End Implementation

In order to provide users with courses they could register for, a database was needed to be referenced to match the users' specifications to. Working with the College of the Fenway department for data of real courses to populate our database, and CoF provided us with comma delimited files (.csv extension) of courses available for cross registration of each school as shown in Figure 8. Taking each of these five csv files, all institutions were combined into a uniform file. We then converted it to a .sql format and uploaded it to our XAMPP (our LAMP stack) as shown in Figure 9.

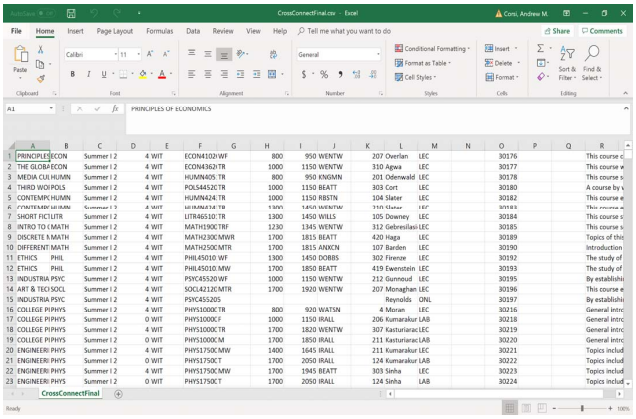

Figure 8. The CSV File of All Courses.

The CSV input files were all in different format as the CoF did not require each institution to submit their courses in uniform format. Most of the backend implementation was to create a uniform SQL friendly file that worked around the different CSV files given by each institution. Once all the CSV files were in a uniform format, a functional database was created.

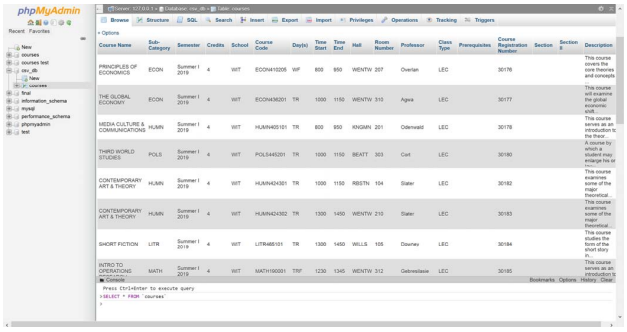

Figure 9. All Courses in .sql Format in XAMPP.

To implement a responsive website, we created an asynchronous web application using Ajax. Ajax combines languages such as CSS, JavaScript XHTML, XMLHTTP, DOM, etc. to meet the construction techniques of the application while solving the issues of heavy server load and slow page loads. The decision to use Ajax creates a more efficient and dynamic user interface close to the local desktop application.

```
C: > xampp > htdocs > xampp > Code > php > php > phpconfig.php >
1  <?php
2  $host = "localhost"; /* Host name */
3  $user = "root"; /* User */
4  $password = ""; /* Password */
5  $dbname = "csv_db"; /* Database name */
6
7
8  $con = mysqli_connect($host, $user, $password,$dbname);
9  // Check connection
10 if (!$con) {
11   die("Connection failed: " . mysqli_connect_error());
12 }
13 //echo "Connection successfull";
14 ?>
```

Figure 10. PHP File that Establishes a Database Connection.

```
<?php
    $sql = "SELECT * FROM courses;";
    $result = mysqli_query($con, $sql);
    $resultCheck = mysqli_num_rows($result);

    ?>

    <?php

    echo "<p> Results</p>
                    <table class='table mytable table-dark'>
        <thead>
            <tr>
                <th scope='col'>Course Name:</th>
                <th scope='col'>Semester:</th>
                <th scope='col'>Credits:</th>
                <th scope='col'>College:</th>
                <th scope='col'>Day(s):</th>
                <th scope='col'>Start Time:</th>
                <th scope='col'>End Time:</th>
            </tr>
        </thead>";

    if ($resultCheck > 0) {
        while ($row = mysqli_fetch_assoc($result)) {
            //echo "<th scope='col'>Course Name:</th>";
            echo "<tbody>
                    <tr>";

            echo "<th scope='row'>";
            echo $row['Course Name'];
            echo "</th>";
```

Figure 11. Format of the SQL Output.

As shown in Figure 10, the PHP is set to log into the localhost. It then searches for a database called csv_db and attempts to establish a connection.

Once connectivity is formed, the second PHP file is used to pull entries from within the database and display them back to the frontend, as shown in Figure 11.

3. Results and Future Work

For students in the Colleges of the Fenway, cross registration needs to be improved to promote a collaborative learning environment. In a primary showcase, students that used the website were able to search specific courses in their field of interest without the confusion or hesitation the previous web tool offered. Bootstrap was able to display the site in a user-friendly way when switching from mobile to desktop. The quick result-generation Ajax provides, allows future improvements to the website. This includes, allowing to reference specific majors, list of courses students are able to take, implementing a machine learning algorithm that allows for users to be recommended popular courses based on their major, or implementing a review system where students are able to leave feedback on the course for others to see.

References

[1] CoF Cross Registration web site: http://www.colleges-fenway.org/academics/cross-registration/ (Last retrieved Oct. 7 2019)

[2] Mark Otto, and Bootstrap contributors. "Bootstrap." Getbootstrap.com. N. p., 2019. Web. 3 Oct. 2019.

[3] Xudong and W. Jiancheng, "User Interface Design Model," *Eighth ACIS International Conference on Software Engineering, Artificial Intelligence, Networking, and Parallel/Distributed Computing (SNPD 2007)*, Qingdao, 2007, pp. 538-543. doi: 10.1109/SNPD.2007.287

[4] Projects.lukehaas.me. (2019). jQuery Scrollify - Power steering for your scroll wheel. [online] Available at: https://projects.lukehaas.me/scrollify/#home

[5] S. Dong, C. Cheng and Y. Zhou, "Research on AJAX technology application in web development,"*2011 International Conference on E-Business and E-Government (ICEE)*, Shanghai, China, 2011, pp. 1-3. doi:10.1109/ICEBEG.20