College of Engineering

CS Capstone Final Progress Report [CS463 Sp17]

June 12, 2017

Website and Application for Health Careers in Oregon

Prepared by

Capstone 41

David Corbelli _____ Signature _____ Date

Jason Ye _____ Signature _____ Date

Zixuan Feng _____ Signature _____ Date

Abstract

The application and website for Oregon Health Science Careers is a guide for middle school and high school level students to learn about health science careers. Between an application and website, the service shall provide information as exploration tool for students looking for future careers in health science. Due to the many fields under the classification of health and science, it may be difficult for a student beginning to take an interest in the subject to find the proper path theyre looking for. As a development team we will focus on developing an exploratory website and then develop corresponding applications for two major platforms, Android and iOS. Through our platform, students will explore pathways and careers in health and science. In this paper, we will discuss our design and specifications of the applications and website we plan to develop.

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1 Introduction

This project was given to us on behalf of Art Witkowski, an educational specialist from the Oregon Department of Education. This project was requested in hopes that we would be able to develop a website suitable for use by middle and high school students as they may look to explore different careers within health sciences. Our website and application look to close the gap between a student's available resources and the amount of information to consider when taking an interest in a specific career field; we look to gather the most relevant material in a single resource. Our development team members consist of David Corbelli, who worked as our project manager and web developer, Jason Ye, who worked as our database and back-end developer, and Zixuan feng, who worked as our mobile application developer and web developer. Our client, Art Witkowski, supervised our project, as we were looking to develop this website to meet his vision, and worked to provide us with the necessary information to be hosted on the website.

2 Requirements Document

2.1 Original Requirements Document Draft

The following pages include our team's original Software Requirements Specification.

SOFTWARE REQUIREMENTS SPECIFICATION

Sponsor

Oregon State Department of Education

Prepared by Capstone 41

Abstract

The application and website for Oregon science is a guide for middle school and high school level students to learn about health science careers. Between an application and website, the service shall provide information as exploration tool for students looking for future careers in health science. Due to the many fields under the classification of health and science, it may be difficult for a student beginning to take an interest in the subject to find the proper path they're looking for. As a development team we will focus on developing an exploratory website and then develop corresponding applications for Android OS. Through our platform, students will explore pathways and careers in health and science.The application and website for Oregon science is a guide for middle school and high school level students to learn about health science careers. Between an application and website, the service shall provide information as exploration tool for students looking for future careers in health science. Due to the many fields under the classification of health and science, it may be difficult for a student beginning to take an interest in the subject to find the proper path they're looking for. As a development team we will focus on developing an exploratory website and then develop corresponding applications for Android OS. Through our platform, students will explore pathways and careers in health and science.

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I. Introduction

A. Purpose

This document introduces information, process, and user characters relevant to this project. This document will explain details of the product including the product perspective and necessary functions, as well as illustrate its benefit to users.

B. Scope

This project consists of creating a website and mobile application that will provide accurate and updated information based upon information from the Oregon Department of Education. The project will be completed by May, 2016. Modules of the website and app will include information about career pathways, administration tools, and a way to help student.

C. Overview

The remainder of this document describes the overall of the functionality of the product. It will describe the perspective and functions, introduce user characteristics, project constraints, assumptions and dependencies, as well as the apportioning of requirements.onecolumn

II. Overall Description

A. Product Perspective

The website displays pages containing information pertaining to the separate branches of health science careers; each page may also provide links to pages with more specific fields. There is also navigation supported for pages including educator tools, workforce partners, and education centers. The majority of the website information will be stored in a database for easy manipulation. Additionally a mobile companion application will be available based upon a mobile web browser to provide an alternative viewing platform.

B. Product Functions

The website designed for Health and Science Careers in Oregon allows users to interact through both web browsers and mobile devices. Users are able to navigate through a series of informative pages to learn about the different fields within health sciences. Alternatively, users may also use a search bar to view pages that include desired keywords. The website is also designed for mobile viewing and includes the same features as the desktop site.

C. User Characteristics

The website is focused for middle and high school level students. Students at this level begin to choose their future career paths and to some it is still unclear how to start their goals and what requirements they need to fulfill. This website is meant to bridge this gap and provide an opportunity for exploration and learning.

D. Constraints

The application for mobile devices may be constrained by differences in mobile devices based on display size. There exist many different display sizes and aspect ratios to take into account. Network connection is also a constraining factor as information is pulled not only from a web server, but also from a database. Should connection be poor, the required time for a page to load may vary, along with the time it takes to query the database.

E. Assumptions and Dependencies

Detailed information concerning careers in health sciences is provided by the Oregon Department of Education. Additionally, a secure hosting server and database for the final product will be provided by the Oregon Department of Education. Publishing of the mobile application will also be managed by the Oregon Department of Education.

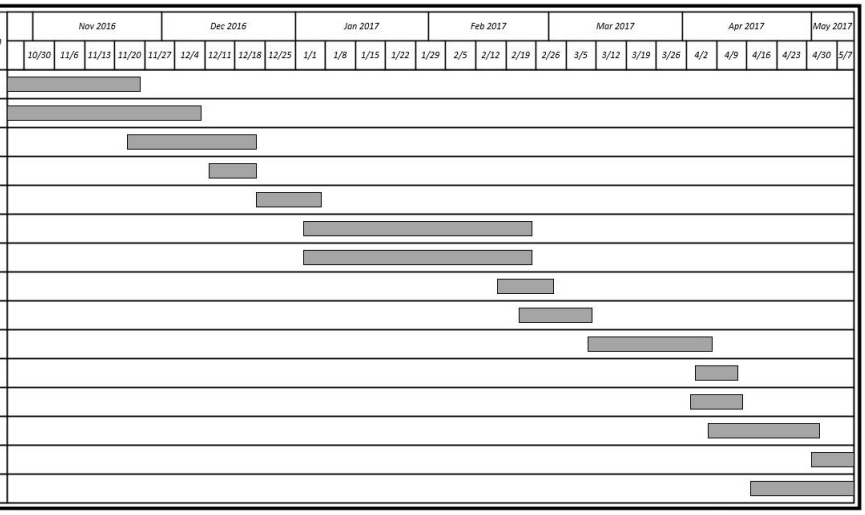
F. Additional Requirements

The site will include an additional backend page and documentation for updating pages and the database with new information.

G. Apportionment of Requirements

The project time frame is as detailed by the following Gantt chart.

ID	Task Name	Start	Finish	Duration
1	Format Coding Guidelines	10/26/2016	11/25/2016	23d
2	Website Design	10/26/2016	12/9/2016	33d
3	Navigation Planning	11/23/2016	12/22/2016	22d
4	Database Design	12/12/2016	12/22/2016	9d
5	Database Setup	12/23/2016	1/6/2017	11d
6	Webpage Programming	1/3/2017	2/24/2017	39d
7	Webpage Styling	1/3/2017	2/24/2017	39d
8	Webpage User Testing	2/17/2017	3/1/2017	9d
9	Mobile Site Design	2/22/2017	3/10/2017	13d
10	Mobile Site Programming	3/10/2017	4/7/2017	21d
11	Mobile Application Programming	4/4/2017	4/13/2017	8d
12	Learn IOS Development Techniques	4/3/2017	4/14/2017	10d
13	Mobile Application Programming	4/7/2017	5/2/2017	18d
14	Mobile Application Testing	5/1/2017	5/17/2017	13d
15	Design Maintenance Training	4/17/2017	5/10/2017	18d



The Client Requirements Document of App and website for Health Sciences Careers in Oregon

Version 1.0, 2016-10-26

Zixuan Feng

Email: fengzi@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

Jason Ye

Email:yeja@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

David Corbelli

Email:Corbelld@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

Signatures

Art Witkowski

Date: 11/5/16

David Corbelli

Date: 11/4/16

Jason Ye

Date

11/06/16

Zixuan Feng

Date: 11/6/16

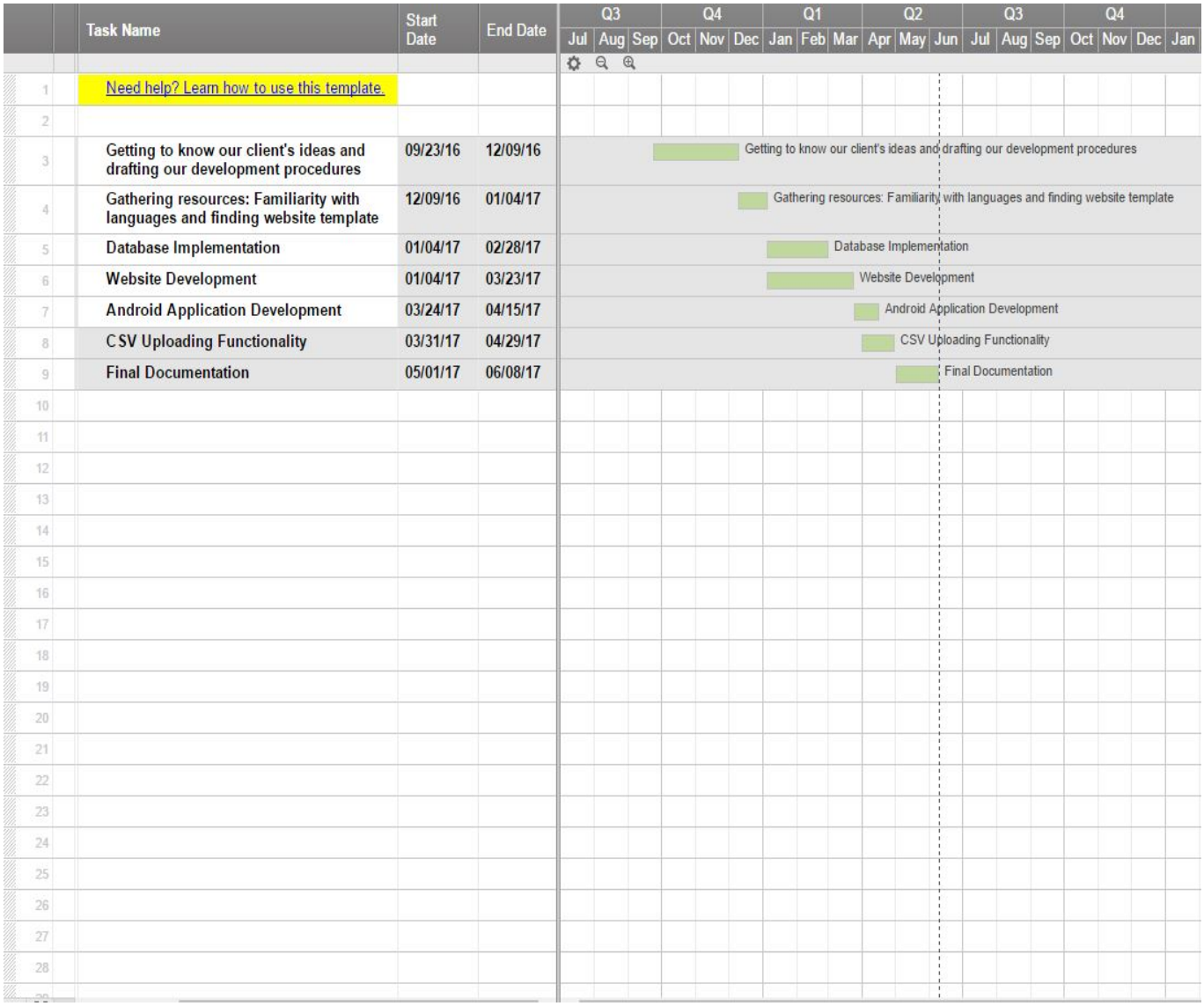
2.2 Client Requirements Document Changes

Requirements Report Chart

Requirement	What happened	Comments
Mobile Application Implementation	Changed to single Android Application development	iOS application development was pushed to a stretch goal due to foreseen time constraints

2.3 Gantt Chart Changes

Our timeline changed only slightly from our original Gantt chart's planning



3 Design Document

3.1 Original Design Document Draft

The following pages include our team's original Design Document.

Design Document

Sponsor

Oregon State Department of Education

Prepared by Capstone 41

David Corbelli, Jason Ye, Zixuan Feng

Abstract: The application and website for Oregon science is a guide for middle school and high school level students to learn about health science careers. Between an application and website, the service shall provide information as exploration tool for students looking for future careers in health science. Due to the many fields under the classification of health and science, it may be difficult for a student beginning to take an interest in the subject to find the proper path they're looking for. As a development team we will focus on developing an exploratory website and then develop corresponding applications for Android OS. Through our platform, students will explore pathways and careers in health and science.

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I. Overview

A. Scope

This project consists of creating a website and mobile application that will provide accurate and updated information based upon information from the Oregon Department of Education. Modules of the website and application include information pertaining to career pathways, industry events, and administration tools.

B. Purpose

This document is intended to detail the implementation of each component pertaining to the project. It also describes the components and steps of applying and creating of the technologies. Decisions discussed within this document concern relational databases, Google Analytics and Android platform, written by Jason Ye, MySQL, testing options, and Android Studio, written by Zixuan Feng, and hybrid application development, Twitter bootstrap, and template paged generation, written by David Corbelli. We have conducted research on these technologies and they have been selected as the best-fit technologies for this project.

C. Intended Audience

The intended audience of this project is aimed towards high school students and their parents. Students at this level begin to choose their future career paths and to some it is still unclear how to take steps towards these goals and what requirements they need to fulfill. The website and application developed through this project will become a user-friendly means to fill this gap.

D. Timeline

The development of this project will occur in three major phases. The first includes designing the web page layout, styling, navigation and back-end database setup. The next phase entails the implementation of these design choices, primarily, the coding of HTML pages and the PHP scripts to read from the database. The third and final phase is the implementation of the mobile site and Android application. The latter of these tasks is to be heavily influenced by the former, as such their development is grouped.

ID	Task Name	Start	Finish	Duration
1	Format Coding Guidelines	10/26/2016	11/25/2016	23d
2	Website Design	10/26/2016	12/9/2016	33d
3	Navigation Planning	11/23/2016	12/22/2016	22d
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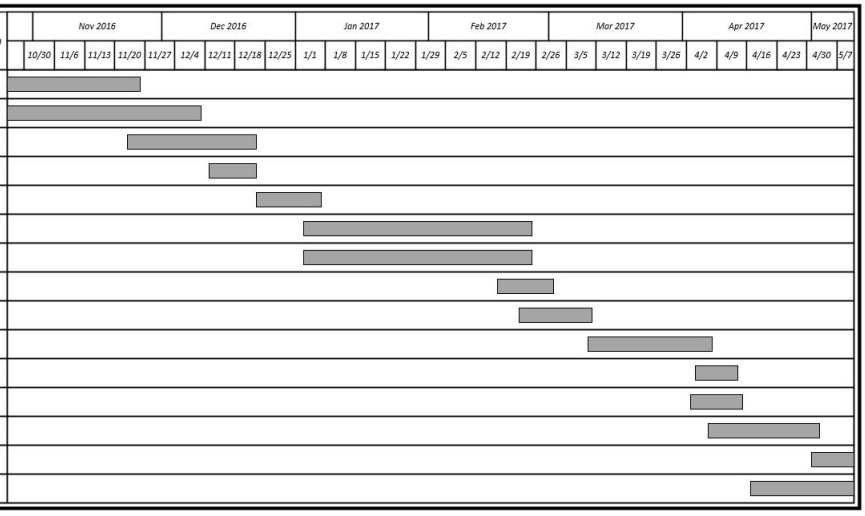
14	Mobile Application Testing	5/1/2017	5/17/2017	13d
15	Design Maintenance Training	4/17/2017	5/10/2017	18d



II. Definitiosn

Application Programming Interface: A set of routines, protocols and tools for building software applications.

AVD Manager: Android Virtual Device(AVD) will performs as different Android devices.

Bulk Copy Program: Program that copies data between an instance of MicrosoftSQL server and a data file in a user-specified format.

Cascading Style Sheets (CSS): The primary language used for remodeling the visual presentation of a website

Database: A structured set of data held in a computer, especially one that is accessible in various ways.

Debugger: A computer program that assists in the detection and correction of errors in computer programs.

Emulator: A hardware or software that enables one computer system to behave like another computer system.

ER diagram: Entity-relationship model means related things in the database in specific domain.

HyperText Markup Language (HTML): The standard programming language used for creating web pages

Integrated Development Environment: A software application that provides comprehensive facilities to computer programmers for software development.

Library: A package of pre-written code that may be called upon for a variety of purposes.

Metadata: A set of data that describes and gives information about the HTML document.

Mysqldump: Mysqldump usually performs intelligent reinforcements, creating a set of SQl proclamations that could be executed to recreate the first database object definition and table information.

Operating System: The software that supports a computer's or mobile device's basic functions.

PHP: A scripting language used to instruct operations performed by the server

Plugin: A software component that adds a specific feature to an existing computer program.

Relational Database Management System: The various software systems used to maintain relational databases.

SDK: Software Development Kit.

Source Code: Any collection of computer instructions, written in programming language, as a ordinary text.

Statistics: A collections of numerical data in large quantities.

Structured Query Languages: A programming language that is used to communicate with a database.

Software Framework: An abstraction of generic functionality allowing for selective change in functionality by the use of additional code

UI Design: UI Design means user interface design, such as computers, applications, and websites.

III. Design Descriptions

A. Database Type

The most important aspect of our project is to have a place to store a large amount of information. In addition, the ability to edit the information by adding, deleting, and updating is crucial for an informative website such as our project. A technology such as a database to keep a collection of data that can easily be accessed and managed is necessary to have. Our project is to create an informative website and application, and a database is the most appropriate technology to use.

Within the different types of database, the most common of all is the relational databases. In this field, we would be implementing the data in a relational database and store them in various data tables. Simply a relational database system contains one or more objects are called tables [1]. Every table will be uniquely identified by their names, and each name is comprised of columns and rows. Supposed we have information about a specific health science career. In a table, the name would be the name of the career, the column contain the column name, data type, and other attributes for the column, and rows contain the records or data for the column such its degree of completion or GPA requirement. Each table must follow a certain integrity rules to ensure that the data are always accessible. For the rows in a table, they should all be distinct. Duplicated rows can be lead to possible selection problems. Fortunately, database system allows developer to specify that duplicated rows are not allowed.

In the case of relational database, there is a Relational Database Management System (RDBMS) which handles the way data is being stored, maintained, and retrieved [1]. In addition, we would be using RDBMS, because it is the best option for the storage of data in databases used for educational information such as our project. RDBMS also provide the usage of Structured Query Languages (SQL) to communicate with a database. SQL is a language designed to be used with relational databases. The implementation of SQL tends to be standard and is used by all RDBMSs. In addition, SQL is the technique to retrieve data from a database, or update data on a database. Before accessing the databases, all of the data must be implemented in tables. To input a large amount of data into the database, we would be using Bulk Copy Program (BCP). BCP is a command line tool within the SQL server that export text file into SQL server. With that ability, any size of file can be imported into our server automatically. After all of the information is completely stored, we would be using SQL to access the large amount of data directly from the database. From that point on, we would be able to deliver valuable contents onto the website and phone app for our audience to view.

B. Database Hosting

Due to our mission, we are going to developed a website, and the main function of the website is going to exhibit information to users. To make sure the stabilization of database is our priority goal, according to the book Building Your Next Big Thing with Google Cloud Platform[2],Google company will help the user to maintain the server. Since we will make a notebook for future database management, and we cannot make sure the future website manager are experienced with web development, Google Cloud SQL is an easy tool to manage in the future. What is more, Google Cloud SQL always store the data in the cloud, it is easy and safe for the future database managers. According to the Google Cloud SQL, Google company store the data in different data centers at same time, which gives user a safer environment. Currently, The Google Cloud SQL has compatible with JAVA and Python, which is same as the MySQL as for programming language, we are all familiar with

python and MYSQL, so this tool fits our language skill and it could allow the programmer use the MysqlIDump import the database. Due to the budget, since our client is government, we need to control our budget and help the government to save money. As we compared, Google Cloud SQL is one of the cheapest tool to use.

However, there are two disadvantages of Google Cloud SQL, first is GCS only could provide 100GB memory. Considering our website mission, 100 GB is enough for our website. And Google Cloud SQL limits the search speed as 16MB/Seconds, but it could also fit our websites data.

As for creating database in the Google Cloud Sql, firstly, we need to figure how many tables we need to create. Based on our website and current data we gathered, at least 6 tables we need to create at first: user accounts, current events lessons, career pathways, contents of health careers, education tool box and career resource. Besides of these tables, we also need to create an ER diagram for our database, which is helpful for us to create table, since it will show us the clear relationship of each table. After creating the table, we just need to use MySQL query to check and calculate all the information in each table.

C. Twitter Bootstrap

One of the most noticeable features of a website is its styling. Rather than writing our own CSS document to customize our page layout, fonts, and navigation bars, we are able to use an open-source styling framework. Utilizing a publicly available styling framework will allow us to achieve a marginally similar if not greater level visual presentation than we could manage ourselves, while allowing for the reallocation of time towards other essential features of the website. Evaluating several frameworks upon criteria including usability, documentation, compatibility, and visual output, Twitter's Bootstrap is the decidedly optimal implementation

Bootstrap, the styling framework developed and utilized by Twitter's main website, is reliant upon the specification of HTML class tags to determine how styling should be applied to specific page components. This allows for individual customization of each element. Bootstrap also incorporates a grid system to allow for quick changes in layout, while other options also include custom fonts, colors, and pre-built navigation bars. For increased responsiveness, the navbars and page components may be collapsed to better fit the window size of desktop and mobile devices.

The implementation requirements for Bootstrap are simple. The Bootstrap package must be either downloaded as a local package to be stored server-side, or linked to the online GitHub hosted project library. Both of these options are equally as functional for out project, however, the server-side implementation allows for greater fidelity should connectivity to the GitHub library suffer. This decision may also benefit load-time issues associated with loading in page information from a nonnative source. There exists thorough documentation, both first-party and third-party, for webpage design templates and usable class tags. Basing our own styling upon pre-existing templates provides a starting point before delving further into individual design choices tailored for this particular website. However, before determining which template to implement as a baseline, a prototype page layout for each page will be drafted to visualize different styles and pagebody organization. Once design planning has concluded, a template webpage containing the navigation bar, header, and footer will be drafted

as the standard frame by utilization of bootstrap templates and class tag selection, while the body of each page is to be developed individually or loaded in through a combination of PHP and Javascript depending upon the content type.

As the website is directed towards middle and high school students, a design format familiar to the target audiences will allow the users more comfort as they use the site. Aside from assisting with the functional organization of our webpages, open-source pre-developed themes will give the website a modern feel with features including background images and dynamic page content.

In order to save time in developing between both the desktop and mobile versions of the site, Bootstrap has been chosen to provide scalable navbars and borders in order to maintain consistency across platforms. Utilizing these specific classes will minimize the discrepancies between the separate coding implementations and will also assist in upholding a visual standard across differences in devices and screen sizes.

In implementation. Bootstrap serves to improve this website's potential in terms of visual output and time allocation.

D. Webpage Generation

Templated page generation is another practice that allows for efficient allocation of development time. Each web page comes with a variety of requirements; navigation bars, headers, footers, and CSS styling associated with each as well as the main page body are all pieces of redundant code to be used across each page. Rather than re-coding the CSS specifications for each page allowing for marginally greater control over each page's appearance, creating a single coded framework to act as the standardized website page style will save time and increase consistency across all pages. Considering the implementation choice to utilize Twitter's Bootstrap, consistency between styling class tags will be essential due to the sheer variance in the framework's styling.

The implementation will require several steps. First, the appearance and organization of the page must be drafted and improved upon until a finalized version of each page can be visualized. With this implementation it is also necessary to ensure that the layout of each page is similar enough or standardized to the point that no page styling may conflict with organization of another. Second, the basic HTML code containing the necessary elements for all pages, including the header, footer, navigation bars, and primary page body sections will be coded with empty class tags. The main page body must be developed separately after the template's completion and the displayed information will vary based upon the pages purpose within the site. With the infrastructure of each page in place, the next step is to reference the drafted site styling with the available styling tags within the Bootstrap library. The most simple option is to identify an existing Bootstrap template and to fill in the necessary HTML code to fit our site. This operation must be done for each page component to ensure the majority of the page is consistently styled with Bootstrap.

The adoption of this page generation strategy should serve to reduce the amount of coding time required by each page. After the basic HTML or PHP files for each web page are created using the template, the remaining section of page body

must be filled in with the required code. These sections will also require styling choices, while not implemented using a template, must require conformance to similar styles amongst other the pages.

Once the procedure has been implemented for the desktop site, a similar process must be undertaken for the mobile site design and development. As most of the styles available through Bootstrap are capable of scaling to screen size, many of the necessary page components including headers, footers, and the navigation bar are able to collapse to versions suitable for mobile devices, requiring no change in implementation. For other page elements it may be necessary to identify different class types from the desktop site for optimal viewing through mobile browsers.

The creation of web pages based off of a devised template will serve to uphold the consistency of the website and application visuals and save time in development.

E. Web Statistics

For the purpose of maintaining the website, we needed a service that will analyze the website statistics for trends and success level. Alternatively, we need a visualization tool that can display the data in a meaningful way for client and programmer to see. It is important to have a log file that measure the behavior of visitors and track details, because it is useful for market research. Also, it is crucial for us to know what is needed to be evaluated on the sites content to ensure that visitors are finding what they want. The best measurement, collection and reporting of web data would be Google Analytic.

Google Analytics lets us analyze user behavior on the website to improve user experience and ensure the success of our project [3]. Before beginning to analyze the website statistics, it is necessary to create an analytics account. After an account is made, a number of instructions will be given for setting up the Google Analytics. The first step is to have Google verifies the website. After verification, a tracking code will be provided for identification. The tracking code will identify and collect data from the website. This decision must be followed in order for Google to know when the site is visited. In addition, these scripts of coding must be installed on every page on the website. The coding varies depend on the type of website. Because our website will be built on HTML files, we will add the tracking code inside the metadata container. After a successful implementation of the tracking code, the site is ready to show data statics on Google Analytics. With its data, we can start learning about our website traffic. A detailed report will be shown each time we connect to Google Analytics.

Google Analytics provide different useful reports for analysis. One of the reports Google Analytics provide is an audience report. Audience reports inform about visitors who show interest in our website. These visitors are our main customer, and we would find detailed report for their demographics, interests and location. Similar to audience reports, acquisition reports would inform data about what drove visitors to our site. In this report, our data show which channels or promotions lead visitor to our site. With that data, we could increase our potential growth of audience by advertising the site on specific social networks. In addition to analyzing visitor's data, Google Analytics offers a behavior reports which reveals what our visitors do on the website. The general overview of the report provides the traffic of page views, average amount of time users spend viewing a page, percentage of single page visits, and percentage of user who exit from a page. These reports

can help us determine if visitors are finding what they are looking for on the website.

F. Testing

As for our project testing, we are going to use all these three testing method to test our website and application: tree testing, click testing and remote usability testing.

For tree testing, According to the article Solving Site Navigation Issues with Tree Testing [4]which is the first testing method for web development, since all the functions of website are based on the tree relations. As for steps of tree testing: firstly, we need to choose a mission task, for example we want to search information about health career, at first we need to test sign in and register to make sure user could use the research function as a website user. And we could test whether we could use the research function, so we could type some information in the search container, and then check the result whether is related to health career. Based on the result, click any of the research result to check whether it is clickable and it is related to health career information. After done with this task, we could choose another task to test other functions of website until test all the functions.

For click Testing. as for another basic testing method is going to test all the website and application button whether is clickable, which includes navigation and functionality. According to the article Getting The First Click Right [5]Same as the tree testing, we need to focus on the Where to, how to and Where is. But we need to know the correct path of mission, and do the each click in orders, and record the time. At last, we need to conclude the entire click testing process whether it could go to correct destination through correct path.

Besides of these two testing method, we need to use the remote usability testing. Click testing and Tree testing are all controlled by professional tester, like programmers, however no matter website or application, the main users are non-professional users, so we need to use the remote usability testing to let general users to test website and application. According to the website, Unmoderated, Remote Usability Testing: Good or Evil? [6] Since general and new users do not know our website and application, they will only follow their general experience and computer knowledge to finish the mission, which could help developers to find bugs during normal using. As for the specific process, we could choose 10 tester and we do not want tester are related to computer science career. To make the tester efficient and effective, we could choose various age testers: 4 testers around 15 years old, 2 testers around 20 years old, 2 testers around 30 years old, and 2s tester around 10 years old. Since our range age users are from 10-30 years, so we could cover all these age testers. And setting up 3-5 different missions to ask user to finish, for example, search health career job and find a related result. Considering the different missions, we should set the time limit, since if the tester cannot finish it on time, which means the task is designed too complicated. As for the negative factors of remote usability testing, we should avoid these factors. First, we should not limit our testers time, we could just give them a time range to finish it instead of at some specific time. In this way, we could give tester a more flexible time to users. And then, to avoid some bad attitude of tester, we could give them tread to finish it. For instance, we could give them a 5 dollar gift card to finish the test. In this way, the gift card to increase testers engagement. Once they finish the test, and we think their test processes are finished carefully, we could give them a tread as appreciation.

G. Mobile OS Platform

Besides providing a website, we are require to develop a mobile application on a mobile operating system platform. The major platform requirement for the project is to create an application on an Android platform, which is an open source mobile system. Its massive user base offers the best technology framework in the Android community. One of the best tool Android offers is Android Software Development Kit (SDK), which is a development tool to develop applications for Android platform. SDK are comprised of application programming interfaces (APIs). Also, it provides many unique set of tools such as debugger, emulator, sample code, documentation, source code, and libraries for a wide range of usage.

Because Android is an open source mobile operating system (OS), its source code can be taken and altered by anyone when released [7]. As its source code is widely available for people to change, many variants of the OS, adapted to different hardware platforms, are showing up. Its open nature has encouraged a large community of developers to use as a foundation for many projects. Its driven projects deliver updates to older devices or add new features for advanced users.

Android platform is hosted by Google, there are many important players such as: IDE, documentation, and Google Play in the system. Before implementation, ones first consideration of building an Android app is a right tool. Usually, a recommended tool such as the Integrated Development Environment (IDE) is used for app development. To access Androids IDE, one download the Eclipse IDE, which is a Java-based open source platform, and Android developer tools plugin. The next tool is documentation; it is a problem that most developer faces when working on Android app. Because the apps have to be installed on top of the Android OS, developer must know which Application Program Interface (API), which is a set of protocols and tools for building software applications, they can use in the code. Supposed we are working with PHP, there are three different APIs to connect to MySQL, which is an open source SQL database management system. It would be difficult for developers to choose which API to use. We can examine documentation to find appropriate function to implement it in the app. The last tool Google offers is Google Play, which is an official app store specifically designed for Android. This portal allows developer to host and earn revenue after the app is fully and successfully developed. Beside Google Play, user can install .apk files, which is a file format used for installing software on the Android OS, to download the app directly on their Android phones.

H. Hybrid Application

Our website development has several requirements: among them, a mobile website and second, a mobile application. As both of these implementations are meant to be accessed by a mobile device, capable of both downloading an application based on our site, or by accessing a mobile version of the website via web browser, a more simple implementation is to develop a site to become the body of an app. A hybrid application is able to combine several functions of native applications, which are downloaded and store data directly on a mobile device, and web applications, which perform similarly, but are accessed through a web browser and are often known as the mobile versions of corresponding websites.

This approach consists of first creating a web application, which will accommodate navigation, styling, and information

display, and then developing a native application intended to access this mobile site. This abstracts certain features of a typical web browser, such as bookmarks, multiple tabs, and the address bar, however, this implementation allows for greater control over visual and functional features of the site. By allowing users the option to download the application, we eliminate the requirement that frequent users must bookmark the site for convenient access while leaving the option available for others.

In implementation, the project's web application will be developed through the Eclipse development environment for web applications, which will require the use of HTML, JavaScript, and PHP files specific to the mobile site. As a software development environment, Eclipse supports file management and construction of applications in a variety of languages and towards several output platforms. Furthermore, once development is completed, the file structure will be formatted in the necessary configuration for our application to be pushed live. Once the development of the mobile site is complete, development towards the counterpart hybrid application may begin.

Development for the Android platform requires the installation of Android Studio, a software development environment, Android SDK, the corresponding software development kit and Node.js, a system to run JavaScript in the background of our mobile application [8]. Once we have the essential packages installed, the next step is to build our application project in Android Studio. Since the proper application structure will have been developed in Eclipse, all that will be required to import the application will be to add necessary files to the proper Android project directories. From here the main UI for the site will be in place; further development will require bridging communication between the Java code running in the Android application and the JavaScript running in the web application.

Mobile application development also comes with various potential obstacles related to required libraries as programming across several languages and development environments, but there is thorough documentation available to act as a guide through the process. As the last component of the project requirements, design choices made during the development of the desktop version of the website will also take into consideration how development of the mobile site and Android application will be affected.

I. Mobile OS Development

As we talked with our client, Android application is our primary goal besides the website. So we will go create the android application first. After compared with current popular tools for android application, we find Android Studio is one of the most official and convenient tool to develop the application.

As the process of development, firstly, we need to download the tool, and then we have already been given the UI design from client, so we could just create a UI through the Android studio. After we finish the UI, we could basically know how many pages we will have in the application. And then set up the relationship between each pages, and develop all the function through the android studio. At this time, we have ready learn the C++ languages, and we could use C++ language to imply all the functions the client required, since the Google Android support the C++ and C language, but others only could be developed by Java. Once we implied one function, we could choose different AVD manager to make sure it will works on real devices. At last, we need to debug our application to make sure our all the functions of applications could

work. After we finished with Android application, we could set up the test for our application, at that time, we could use the remote usability testing to assign different tester to test our application.

Secondly, we are asked to develop two platform application, we need to develop a application on IOS platform too, we choose Corona to develop IOS application. In this tool, it needs a special language LUA, this language is easier than Object C, which is easier for us to develop the application. Same as the android application, we could first make up a flow chart, and create the UI, and then implies all the functions. At last, we need to use same test method with Android application, firstly, we need to debug our application and let all the programmer developer have to engage to test our applications. At last, try to find target user tester to get involved with remote usability testing, and deal with bugs found by testers.

IV. Conclusion

The implementation choices as described within this document serve as the initial approach towards specified development challenges. Should more effective or efficient solutions be discovered throughout the course of development, the implementation strategies for certain requirements may change respectively.

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Zixuan Feng

Email: fengzi@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

12/1/16

Jason Ye

Email:yeja@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

12/1/16

David Corbelli

Email:Corbelld@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

12/1/16

Art Witkowski

Email:art.witkowski@state.or.us

Zixuan Feng

Email: fengzi@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

12/1/16

Jason Ye

Email:yeja@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

12/1/16

David Corbelli

Email:Corbelld@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

12/1/16

Art Witkowski

Email:art.witkowski@state.or.us

12/2/16

3.2 Design Document Changes

The only change made to the design of our project's implementation was the choice to use a cognitive walkthrough form of user testing rather than the tree testing, click testing, and remote usability testing. This change came about due to the limited functionality of our final website and time constraints towards the end of our project.

4 Technology Review

4.1 Technology Review Document

The following pages include our team's original technology review documentation.

Technology Review

Sponsor

Oregon State Department of Education

Prepared by Capstone 41

Abstract

The application and website for Oregon science is a guide for middle school and high school level students to learn about health science careers. Between an application and website, the service shall provide information as exploration tool for students looking for future careers in health science. Due to the many fields under the classification of health and science, it may be difficult for a student beginning to take an interest in the subject to find the proper path they're looking for. As a development team we will focus on developing an exploratory website and then develop corresponding applications for Android OS. Through our platform, students will explore pathways and careers in health and science.The application and website for Oregon science is a guide for middle school and high school level students to learn about health science careers. Between an application and website, the service shall provide information as exploration tool for students looking for future careers in health science. Due to the many fields under the classification of health and science, it may be difficult for a student beginning to take an interest in the subject to find the proper path they're looking for. As a development team we will focus on developing an exploratory website and then develop corresponding applications for Android OS. Through our platform, students will explore pathways and careers in health and science.

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I. Introduction

The purpose of this document is to further analyze the problems outlined by our project specifications and research and compare different solutions. Decisions discussed within this document concern database types, web statistics and mobile operating system platforms, written by Jason Ye, database hosting, user-testing, and mobile operating system development, by Zixuan Feng, and styling framework, webpage generation, and styling framework, webpage generation, and mobile application type, by David Corbelli. We have conducted research on possible technologies to implement as solutions to our anticipated problems and have selected those best-fit for our project.

II. Database Type

Before we begin implementing our project, we need to identify components and technologies that are beneficial to the project. Since the project is mainly focus on website development, one of the main source of technology we will be using is a database, which it can stores and collects large number of information and data. Without a doubt, we need an organized database management system that allows user and database to design querying and administrating. As part of the research of finding the technology, one of the technological solutions to our problem is to have a database. During our analyzing of the problem, we were figuring out a technology that could take in a lot of information and store them in the most efficient and easy way. After a long research on different type of databases, we were given two options: relational databases and non-relational databases [1]. Due to our team members skill sets, we decided to work with relational databases. With relational databases, we can easily add, delete, update, search, sort and analyze data without having to search sequentially through the entire file. We will be using simple SQL query to search through the database and aim for comparison to other data purposes. According to Jacqueline Homan, a software engineer writer for Pluralsight, she stated that relational database uses MySQL, PostgreSQL and SQLite3 to store data in tables and rows efficiently[1]. For us to display the information on the website, we thought of applying relational algebra as our query language. Also Homan described that theyre based on a branch of algebraic set theory known as relational algebra [1]. We assumed that our website would be extracting a lot of information; an application like relational database would be able to handle a lot of complicated querying and database transactions. Thus, applying relational algebra which takes instance of relations as input and output is the best way to display information onto the website. In addition, if your application is going to focus on doing many database transactions, it is important that those transactions are processed reliably. [1]

A. Relational Database

In addition to working with relational databases, an important aspect of referential integrity will be applied. Referential integrity is the concept in which multiple database tables share a relationship based on the data stored in the tables [2]. Because the website contains valid information about health science career pathways, its database should be enforced with cascading actions of updating, adding and deleting data. As long as we define the appropriate primary and foreign keys in the databases, we could use them to enforce data integrity in SQL server tables [3]. Suppose we wanted to delete inaccurate records related to health education. By applying referential integrity, we have the ability to remove it from the table and its relation to other tables without manually deleting them one by one. Using referential integrity would be time effective for implementing and displaying information onto the website. By enforcing referential integrity, we can take advantage of changing data in the tables with minimal headaches.

B. Non-Relational Database

In non-relational databases, there are multiple disadvantages. Developer would not have the ability to use joins like there would be in relational databases. If we wanted to have multiple tables to have a relation with each others, we needed to perform multiple queries and join the data manually and that can be very troublesome [1]. In addition, non-relational does not treat operation as transaction the way relational database does. Creating, verifying and committing databases must be done in order to have a proper transaction. It is a very time-consuming process. Overall, working with non-relational databases is unacceptable.

III. Database Hosting

Our project is focusing website and application, database our priority tool for future updates. Choosing an effective, stable, cost-efficient platform for database is very important for us. We chose three most popular database platforms: Google Cloud Sql, MySql and Microsoft Sql Server.

A. Google Cloud Sql

According to the book Building Your Next Big Thing with Google Cloud Platform[4], Google Cloud SQL is a cloud service, which has similarities with tradition database, and it is easy to generate with Google App Engine. Google Cloud SQL is same as the Data Store, Google Company will maintain the server, programmer could use it without maintenance. There are some features belong to the Google Cloud SQL, all the database will use it over the cloud. As for convenience, it does not need programmer maintenance,Google will help programmers manage and maintain the data. It is trustworthy and high availability. All the data will stored in different database, and all the errors of database and machines will adjusted automatically. Also, The Google Cloud SQL has compatible with JAVA and Python, which is same as the MySQL. Whats more, the Google Cloud SQL could have 100GB memory. As for Convenience, it could allow the programmer use the MysqlIDump import the database. Additionally, Google Cloud SQL could implied by the JDBC, which is based on the JAVA App Engine, and Python App engine application, All these environment are same as the MySQL. Compared with MySQL and Microsoft SQL Server, it is the cheapest way to use, which could save the cost for client.

B. MySql

MYSQL is one of the most popular relational database system. Which could imply by the FreeBSD, Linux, MAC and Windows system. According to the book ProMysql[5]There are some features belong to the MySQL, firstly, it could deal with large data, especially for some big company, like our cline, which is, belong with the government. Secondly, we could use the most popular database language SQL. Thirdly, it is easy to install. Fourthly, it is easy to adjust, manage and optimize. And then, the SQL server has all the popular functionality programmer could use, it is fast and trustworthy. There is the most important feature, MySQL server is in charge of client, it is a server system, which could support multithreading. And it could also support different clients programs and management tools. As for our client, since our client is government, so the trustworthy is the priority element. As for the representation of open source database service, the MySQL is the most popular tools, there are a lot big companies are using, like Facebook, Yahoo, and so on. All in all we could conclude the MySQL in three words: easy, effective and trustworthy.

C. Microsoft Sql Server

As for the Microsoft SQL server is also a relational database system. It has convinces and high integration degree features. According to the book Microsoft SQL Server 2012 Security Cookbook[6] Microsoft SQL Server is a comprehensive database platform; it integrated with BI tools and could provide the big company database management. According to the SQL Server 2016, and national vulnerability database report, Microsoft SQL has the least bugs compared with all other database hosting. What is more, Microsoft SQL Server could use the Visual studio to develop, which means various programmers could imply it in the same time. Additionally, Microsoft SQL Server is related with Microsoft Office, they all have same user interface, which could be a easy way to let programmer train the future people to maintained the database in the future. As for the most current update, Microsoft SQL Server 2014, Microsoft did a lot change for the memory technology, which could support the storage index updates and it also use the newest LSI Nytro technolog to work with the SQL Server, which could reduce the delay and increase handling capacity and trustworthy. In addition, it also combined with the Cloud technology, which means it could easily generate the Windows Azure

IV. Styling Framework

For a website intended to assist middle and high school students in searching for a career path, implementing a visually attractive theme while maintaining an intuitive design is a decidedly important factor for this project. The frameworks considered as a solution include Twitter's Bootstrap framework, Zurb's Foundation, and Dave Gamache's Skeleton.

A. Twitter Bootstrap

Twitter's Bootstrap framework provides HTML and CSS templates that allow for easy website customization. This framework contains JavaScript plugins to provide interface elements, such as: button groups, navigational bars with dropdowns, progress bars and more[7]. Bootstrap is well documented providing examples, templates, and premade themes, allowing users to preview a variety of different page types. These include: cover pages, blogs, dashboard, and sign in pages, and navigation bars, all customizable by editing class tags. Implementation of this framework requires either a free download or a link to the sources files and library hosted on GitHub. It is documented in recent update history that the current version, 4.00-alpha, offers greater grid layout support; a key benefit in this project due to our mobile development intentions. Bootstrap offers support for Chrome, Firefox, and Safari, as well as their respective mobile versions, and Internet Explorer 9.

B. Zurb Foundation

Foundation by Zurb is noted to be similar to Bootstrap in many aspects, but has several distinguishing highlights. Noteworthy differences include implementation for form validation through Abide, Zurbs HTML5 form validation library, and a customizable grid, for greater control over page layout[7]. Foundation may also be implemented through a free-to-download library and is also hosted on GitHub for alternative access. Since the latest update, this framework has experienced a 50% reduction in size, refactored to optimize file size and modularity. Foundation, however, offers support for fewer browsers than bootstrap, failing to support Chrome and Firefox for mobile OS.

C. Skeleton

Skeleton offers less features than the two previously discussed options while providing several similar functionality. This framework offers similar grid layout support but lacks documentation that supports greater functionality for mobile browsers

[8]. Skeletons homepage also states that only a handful of standard HTML elements may be styled through this framework, and thus may lead to complications once our website expands. The most recent update to the framework was in December 2014 and has remained unchanged since then. Skeleton is also hosted on GitHub, but also offers a free download. This implementation, however, is based upon vanilla CSS and is thus a intended as a starting point for responsive websites.

D. Verdict

Out of the three, Skeleton was deemed the least favorable due to the lack of support for mobile browsers as we intend to develop an application based upon a mobile implementation of the website. While there exist many similarities between Bootstrap and Foundation, in research several reasons were discovered to prioritize one framework over the other. One of the most apparent is that Bootstrap is noted to create websites that look very much like they were styled using Bootstrap. While the layouts and templates appear organized and sleek, they seem fairly recognizable; adding themes or custom styling seem to improve upon this aspect but it may take additional labor. There is also documentation to support that Bootstraps components may be more suited to getting websites off the ground and adding a theme, compared to several additional labor required with Foundations components, albeit with several additional features. In terms of performance, the differences were decidedly negligible.

V. Webpage Generation

There are several ways to optimize the way webpages are generated; some favor time-efficiency, while others allow for greater control. Two implementations we have considered are hard-coding the information to webpages or using webpages templates to display information located within a database.

A. Hard-Coded Webpages

One form of webpage generation we can pursue is hard-coding our information. Rather than basing all of our webpages on a template and then populating those pages with the required information through a specifically designed form with input and output, we are also able to hand-write all of the page information ourselves while referencing the database or spreadsheet given to us by our client. While we lose time efficiency inputting and verifying all information ourselves, we are also given greater control over what tags are being used. This will allow for greater control over styling should we not have standardized image sizes or if there is variance in the way we would like information to be displayed. The largest drawback, however, is also presented in the necessity to tag each block of information individually and ensure each is given the necessary class to keep styling uniform.

B. Template Based Generation

Another form of webpage generation we have considered is template based webpage development. We are considering placing standard tags across our information-based webpages and then actively reading in all information from a database. The majority of this work will consist of developing the initial HTML or PHP files that will be used as our template. This implementation may help to standardize the look of all our webpages, but will require work in styling and scaling different parts of our website[9]. One of our options requires the use of JavaScript and Ajax to load in from the database each page actively as the user navigates the website; another option is to construct each webpage to individually query the same database with information specifically tied to the corresponding PHP or HTML file. These are greater design choices to make while we develop navigation.

C. Verdict

Due to the time constraints of hard-coding our information and tagging each block of displayed information individually, we have selected a template based page generation strategy. Hard-coding also has the potential to raise problems as we move towards application development; keeping our tags standardized across all pages will help ensure the applications scalability as the site is optimized for mobile devices. We have yet to design our page layout and or precise template implementation, whether it be entirely based upon static webpages pre-generated for each page requiring database hosted information or live-updated pages utilizing JavaScript simplify the amount of page-linking required. Though, the latter method may require more thought consideration pertaining to webpage search functionality. Ultimately, this design choice leaves the most room for expansion. After we pass off our website as a product to our client, maintenance is most easily conducted if we have a standardized method; a method most easily controlled through a standardized template.

VI. Web Statistics

For the purpose of maintaining the website, we wanted to implement a technology that will analyze the website statistics for trends and success level. Simply a visualization tool kit that that we use to display the data in a meaningful way for client and programmer to see. It is important to have a log file that measure the behavior of visitors and track details. Since the website will be used by the Oregon Education of Department, we need a tool that measures and qualifies aspect of the website. We have to make sure the website is being used in the most efficient and effective way. To do so, we will be applying web statistic software from Google called the Google Analytics. Google Analytics lets you analyze data from all touch points in one place, for a deeper understanding of your customer experience [10]. Google Analytics offer the best features that benefit our website and mobile application. One of the best features Google Analytics offer is the learning what people are search for on the site. Kristi Hines from Kissmetrics Blog stated that, Site Search can help you determine if people are finding what they are looking for on your site [11]. The ability to visualize which page of the content need more specific information is very important. It is crucial for us to know what is needed to be evaluated on the sites content to ensure that visitors are finding what they want; Google Analytics is the perfect tool for us to use to analyze and optimize our website and mobile application.

A. Benefit of Using Web Statistics

According to an article by Karyn Greenstreet, the visitor information on the statistic map is important to keep track of the trend and traffic flow [12]. Also, she stated that the number of unique visitors will help you to determine whether your site is receiving more or less visitor each month [12]. It is important that our audience visit the website for the purpose of being useful and effective. If low detail of action shows on the statistic software, performance or technological issue may occur. Greenstreet also mention that another important distinction is the concept of visitors versus hits [12]. Each person who visits our site is considered a visitor Greenstreet described. They are our target audiences that our website aims for. We want visitors with a purpose to come on the website and spend productive time analyzing our information. There is another important aspect in web statistics, and that is called pages. This section of your statistic will help you to determine which pages are visited most often, how long people stay on a page, and which page people exit your site from Greenstreet stated [12]. Based on the massive information that will be provided on the website, it is crucial to know which web page is more popular than others. Knowing that people spend 5 seconds on a page versus 3 minutes to read is important. This can give

the programmer the idea there may be certain page that is not useful than other pages. Simply we could gather error reports to see where people had problems accessing or analyzing the site.

VII. Testing

Due to our goal are website and applications, testing are very important. No matter website or applications, these three testing are necessary for our project. These three testing: tree testing, click testing and remote usability testing are requisite.

A. Tree Testing

As for the testing method for website, tree testing is a usability tech to evaluate the website. According to the article Solving Site Navigation Issues with Tree Testing [13] All the websites are based on the trees, which means all the websites have various main topics and subtopics, tree testing will provide an effective way to measure and evaluate how users could get the item what they want. In the tree testing, it usually runs in a way, first is going to find a task, which means choose a item, and then it could shown as a text list as the priority level topic of the website. And then it will choose a topic, and shown a list of subtopics. And then continue to searching and choosing until find the specific topic. And it will do other tasks in that method. inally, when the tasks have been finished, it will complete the test, and the result will be analyzed. In this method, programmers could always use in paper ways and also could use some software to test, like optimal workshop.

B. Click Testing

Click testing is a basic testing method for website, it will test the users who would click on first on the interface to finish users task. According to the article Getting The First Click Right [14]As the basic testing method, click test always be used as the priority method. The website will allow programmers to evaluate the linking structure of the website, which includes the navigation, and functionality, it could help the programmer test the users task around the website. As a method flow, first it will let the programmer choose a task, which need to focus on where to, how to" and where is. Secondly, programmer should know the correct path to complete the task. Thirdly, click the click in orders. Fifthly, record the time. Finial, conclude all the process, whether it could use the correct path to complete the task. Click-Testing is performed as the easiest method, which is the first test for all website development. All websites should be tested for Click testing.

C. Remote Usability Testing

In general, the remote usability testing has two different method, moderated remote testing and unmoderated remote testing. According to the website, Unmoderated, Remote Usability Testing: Good or Evil? [15]All the testers will follow the programmers request and their own schedule to test the website and application. The entire testers have to record the test process, during the process, programmers should not disturb and any intervention. As a suggestion, all the remote usability testing should be controlled in 15-30 minutes, which has 3-5 missions. There are some disadvantages about the remote usability testing, firstly, it does not have interaction between testers and developers, if any errors happens in the process, tester do not know how to move to next stage. And the test environment are not controllable, tester could be disturbed by any environment elements, such as phone, or friends. Thirdly, programmer cannot tell the testers attitude, developer cannot tell whether the tester have the interest to test the website or applications, it will affect the result. On the other hand, there are a lot advantages of remote usability testing, due to the current technology, developer could use the video conference to watch the tester to do the test. What is more, there are a lot tools could support the developer to do the test.

D. Cognitive Walkthrough

Rather than using the three methods discussed above, in order to make better use of time we will use a cognitive walkthrough method for usability testing. This method requires evaluators given the role of 'experts' to complete certain tasks and evaluate whether or not the task was possible, whether or not the user's actions returned their intended outcome, if problems arose, and whether or not any solutions are apparent. Due to our late implementation of user testing, this method primarily serves to test for any problem areas on our site

VIII. Mobile OS Platform

Besides providing a website, we are requiring to develop a mobile application on a mobile operating system platform. Due to our agreement with the client, the mobile application will be made in order for students, parents, teachers and counselors to explore health education career pathway; the application will be corresponded to the website.

A. iOS

Today Android and iOS platforms cover about 90 percent of the mobile market [16]. Because these two platforms are what people are using the most, it is obvious that we would be working with Android or iOS. In Apple application development, creating the app using Xcode IDE with iOS SDK is a must [16]. One specific programming language that most iOS developer uses is Swift [17]. Swift is based on Objective-C which is apparently less prone to errors and more concise. Although Swift is a great language to use to create a mobile application, there is a limitation of running the application on mobile device. If we decided to create iOS app instead of an Android app, then the application can only be used on Apple smart phone. We wanted our project to be used on multiple phones and having variety usage is important for our customers.

B. Android

After contacting with our client, we were requested with the task of making an Android platform for our Mobile operating system. According to an article from Rishabh Software, it stated that Android is an open source mobile operating system with massive user base and simplified mobile app development process [18]. The reason we decided to develop Android over iOS was because it offers the best technology framework in the Android community. Its open source advantage from licensing and royalty free is far greater than iOS [18]. In addition, one of the Androids benefits gives us the ability to interact with the community for updating content and expansions. Since our project focus on educational materials, it is important for developers to notify visitor about updates and maintenances.

1) Integration: After contacting with our client, we were requested with the task of making an Android platform for our Mobile operating system. According to an article from Rishabh Software, it stated that Android is an open source mobile operating system with massive user base and simplified mobile app development process [18]. The reason we decided to develop Android over iOS was because it offers the best technology framework in the Android community. Its open source advantage from licensing and royalty free is far greater than iOS [18]. In addition, one of the Androids benefits gives us the ability to interact with the community for updating content and expansions. Since our project focus on educational materials, it is important for developers to notify visitor about updates and maintenances.

2) Language Development: Finally, Android application is easy to adopt. Its main language is scripted in Java with the help of rich set of libraries. Ben Jakuben from Treehouse stated that it is recommended method to develop Android app is to use Java and the Android SDK [19]. With the objective-oriented language such as Java, we are able to manipulate data, collect input from users, and display things on the screen [19].

IX. Mobile Application

Several options exist for developing applications for mobile devices. There exist options hosted both native, where data is stored within a user's device, web applications, where all information is hosted on a web server, and hybrid applications, dependent upon both local and hosted data.

A. Native Application

This type of application is designed specifically for a mobile operating system; in the scope of our project, Android and iOS. One of the key benefits of this design choice is performance; writing the application in Objective-C or Swift for iOS or Java for Android allows for faster and more reliable performance than hoping that the mobile devices web browser will handle a desktop site optimally[20]. Since the native app is built from the ground up, this implementation also ensures the users interaction with the app will feel natural and consistent to that of other applications. One notable benefit is that users who download the application will have immediate accessibility; the applications full functionality and information remain constantly available from a home screen icon. Unfortunately this implementation requires disk space and in the case of applications with greater functionality or requiring intensive data storage, the user may decide the application is not worth the keeping, resulting in a lost user.

B. Web Application

This implementation loads within a mobile browser, such as Chrome, Safari, or Firefox, and may often to be referred to as a mobile website. Web apps are typically programmed using HTML5, Javascript, and CSS and thus, typically lack a standard development kit. Since the applications features and performance are bounded by the capabilities of the web browser, users will typically require an internet connection, design may be less intuitive, and the implementation may not behave like a native application[21]. Other downsides include the difficulty to maintain a user base as the easiest access to your site will be through a bookmark; not an icon on their devices home screen. However, one of the benefits of loading an application through the browser is that no disk space is required.

C. Hybrid Application

Hybrid applications, however, combine the best of the two implementations. One of the key features of hybrid apps is cross compatibility. Since the majority of the information is hosted online, only certain portions of the code must be re-written to allow functionality across different devices. With certain software development kits, such as Phone gap, Accelerator, and Android Studios, it is possible to design the app across HTML, CSS, and JavaScript files as though they were websites and then wrap them into an application[21]. Several drawbacks to note are first, the hybrid app will not run as fast as a native app as performance is partially dependent on browser speed, and second, additional functionality may require additional coding for each platform.

D. Verdict

Our projects implementation is meant to include a desktop website, mobile website, as well as a mobile application. Our devised workflow will begin with developing website navigation and functionality; we will then move on to porting these features to a mobile version of the website. Since we will have already built a mobile website, it will be most efficient to create a hybrid application to account for our mobile application. This will allow us to fulfill our requirements while reusing most of our code. While both the mobile site and hybrid application will have similar functionality, developing both will allow for additional accessibility.

X. Mobile OS Development

As our second goal of our project, we need to develop applications for Android and IOS. To find a efficient and convenient way to develop application will help us to develop better applications. Currently, these three platform could allow us only use one of them could develop application for both systems although some of them still have disadvantage.

A. Android Studios

As for the request of Cline, we need to create applications; android studio is a tool to develop the application. Android Studio is based on the Intelligent IDEA, which is same as the Eclipse Adt, Based on the idea of the application, it has various advantages for Android application. According to the book Android Studio 2 Development Essentials [22]First, it has the reconstruction of the exclusive and quick fixes. Some tool tips will mention and hint the developer the usability and compatibility. What is more, the functionality of Android Studio will allow the developer combine the functionality with UI. Due to the current Android Studios, it also support the C++ to develop the application, which gives programmers an easier way to debugging and develop the application.

B. Corona

As for another main current mobile application development tool, Corona is another easy and convenient application for application developers. According to the book Corona SDK Application Design [23] First of all, stabilization is the most significant feature. Secondly, it also supports the hardware acceleration, GPS, compass and cameras. But the Corona need a special language, called LUA, but it is easy to learn and use. As for us, we are going to develop the two main platform applications IOS and Android, so Corona is a convenient tool to develop the IOS and Android. On the other hand, there are a lot bugs when developers develop the Android applications. And then, it has to upload the code into the server, programmers cannot compile locality. In a word, even Corona is one of the most popular platform to develop the application, but it has some disadvantages programmers should not ignore, especially for the Android application bugs, programmer should pay attention at.

C. Appcelerator Titanium

For our team, we are a new team for developing the mobile application. Currently, the Titanium is one of the easiest way let new programmers to develop applications. According to the book Accelerator Titanium Smart phone App Development Cookbook [24], Because it could let programmers use the HTML, JavaScript and CSS, also it could applied by the Python Ruby and PHP. This platform is tool could combine let the programmer combine the UI and web. For us, the website is our

priority goal for the project, CSS and HTML are two major tools for us, we could also use these two language to develop the applications as well. Programmers could use the same language to develop two applications, IOS and Android.

XI. Conclusion

Post-research, the design choices we have made will affect our database, website design, mobile site, and mobile application implementations. The decisions discussed within this document will be referenced as we continue development on our project.

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Technology Review

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Zixuan Feng

Email: fengzi@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

Jason Ye

Email:yeja@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

David Corbelli

Email:Corbelld@oregonstate.edu

Address: 1148 Kelley Engineering Center, 2500 NW Monroe Ave, Corvallis, OR 97331

4.2 Technology Review Changes

One major change we had on the technology review is the user testing for the project. Originally, we were planning on using three testing methods: tree testing, click testing, and remote usability testing. On the last phase of our project, we were overwhelmed by the lack of time and limited resources for user testing. In order to test our project effectively and professionally with a small amount of time, we decided to change the test methods into a single user testing called Cognitive Walkthrough, which is a testing process that consisted of gathering feedback and distinguish potential usability problems from users.

5 Team Member Weekly Blog Posts

5.1 Fall Term

Week 3

David Corbelli As a group we have finished drafting our problem statement document and are awaiting approval and signature. Communication within the group is going smoothly and we haven't hit any road bumps in planning. In testing LaTex seems to have a slight learning curve, but benefits can be seen at first glance. Looking ahead to next week, we will be scheduling an appointment with our TA, John Dodge.

Jason Ye 10/13/2016 Last week, on October 5th, we have met with our client through a video conference. My teammates and I have asked about the main objective project. We have talked about the basic functionalities and main focus of the project. Fortunately, Mr.Witkowski is a generous person who enjoy talking with us. He is very passionate about his project and willingly to guide us through every detail of the project. My teammates and I decided to meet with our Mr.Witkowski at least once every week, so we could talk about our progress of the project. We are excited and looking forward working on the project alongside with Mr.Witkowski. This week, we will be turning it a problem statement which define our project's description.

Zixuan Feng From Week2, I have met my other two teammate, they are nice and friendly. And On Week 2 Friday, We have a video conference with our cline, Art, he is a kindly person, we talked about this project, what he want get from us, and what is his goal. Through the lecture, we learned a lot from lecture, how to communicate with cline, and how to communicate with teammate. As a computer engineer, communication is one of the most important skill same as the coding. After we talked, we have a very clear mission in the next years. Through a whole week, we have finished our problem statement, including our abstract, problem definition and problem solution, and we sent this to our cline, he is very satisfy with that. On the other hand, through the problem statement assignment, our team deeply know what we are doing and what we are going to do for our cline. And we will talk to our TA next Friday about our project, and talk about our next mission in the future.

Week 4

David Corbelli This week we have discussed changes we will make to our initial problem statement submission and have scheduled our meeting times and goals for group work next week. We were also able to meet with our TA, Jon, for introductions.

Jason Ye This week, we turnt in the problem statement as a draft and received feedback from the professors. The feedbacks are reasonably simple to fix. Our main focus stayed with our client, and we decided to inform our client about our work through email. In addition, we introduced and met with the TA. Jon, who is our TA, wish to meet with my group and I at least once a week.

Zixuan Feng In this week, I reviewed and learned a lot about database and web design tech. Some of them I just learned in this week, and I just reviewed the data tech what i learned before. All these knowledge are prepared for our next step to work on our project. And I watched a lot video about Xcode and Apple Application from Youtube to

learn how to develop the IOS application. As for our team, we met our TA to talked about our project and get to know each other. For the next week, We are going to finish our Client Requirement Document, and we begun to start for our website design in next week. We are in a good team, good team-member and great client. We do not have any problem for our relationship. And I still left a lot technology part question for IOS application, I will go solve those questions in next few weeks.

Week 5

David Corbelli This week we were able to complete our edits for out problem statement as well and meet up in person to complete our requirements specification. We were also successful in drafting our project time frame. Unfortunately I missed our weekly TA meeting this week.

Jason Ye This week, my team and I have met up and worked on the requirement documentation that outlines our project. We have written the necessities and important factors of the project in order for our client to know. We have turnt in the rough draft of the requirement document and hoping for some feedback from our professors. In addition, we have met with John, our TA, and talk about the next upcoming document.

Zixuan Feng In this week, We have done the Requirements documents, and we learned how to use the format IEEE Std 830-1998, this is our first time to touch these Latex form, this is hard for us, we did a lot research and spend a lot time to deal with this problem, but finally we finished this task. We just met with Our TA, he is nice TA, and we talked a lot about our Requirements documents, we know we have a lot problems, so we we know what should we do in the next week, firstly, our first step is going to fix the Gantt Graph, we should specific our missions, we should have more than 20 missions. And then in the next coming week, we should learn more about IEEE std 830-1998 ,this is very important for us, we will use this for next whole year.

Week 6

David Corbelli This week we worked on editing the format of our software requirements specification document. We worked through several problems in dealing with Latex and were able to conform to the IEEE guidelines. We also met with Jon, who gave us tips regarding the SRS, Gantt chart, and tech review.

Jason Ye This week we were suppose to turn in the require document. The document was in IEEE and LaTex format, and we were struggling on making it right. In addition, we could not get our client's signature so we have to turn it in on Monday instead. Overall it was a great experience for us to learn how to do a require document.

Zixuan Feng In this week, I learned the real IEEE format for our requirement document. We spent a lot time to fix our privous document. Before today, we still do not know how to use the IEEE format, we do a lot research, and after we talked to our TA, he told us the specific detail, and we fix that thought this afternoon. In the next coming week, we need to do our first individual assignment, it is about the technology, and I will also try to do some research about our IOS application. This is very important for our project.

Week 7

David Corbelli Not too much was accomplished this week aside from planning. We made decisions related to the technology review's components. We were able to contact our client to discuss some of our project's direction and have made plans to meet early next week.

Jason Ye This week we were assigned a technology review and implementation plan. This document is an individual work which explain what software or hardware needed to be implemented in our project. The purpose of this assignment is to analyze the problem we be will solving and identify the best way to go about solving the problem. In addition, this assignment will help us start our designing process and get ready for program implementation. We were given 9 technology reviews to write about, and total amount of work load is massive.

Zixuan Feng In this week, we just finished the document requirement, and our team have worked on this document over 20 hours, this is not a hard assignment, but it is complex, it is a changelle for us, since we need to learn some real programmer's professional skills, not just coding. And by the end of this week, we split the teach work, and we are going to write a report for that in this weekend, this means we have to follow the report and know what part we need to work, and deeply know it and deeply learn it for the project. For the next week, we are going to combine our all the tech report together, and talk about it ,and then be sure every one agree with that, even that is a individual assignment, but it is for our project.

Week 8

David Corbelli This week we completed our individual written components and submitted our technology review through GitHub. We also began planning our design document. We have decided to meet early next week in order to ensure we're all on the same page moving forward.

Jason Ye This week we have completed the individual write-up for our technology review. We each had to write up at least 1500 words document which explain what technologies we would be using for our project. The process was a long and tiresome, but it was worth the effort in the end.

Zixuan Feng In this week, We finished our tech review on Monday, We combined all our parts together, and formate the document, and write a new abstract for our document. And we set up a plan for our this term biggest document, design document, and we meet with our TA and talk with him about Requirement document and design document. In the next week, since it is a holiday week, we plan to meet our client around Monday or Tuesday, and talk about our client requirement of design document. We still have a question about our website UI, so we need to talk about our UI with client in the next week.

Week 9

David Corbelli During week 9 we were able to meet and discuss our project planning through the rest of the term. We were also able to get in contact with our client and decide on a time to conference. The purpose of this meeting will be

to discuss visual features of the website.

Jason Ye This is week, we prepared to work on the designed document. Its purpose to help us analyze our technologies that we will be using on our project. This document will so help us on the progress report that is due later in the term. It is a holiday week, so we did not meet up with our TA, John, for further clarification.

Zixuan Feng In this week, we just set up a appointment with our client to talk about our document design, we set up a plan for our document design, we planed to finish our document during the holiday weekend, and format our design document in the next week. In the week 10, we plan to finish our design document first, and then we will finish our progress report in the next weekend. We only have one problem is the our website UI, so we need to contact with our client to talk bout that.

Week 10

David Corbelli This week we were able to meet with our client to discuss various aspects our website. We also finished drafting out design document, progress report, and begin recording our presentation.

Jason Ye This week was all about preparing and working on the design document. This document is about writing the step by step of the implementation of our technologies. This document follows the styling guideline from the previous assignment. Overall, it is a brief write-up, and the team and I are working toward the progress report and presentation video.

Zixuan Feng In this week, we have finished our design document, and we record our progress report. Basically we have finished all these terms work. We have also discuss the future steps, we will learn our parts deeply and learn the function of boot strap for next term coding.

5.2 Winter Term

Week 1

David Corbelli: We received images and information to be necessary for our website from our client. We were also able to share different ideas for website designs to implement ***Jason Ye*** This week is the first week of winter section. David and I have met after class and talked about our schedule. We discussed and mentioned that we needed to meet up a lot more than we used to.

Zixuan Feng In the first week, we set up a appointment to meet with each other, and talk about this term's plan, we decided to finish our website in the early of this term, and prepare the application. We planed to start application early in this term since we are not familiar with application, so we need to start our application design earlier. During the break, we have already did some research and ahead work for website, so we could start design right after our meeting.

Week 2

David Corbelli missing

Jason Ye missing

Zixuan Feng In the Week, We have meet with our TA, and talk about our last term grades, we found we did really bad on last assignment during fall term. And then TA we told John about our plan for this term. He agree with our plan, we plan to start the development in week 3. In this week, we have already found some template of website, and did a lot research about Javascript and database. And we have set appointment with our client, we will show him about our website ideal, and talk about the plan with client, if he agree with us, we could start design in week 3.

Week 3

David Corbelli We were able to have a long meeting/work period on Wednesday and were able to work out several components of our site. We were able to complete our site's basic styling outline and plan out our database. We intend to work again next week and complete the setup of our database as well as the setup of our webpage's primary component, the career information pages.

Jason Ye During this week, we have gathered and worked together on the project. We have received necessary documents and information about the project from our Client, Arts, and started designing the front page of the website. We mainly focus on customizing and arranging the outlook of the website. Also, we began to analyze the database for the site.

Zixuan Feng In this week, we just have a meeting with TA and our team again to talk about our progress. We pretty much finished the website frame, so we just need to wait more information and more resources to add in the websites. Our client said we would received the information by next week. So our plan is going to finished the website in two weeks, since we get all the information. Besides, we have not faced any problem seriously. We will have a meeting next week to talk about next progress.

Week 4

David Corbelli This week we worked on editing the format of our software requirements specification document. We worked through several problems in dealing with Latex and were able to conform to the IEEE guidelines. We also met with Jon, who gave us tips regarding the SRS, Gantt chart, and tech review.

Jason Ye This week I went to class for the third time of this term. Class discussion was about the upcoming progress report, Alpha stage of the project, and more in dept of the Expo. Also, the team have met up and worked on the database for the project. We have gotten most of the schema done, but we still needed to input the information into the database.

Zixuan Feng In this week, we tried to contact with our client and get more information for the website, but we only got the branch of the websites, we might need to re do our website database. otherwise, we have not received any more information from our client, so we plan to continue to design our application next week. We assigned our different task

to look up and search some frame of our mobile applications.

Week 5

David Corbelli This past week we were able to discuss certain visual features of our website and begin the process of writing our winter progress report using Overleaf. We received certain documents from out client related to webpage mapping, but are still waiting to receive content for each webpage. We're working to meet our deadlines, but we feel slightly behind. We have decided it may be best to shift focus towards our web app development rather than waiting for the completion of database components

Jason Ye We went to class and received important information about the upcoming progress report and OneNote. These tasks are meant to be keep track of our project timeline. In addition, we have email to our client, Arts, on receiving more information about the website. The upcoming week will be very busy for each of us.

Zixuan Feng In this week, we still have not received more information from client, we still working on our website database, and planning our mobile application. Currently, we decided the mobile application as the mobile cite application, which is good for our application purpose. This app should be small since it is only a small application should be only contain the introduction of career, if the application is too complex, we sill not have too many customers. And we are working on our progress report, we will try to finish that before the due date, we could let our TA to help us check that. Next week, we will still working on website and we try to finish that before the week 8.

Week 6

David Corbelli This week we spent time developing our website as well as completing course documents. We were able to import data into our database as well as setup the career information page using PHP. We spend the next two days working through our progress report document and recording our video

Jason Ye This week, we have met up and worked on the project significantly. We completed the Alpha state of the website which would be presented to the professor. We have also worked and completed the progress report which is about the progress of our project so far. We made a video with powerpoint slides related to the progress report. We still have a lot of things to work on and discussed upon, so we will continue to work on the project for the upcoming weeks.

Zixuan Feng In this week, we finally received information and data from out client, he gave us a new spreadsheet, and we used the new spreadsheet to fix our database again. Because the previous spreadsheet is too complex, it is not good for database setting. And we finished our website framework as well. We only left put more data into website. Other wise we finished our website. Next step, we are planning to start our mobile application, we want to polish our website in next week, and finish our mobile application frame by the end of the term.

Week 7

David Corbelli missing

Jason Ye This week we have met up together and worked on some more on the project. We have figured out the framework of how the website display the information of careers. To display the information more efficiently, we had to think of a way to have a page where it stores and shows all the careers. In addition, we have met up with our TA after 2 weeks due to his sickness. We have talked about the upcoming assignments and EXPO date.

Zixuan Feng In this week, we meet to finish our website. Last week, we finish the database for the website. So we only left to add more pages for website and polish the website. So in this week, we add two more pages for career. We tried many ways to design the career, since there are a lot information of careers, it is hard to organized, we decide to use a chart to list the career and information of careers. We are a little bit behind of our project, so we plan to start the application in next week, at least we could have a general plan for application. We just talk with TA this week, he said we still have one more month for app development in next term. We assign the missions for this weekend to find a tool to develop application of android besides google engine.

Week 8

David Corbelli This week I attempted to get in touch with our client. We're putting the finishing touches on our desktop website, but we are still behind in our progress. By Sunday, I intend to have finished styling the career information pages, Zixuan will have finished styling the career navigation page, and Jason will finish styling the image component of the home page as well as integrating web analytics. We still need information relating to the remaining home, about, contact, external resources as well as many of the health careers themselves. We aren't quite sure of Art's agenda, but I am worried about our timeframe. We intend to begin development on our web app next week.

Jason Ye This we have polishing up the website with the limited information. By finishing up the website, we will able to get started on the web and phone application. We have done some research on how to implement the web application as far as learning how to coordinate the web and phone app.

Zixuan Feng In this week, we finish the database and we finished most part of our styling. I worked on the career's page and i did some styling work for every chart in the page. Besides, we are planning work on mobile cite in the next week, we planned to finish the mobile cite before the end of term, then we will have time to finish our android app by the expo.

Week 9

David Corbelli This week we were able to make progress towards our web application and Android app. Zixuan was able to setup Android Studio and I was able to find an application template to create an abstracted web browser view port. We had planned to move on to this step to test our in-progress web application. Jason also began to work towards an PHP page to upload CSV files to our database.

Jason Ye This week we have accomplished a lot of necessary tasks for the project. First, we figured out how to convert the desktop site into a web app. Steve has found a lot of information about the implementation, and he has been working to the point of completion. Next, we used a temple guideline to create a mobile application referencing to the desktop

site. It went very well in terms of technological and logical sense. Finally, I have implemented a way for our client to input information into a Excel sheet and upload it to the database and display it on the website.

Zixuan Feng In this week, we worked on the our mobile applications, since we almost finish our websites. I finished a mobile website template, but it is not our team asked for, so i just put my work back to shelf as a plan B in the future. We downloaded a template for android studio, this is a template and framework for us to put our website and transfer into mobile application. What we left is only some styling, but the bootstrap also provide CSS package for us to edit the styling for shirking. And we done with some pages, but we still left some pages. In the next week, we are going to finish the poster draft 1, and we set up a meeting with our client on Monday to talk about our website, and finish the progress report and presentation.

Week 10

David Corbelli We spent this week wrapping up development for the term and figuring out what requirements we have left to implement and also conversed with our client regarding domain hosting. We also spent time writing out our progress reports and recording the video progress report.

Jason Ye This week is a dead week and we have had so much accomplished on the project. On Monday, we have had a video conference with our client. We have showed him the beta stage our the website and the mobile application. In addition, we have asked for an in-depth version of a csv file containing health careers. Our client has shown great joy after seeing our result and he was happy about the project. Furthermore in the week, we have met with our TA for the last time for this term, and we talked about the upcoming EXPO event.

Zixuan Feng This is the last week of this term, since we have already done our project for eighty percent. And we met our client in this week, and he is very satisfied with our current products, and we asked more information and requirement documents we need for next step database building. In the next term, we plan to finish the rest of part before week 3. We have not left any problem in this term, everything is in order.

5.3 Spring Term

Week 1

David Corbelli: Our plans for this week had included meeting up again in order to regroup and discuss what tasks were left to complete within the last month of our primary development.Over spring break we were able to receive an updated spreadsheet to include data for several more career paths. Coming back from spring break, very little development had occurred since our previous progress support, but we had begun to look into CSV uploading to interface with our database.No problems were met during this week.

Jason Ye Starting off this spring term, we have went to class and learned more about the upcoming event that is near. Since it is coming up so soon, we have got to prepare for it. Also, the teammates and I haven't heard from our client yet, so we are kind of stuck in the process of delivering the full content of the project. Overall, we are preparing for Expo.

Zixuan Feng In the week1, we meet with our TA and we talk about the next progress, and we set up an undo list, and we separate the work for this term. After that, we did some changes for our websites interface and we fix some problem for the database. For the next week, we are going to finish the poster draft 2 and try to polish our website and database.

Week 2

David Corbelli Our only plans for this week included further development of our website and taking time to look over our poster draft.Over the course of the week Jason took time to further develop the CSV uploading PHP pages, while Zixuan and I made progress finalizing our Android Application. I implemented the domain name hosting and we were able to get the native application interfacing properly with our web application.We emailed Art the previous week asking about database hosting solutions, but have not gotten a response.

Jason Ye This week, we have met up with our TA, Jon, to talk about and schedule our new weekly meet. Jon mentioned about the registration for Expo and more in-depth of Expo day. Also, we have met up two times and worked more on the project in terms of finishing up the requirement and polishing the technology.

Zixuan Feng In the week 2, we finish our poster draft based on the OSU poster requirements. And then we polish more UI staffs for the websites, we do not need to worry about the applications, so we just focusing on the website. And we separate the database works, i am in charging of email part, i tried very hard, but i still need to fix some development in the next week

Week 3

David Corbelli This week our plan was to wrap up the majority of our development for the impending code freeze and finalize our poster draft.Jason had a nearly working implementation of the CSV upload pages completed, while I had gotten the code necessary to generate PHP webpages for all input careers nearly working. Steve worked further on our project's documentation. As a group we were able to finish our poster draft and send it off to our client.We have still not heard back about the databases nor about our poster's approval.

Jason Ye This week we have met up with Jon to talk more about the final progress of the project. We talked about how we going to present it on Expo. In addition, we took a team picture to be posted on the poster draft. One major problem we are still having is the issue of contacting with our client, Art Witkowski. David and I have emailed and called him during daytime, but we have not heard from him.

Zixuan Feng In this week, we have done our final vision of our poster, this is the biggest thing. And we sent to our client, but we have lost connection with our client since this term start, i do not know if we could get the response in the next week. And I finish the email part of our website, basiclly it could allow the user send email from the webiste to adminstrater. Since our code is due on next Sunday, so in the next week, we are going to polish our programming part, and coding part. Otherwise, we only left the report and documentation to do in the rest of term.

Week 4

David Corbelli This week our plan had been to wrap everything up and get things uploaded to Github. Jason had a working version of all pages except career deletion from our database, and I was able to implement the generation of webpages without much difficulty. Other modifications included validating all navigation worked as intended and we also finished our user testing. I took the time to delete unnecessary files from Github and organize our repository.We still have not heard back from our client since spring break despite several phone calls.

Jason Ye This week we are hoping to contact with our client one last time. Due to the deadline of approving our poster, we needed to get in touch with Art as soon as possible. Our last resort is to talk to our professors about our issue. Unfortunately, Art have not contact us; we haven't talked to him for 4 weeks. It was a huge concern for us and we were trying our best to complete and meet all the requirement of the project. We have met up with another team to analyze each other poster for addition credits. Also, we have met up a few times to finish up and upload the project onto Github.

Zixuan Feng We have lost communication with our client since beginning of this term, we have not received anything from him. But we are still moving forward, we are using what we got, like OSU server, OSU database, etc. We have already talked with our professor the current situation, he said he will be our client if we cannot get anything from our client by the end of this term. We have done most of thing we need, rest of weeks we only left the manneal and polish our website for one more time. We did not left any problem. We will continue working on our EXPO in next week.

Week 5

David Corbelli We had little planned this week except for preparing for expo. I was able to compile all of our documents and push everything to Github on Monday and Art responded to my email replying that he would get in touch with his IT department for database setup. No problems occurred during this week.

Jason Ye On Monday of this week, we have submitted the final phase of the project to GitHub. All of the codes and paper work are successfully submitted for grading purposes. In addition to this week, we have met with our TA and discussed more about the Expo event and poster. Fortunately, our client, Art, have finally responded to our email. After four weeks of unresponsive contact with my team, he replied with messages about providing the database server to us. We still are not sure about his future connections with us but hopefully he will stay in touch with us more.

Zixuan Feng In this week, firstly, we finished the final draft our poster, and we polished our website, since the MAY 1st in the last day for upgrate the programming part. On Friday, we set up a meeting with another group to do the peer review poster, and we are confident with our poster right now after a little bix fixing. In the next week, besides the programming, we will begun to move forward of the adminsteration book for our client. We still have not received any infomration from our client. We will still move forward.

Week 6

David Corbelli Our plans this week included preparing our progress report and our presentation for expo. We had

planned to meet on Friday to conduct the majority of our recordings, but only two of us were able to meet.Not much development occurred this week except for the preparation of our slides and script for our video presentation. Zixuan and I were able to record the majority of our speaking sections for the progress report video.Art still has not contacted me about finding a database solution.

Jason Ye This week, we have completed our requirements for the project, and it is ready for Expo. David have emailed our client about our Expo and fortunately we have heard from him for the first time in a very long time. Art was kindly replied about not able to make it to the event due to his busy schedule. So far, our concern is to make sure to complete Expo without any issue. Our TA, John, was not available for this week meeting. Instead, we used time to talk over the Expo procedures and scripts.

Zixuan Feng In this week, we have finished everything we required and we still have not received any information from our client. We checked our design document and other files, we have meets all the requirements and designing. There is nothing left for programming development. We are preparing the EXPO presentation and progress report. We trying to make a appointment with professor Winter to see if she could help us to give us some advices and suggestions for EXPO presentation. We will continue preparing for next week EXPO, and keep running and testing our products to make sure no bugs or bad things happened during EXPO.

Week 7

David Corbelli On Monday we planned to meet in order to record the remainder of our presentation and on Wednesday had planned to meet with Winters about devising our expo presentation.We meet early on Monday to conduct the remainder of our recordings, finalize our slides, and write our progress report. That evening I edited the video and submitted everything through email and GitHub. Our discussion with Winters was productive as we were able to determine what worked well in presenting and things to keep in mind.The Engineering Expo on Friday went well for our group. We didn't speak to many visitors, but it was a good experience and were prepared to answer the questions that were asked.Art contacted me this week to notify me that he does not currently have access to a database nor funds prepared to set one up.

Jason Ye This week we have prepared and wrote the script for the Expo presentation. We wanted to make sure that each of us present the same idea to our audiences. In addition, we have talked to TA and talk about the final preparation for Expo. Expo day went well as we have imagined and we were very proud of each other. Each of us checked in at 8am and ended our presentation at 3:30pm.

Zixuan Feng In this week, we focusing on the EXPO show on Friday. We prepared a lot, and talk with Professor Winters and TA John about some suggestions and advices. After combined the suggestions and advices, we arranged our expo time slot and we could switch our position and take a rest. Finally we had a very smoothly and successful EXPO show. And we accepted about 30 people and talk about our project. In the next week, we need to do more things about document and begun to prepare the manual for our client.

Week 8

David Corbelli We had not setup any plans for working this week. We still, however, need to finalize our project's documentation and begin our final reports. I will contact our client about the handoff of deliverables as well.Project progress was not accomplished this week.No problems were met.If i were to redo the project from the start I would tell myself to start earlier and ask more specifically for what we require to develop the website and request a deadline for its availability.The biggest skill I've learned is group management and time allocation from this project. The skills I can see myself using moving forward include certain management skills and web development.I liked certain freedoms we were given in our development, however, we learned this freedom requires more responsibility and diligence without our client watching over our shoulders.I from my teammates how to work as a team. We were able to split up tasks efficiently and put together a final product we were all satisfied with.If I had been our client, I believe I would be satisfied with our group's work, however, greater stakeholder input might have expedited and improved the final product.If any continuations were to be made to this product they would most certainly be in the area of webpage styling and functionality. There are many areas of this website currently only holding placeholder data and paragraphs; once these are filled in there will be room to perfect the styling of the website and add to the content available.

Jason Ye After the Expo event, we have met up in class and with my TA to talk about the final assignments regarding to Expo. We were assigned with a couple of tasks about the Expo and the overall year experiences. During the TA meeting, my teammates and I talked about the general thoughts about the Expo. We briefly mentioned some personal thoughts and ideas about the Expo. After the meeting, we have decided to meet up as a team and work on the user guide manual for our client and ourselves. As for the client review for our Expo, we still have not heard from him. Part of our grade is based on his review, and we are hoping to hear from him as soon as possible. If we do not hear from our client, Dr.Winters or Kevin will be replacing our client and become our main grader instead.This project was fairly easy and reasonable for all of us to complete. If I was to redo the project, the one thing I would do is to implement better features and user interfaces for our target audiences. In addition, polish it with better CSS styling. The number one skill I have developed and learned over the past few weeks is the implementation of uploading data into the database using various file type. I feel that it is a essential skill to have for my future job. This project has taught me a lot of things I have lacked on, and I enjoy working on it. Web development has always been my passion and I did not regret working on it with people I trust. The one thing I do not like about this project is the lack of communication with my client. If we have spoken more about the project, I would have worked and learned more on it. As a team member, I have learned so much important aspect of web programming and database management from both of my team members. They have corrected and taught me many skills that I lack on. If I was the client of this project, the number one thing I would do is to keep in touch with the workers as many times as possible. Having well-instructed and constant communication is very important for completing the project. If this project were to be continued next year, I would work on publishing the web pages and implement more user interface.

Zixuan Feng In the past week, we had a class meeting and cheer our EXPO last week, and we met our TA on Thursday to talk about future documentation. During the meeting with team members, we talked bout last week EXPO, and exchange our thoughts and ideas. And We made a plan for future missions. We planed to meet on Tuesday next week

to finish our manual for our client for future administration. The only problem we met is we still have not received our client any ideas or feedback for our project, but we will still finish our project entirely. TA said if our client will not contact us anymore, our professor would pretend our client and grade our project. If I would redo the project from the fall term, I would tell myself contact with our client tightly, and maybe go to Portland to meet with him. And I would tell myself pay attention at database, this is the main function of our website. The biggest skill for me I learned how to use the Android Studio to develop a web app, before this class, I have not touched the Android Studio and Java yet. This project provided me a good chance to learn the Android Studio and Java. For me, I think if I could work in some website company, database will be my majority work and if I do the UI design for some websites, CSS and HTML would be my majority language to explore in the future. I like our project, because it is a classic computer science works, and if I go out for work as a bachelor degree student, my job could be same as our project, and this project bring me to the real computer science world and work. I do not have anything dislike about our project. Firstly, I learned how communication skills from our team leader David corbelli. He is in charge of contacting with our client, and his methods are professional and I learned database skills from my teammates Jason Ye, he is good at database skills. If I could be our client, I am satisfied with our project, we not only finish our project completely and entirely, and we also created some ways to make the website easier to manage in the future for our client, this is not requirements, we did a lot extra works for our project, these works not only face our requirement, but also give client extra help to manage website and application. If we need to continued to work on our project, we will continue to develop a IOS application, and publish both IOS and Android applications, and maybe make more pages or more functions for our website, We could add a user log in and register function, and we could more pay attention at user interaction.

6 Final Poster

The following page includes our team's Engineering Capstone Expo poster.

7 Project Documentation

7.1 Usage and Maintenance Guide

Oregon Health Science Careers
Project Use Documentation

PREPARED FOR: OREGON DEPARTMENT OF EDUCATION
ART WITKOWSKI

PREPARED BY: GROUP 41 CAPSTONE 41
DAVID CORBELLI
JASON YE
ZIXUAN FENG

Abstract

This manual is guide for future managers and administrators of our Oregon Health Science Careers website. This document contains a clear guide for how to manage the website and database. Through this manual, future website administer may learn how to change and update information, how to manage the database, and how to fix simple problems in the future.

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9. Android Studio ……..……

10. Google Analytics ……...……

11. Google Maps ……..……

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1. What is Website Maintenance?

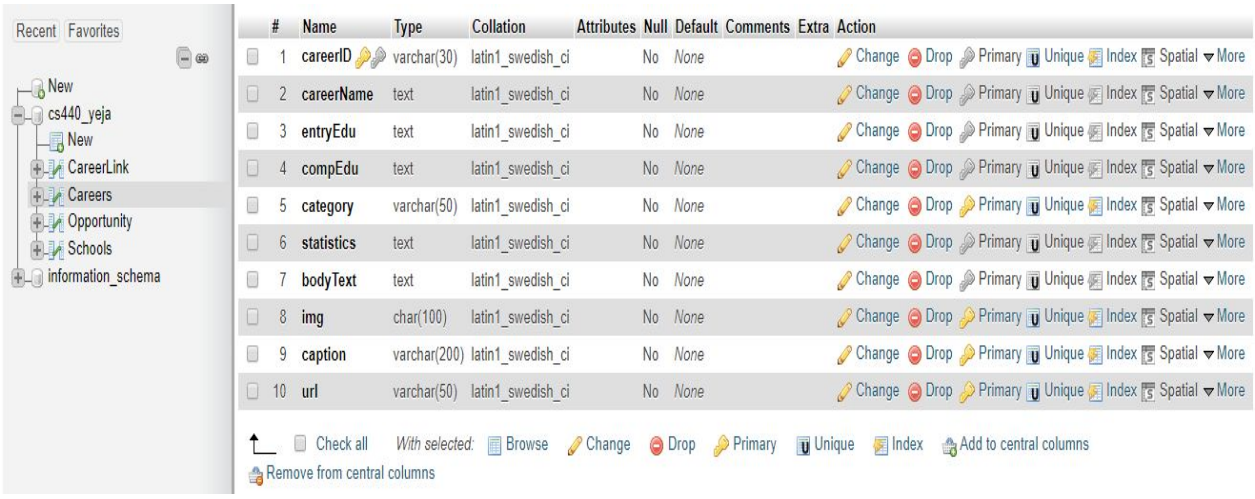
Website Maintenance involves various works to guarantee all the operational activities of the websites and internet. Thus, Website Maintenance is for making sure everything works on the websites and follow the scheduled plan.

Website Maintenance Activities:

- **Website UI Updating:** Involves changing CSS coding to alter UI design.
- **Website Database Management:** Managing data displayed on our website.
- **Website Server Management:** Organizing files, file structure, and file permissions to suit website needs.
- **Website Performance Monitoring:** Using Google Analytics to manage and monitor the website performance and site traffic.
- **Website Content Updating:** Changing content in HTML/PHP pages or databases to update information available on the website.

2. Website Maintenance Glossary

Database:
It is a system software for managing data. The software allow user to create, read, update, and delete data. Database is usually being managed by a Database Management System which is a system software that serves as an interface between the database and application programs. In addition to using a database, most data or information is consistently organized, managed, updated, and remain easily accessible. The data is organized into rows, columns and tables.



HTML:
HTML is the primary coding language used to implement our website's elementary features. It contains elements with class tags that link to our style sheets scripts:

```
<!DOCTYPE html>
<html lang="en">

<head>

    <meta charset="utf-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <meta name="description" content="">
    <meta name="author" content="">

    <title>Health Careers</title>

    <!-- Bootstrap Core CSS -->
    <link href="css/bootstrap.min.css" rel="stylesheet">

    <!-- Custom CSS -->
    <link href="css/business-casual.css" rel="stylesheet">

    <!-- Fonts -->
    <link href="https://fonts.googleapis.com/css?family=Open+Sans:300italic,400italic,600italic,700italic,800italic,400,300,600,700,800
    stylesheet" type="text/css">
    <link href="https://fonts.googleapis.com/css?family=Josefin+Slab:100,300,400,600,700,100italic,300italic,400italic,600italic,700ita
    ="stylesheet" type="text/css">

    <!-- HTML5 Shim and Respond.js IE8 support of HTML5 elements and media queries -->
    <!-- WARNING: Respond.js doesn't work if you view the page via file:// -->
    <!--[if lt IE 9]>
        <script src="https://oss.maxcdn.com/libs/html5shiv/3.7.0/html5shiv.js"></script>
        <script src="https://oss.maxcdn.com/libs/respond.js/1.4.2/respond.min.js"></script>
    <![endif]-->

</head>

<body>


    <div class="brand"> <img src= "img/logo.png" height="120" width="120" hspace="30" />Oregon Health Science Careers</div>
```

Heading:
The headings tags <h1> < h2> <h3>… change the header content from large to small text.

```
<h1>Oregon Health Career </h1>
```

Images:
The image tags, <img>… </img>, are used to link images to pages:

```
<img> logo.png </img>
```

Class:
The class tag attributes are used to apply a series of identical scripts to multiple HTML elements. In our case, element classes are typically used to link Bootstrap and CSS styling to our webpages.

```
<div class="container">
    <!-- Brand and toggle get gro
    <div class="navbar-header">
```

CSS:
According to W3School: "CSS stands for Cascading Style Sheets. CSS describes how HTML elements are to be displayed on screen, paper, or in other media."

As a style sheet, it has to be linked to an HTML file using follow tag structure to connect with the HTML file.

```
<!-- Bootstrap Core CSS -->
<link href="css/bootstrap.min.css" rel="stylesheet">

<!-- Custom CSS -->
<link href="css/business-casual.css" rel="stylesheet">
```

Bootstrap:
Bootstrap is the HTML, CSS and JavaScript framework used heavily to influence our website's visual design.

3. GitHub Repository

The entirety of our project development can be accessed through our GitHub repository at: https://github.com/corbelld/EECS_Capstone_Group_41_2016-2017.

The Desktop_Site directory holds the HTML, PHP, CSS, JS, and image files used in implementing our website.

The Database Setup directory holds the SQL file necessary for implementing our database, while the CSV files are necessary for building our site at its current state.

The Database Maintenance directory holds all files related to our CSV update system through which our client will be able to add new information or update information currently displayed on the website.

The Documents directory holds all documents related to our development process

The Health Careers App folder contains our the files necessary to build our Application project using Android Studio

The User Testing Results directory holds our compiled results from user testing

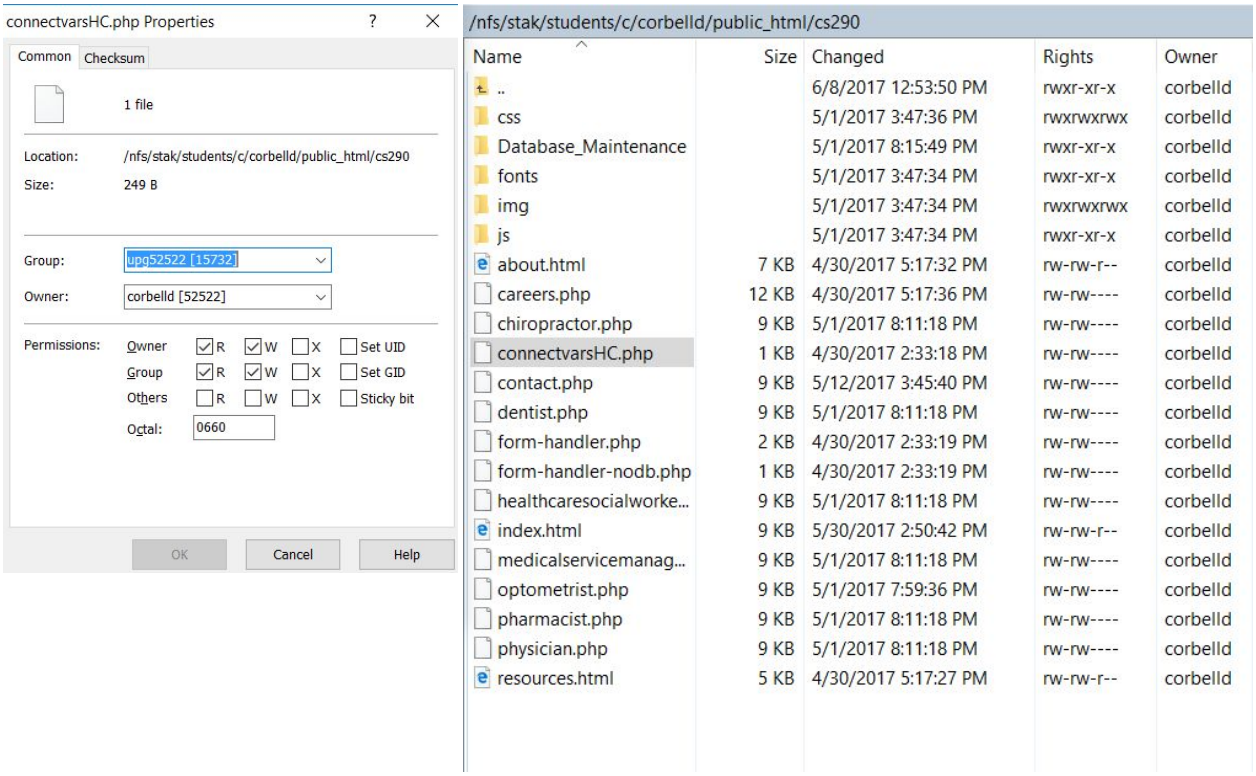
Within this root directory also exists our Android application file. It is required that the application be downloaded to the desired Android device or emulator for testing. It may also be necessary to update security features to turn off application authentication under security or use a file manager to access the file for installation to work properly.

File Hosting and Permissions…….

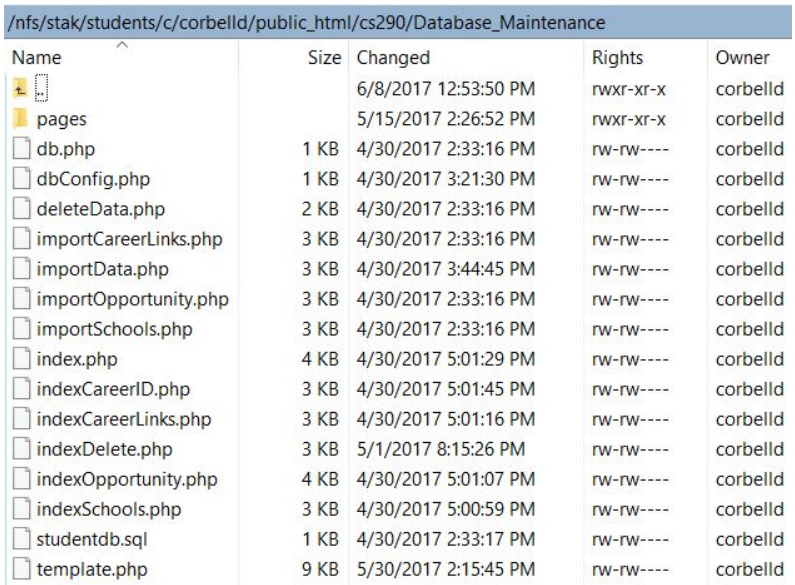
For proper usage, all files from the Desktop_Site repository should be hosted to the desired web server, while the Database_Maintenance files should be hosted separately for security reasons, this will allow only those with the proper URL link to access the upload sites, regardless of whether or not they have the necessary CSV files.

In order to properly host and access the files present in our GitHub repository it is necessary for several key file permission changes to be made. As displayed in the below images, files have read, write, and execute permission variables for Owner, Group, and Other users; in order to properly use these settings, the file permissions should be set as seen in the included file browser window.

These images display the settings for the connectvarsHC.php file. Similar changes should be made to reflect the settings “Rights” file column for R - “Read”, W - “Write”. and X - “Execute.”



The above image shows the settings for files in the Desktop_Site GitHub directory, while the necessary settings for the Database_Maintenance files are displayed below



4. Server Requirements

Our website has been developed using a variety of file types, among which include HTML and PHP files. While HTML5 code is most commonly able to be hosted by web servers, PHP scripts are not necessarily supported. Our implementation requires these scripts for actions such as pulling information from our database, generating career pages, and sending emails from our contact page. In order for this website to work properly it is necessary that the hosting solution for this project supports the running of server-side PHP code.

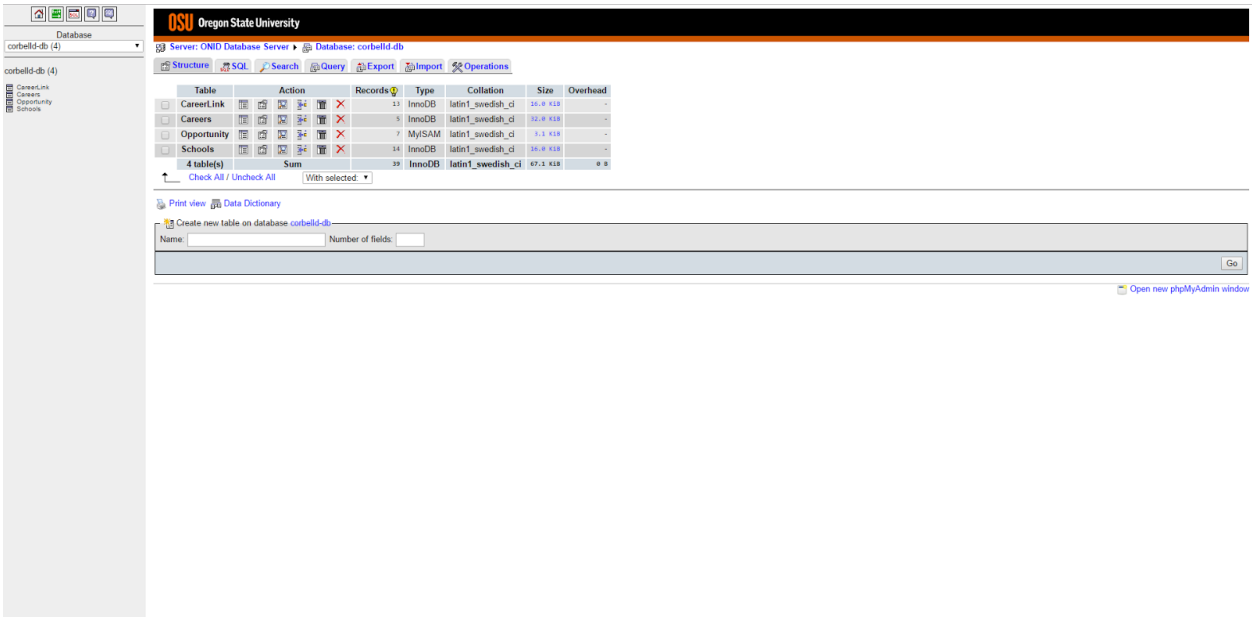
A separate hosting solution is not required for the Android application to run properly as the page display generated is based on a scaled version of the desktop site, which utilizes Bootstrap. Any changes made to the desktop implementation may, however, reflect poorly upon the mobile or Android application displays.

Name	Size	Changed	Rights	Owner
..		5/15/2017 6:42:09 PM	rwxr-xr-x	corbelld
css		5/1/2017 3:47:36 PM	rwxrwxrwx	corbelld
Database_Maintenance		5/1/2017 8:15:49 PM	rwxr-xr-x	corbelld
fonts		5/1/2017 3:47:34 PM	rwxr-xr-x	corbelld
img		5/1/2017 3:47:34 PM	rwxrwxrwx	corbelld
js		5/1/2017 3:47:34 PM	rwxr-xr-x	corbelld
Testing_Hold		4/30/2017 2:53:47 PM	rwxr-xr-x	corbelld
about.html	7 KB	4/30/2017 5:17:32 PM	rw-rw-r--	corbelld
careers.php	12 KB	4/30/2017 5:17:36 PM	rw-rw----	corbelld
chiropractor.php	9 KB	5/1/2017 8:11:18 PM	rw-rw----	corbelld
connectvarsHC.php	1 KB	4/30/2017 2:33:18 PM	rw-rw----	corbelld
contact.php	9 KB	5/12/2017 3:45:40 PM	rw-rw----	corbelld
dentist.php	9 KB	5/1/2017 8:11:18 PM	rw-rw----	corbelld
form-handler.php	2 KB	4/30/2017 2:33:19 PM	rw-rw----	corbelld
form-handler-nodb.php	1 KB	4/30/2017 2:33:19 PM	rw-rw----	corbelld
healthcaresocialworke...	9 KB	5/1/2017 8:11:18 PM	rw-rw----	corbelld
index.html	9 KB	5/1/2017 7:55:30 PM	rw-rw-r--	corbelld
medicalservicemanag...	9 KB	5/1/2017 8:11:18 PM	rw-rw----	corbelld
optometrist.php	9 KB	5/1/2017 7:59:36 PM	rw-rw----	corbelld
pharmacist.php	9 KB	5/1/2017 8:11:18 PM	rw-rw----	corbelld
physician.php	9 KB	5/1/2017 8:11:18 PM	rw-rw----	corbelld
resources.html	5 KB	4/30/2017 5:17:27 PM	rw-rw-r--	corbelld

5. Database Setup

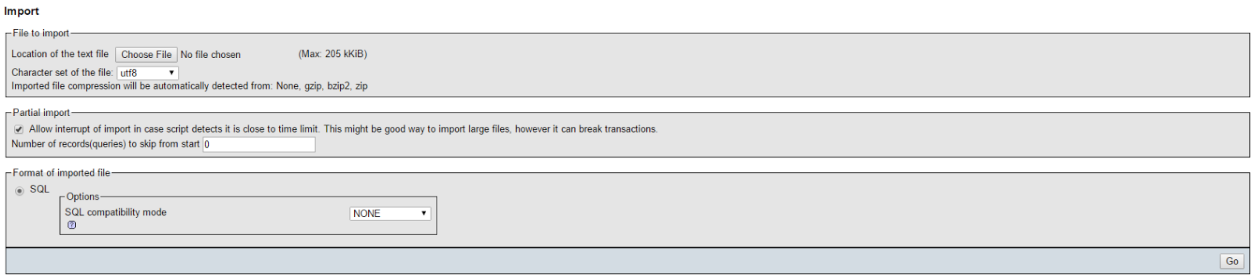
Setup Files……

If the database in use implementa phpMyAdmin as an interface, the display may look similar to the image below:



Upon looking closely it can be seen that an Import tab is available to assist in database setup.

Within our Project files on GitHub, there is a folder labeled “Database Setup” and within this directory exists two database setup files: “DB Empty.sql” and ”DB Populated.sql” depending on how you would like to setup the initial database either of these files may be used. The empty sql file only generates the tables which will hold future information, while the populated file contains the information currently implemented into the website as an example.



After choosing the desired file the user must simply navigate to the import page, select the file, and click “Go” in the lower right-hand corner.

Connection Variables…..……

There are two required files that are needed to have in order to connect to the database. One is called the **dbConfig.php** and the other is called **connectvarsEECS.php.**

dbConfig.php is a file which is used to connect inputted information to the database. **connectvarsEECS.php** is a file that connects information to be drawn from the database to the main website.

The PHP files consist of four required variables: dbHost, dbUsername, dbPassword, and dbName.

- dbHost is the name of the web server
- dbUsername is the username that you need to log into the database
- dbPassword is the password that you need to log into the database
- dbName is the name of the database within the server

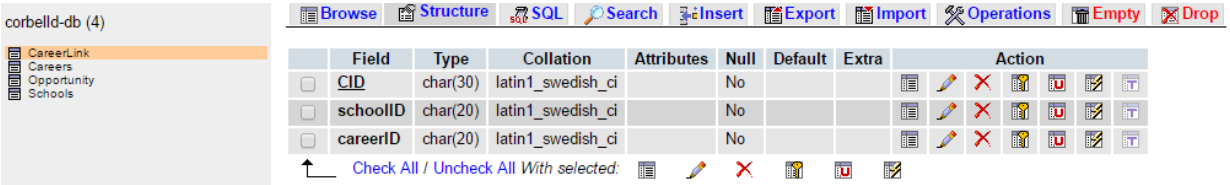
Each of these should be acquired through setting up a working database solution.

Deleting Information…..……

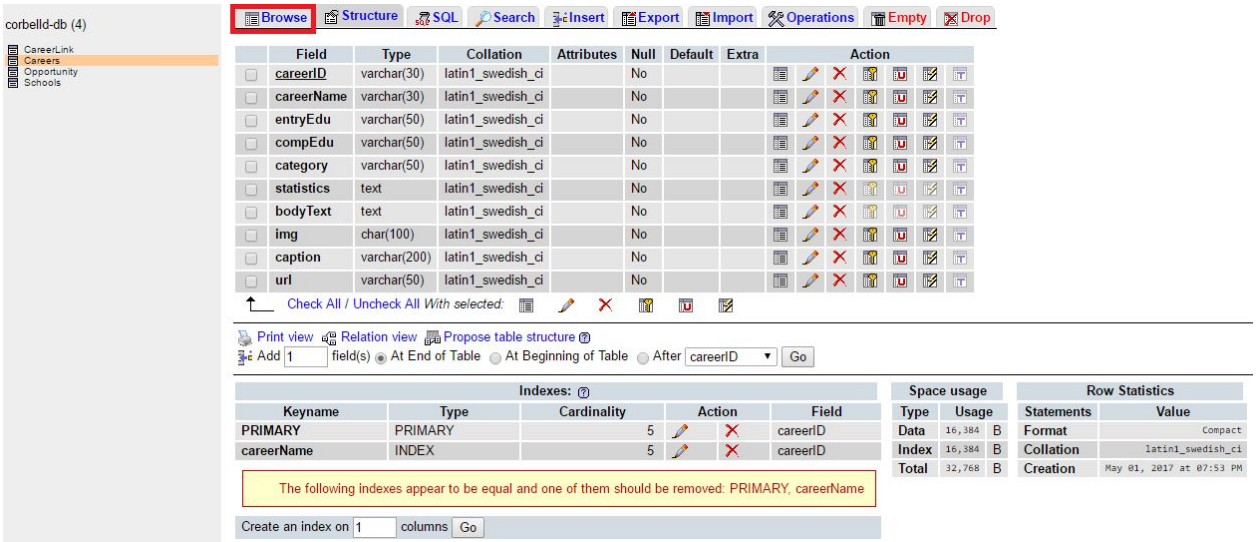
As the database deletion PHP page has not been completed, it may become necessary to clear data from the database manually.

Method 1:

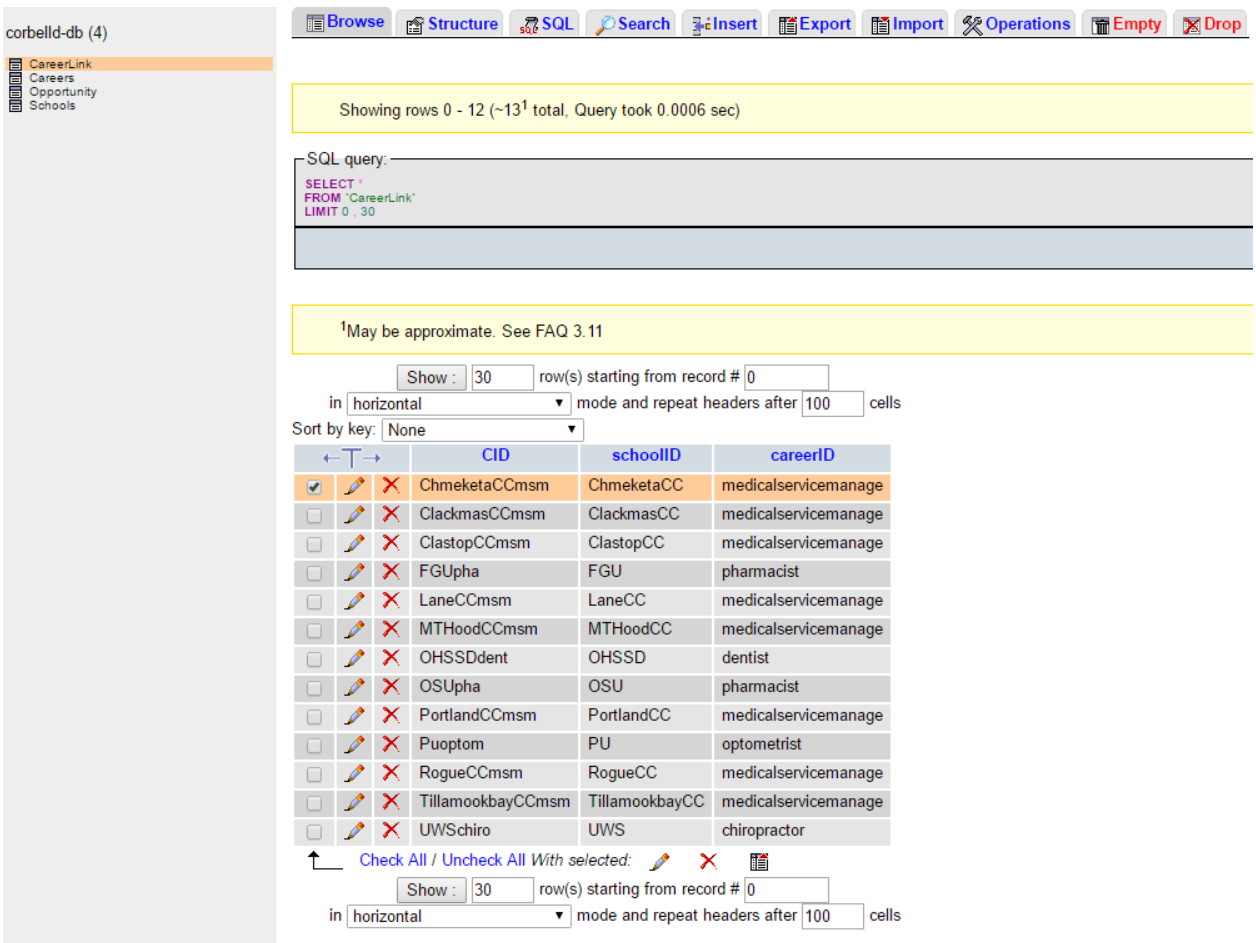
1. The first step will be to select a data table from the left-hand side of the screen



2. The second step is to select the “Browse” tab in the table options bar. It is imperative that this navigation is selected as clicking on a table will bring the user to the table structure tab by default. Deleting from the table structure could render the data table unable to function.



3. Once the user is at the Browse screen, they may select the desired row and click on the red "X" in the third column. This will remove the row from the database.



Method 2:

1. There also exists a method to delete all rows from a database. From any table, the user may select “Empty” from the table menu and this will clear all existing rows. The user should not, however, select the “Drop” button as this will clear the existence of the table entirely and the implementation may become unusable.

6. Website Functionality

The primary elements of our website scale to screen size, however should an administrator wish to change the appearance of certain features, certain lines of code will require editing.

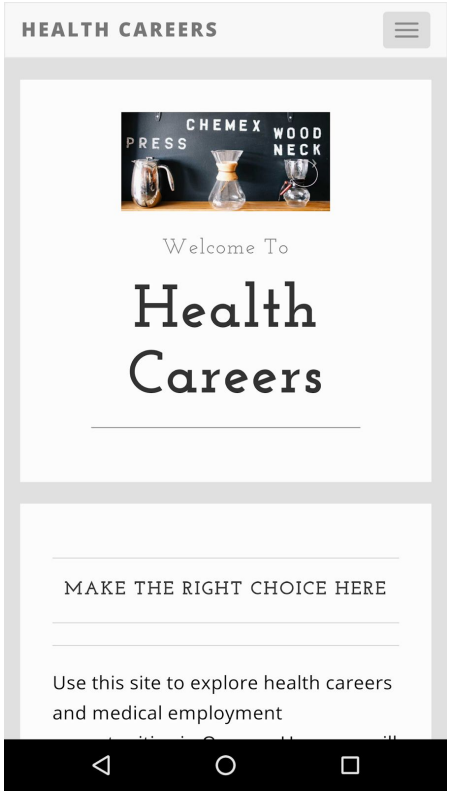
Navigation Bar……

The responsive navigation bar used in our website utilizes our Bootstrap implementation. Certain class tags are necessary for it to operate at full functionality and any additions to the full screen size navigation bar will also be added to the navigation bar for the mobile application's drop down list.

```html
<!-- Navigation -->
<nav class="navbar navbar-default" role="navigation">
    <div class="container">
        <!-- Brand and toggle get grouped for better mobile display -->
        <div class="navbar-header">
            <button type="button" class="navbar-toggle" data-toggle="collapse" data-target="#bs-example-navbar-collapse-1">
                <span class="sr-only">Toggle navigation</span>
                <span class="icon-bar"></span>
                <span class="icon-bar"></span>
                <span class="icon-bar"></span>
            </button>
            <!-- navbar-brand is hidden on larger screens, but visible when the menu is collapsed -->
            <a class="navbar-brand" href="index.html">Health Careers</a>
        </div>
        <!-- Collect the nav links, forms, and other content for toggling -->
        <div class="collapse navbar-collapse" id="bs-example-navbar-collapse-1">
            <ul class="nav navbar-nav">
                <li>
                    <a href="index.html">Home</a>
                </li>
                <li>
                    <a href="about.html">About</a>
                </li>
                <li>
                    <a href="careers.php">Careers</a>
                </li>
                <li>
                    <a href="contact.php">Contact</a>
                </li>
                <li>
                    <a href="resources.html">Resources</a>
                </li>

            </ul>
        </div>
```

Shown above is the HTML implementation of our standard navigation bar. As shown all links are shown between <li> list tags with an <a href> hyperlink URL tag.



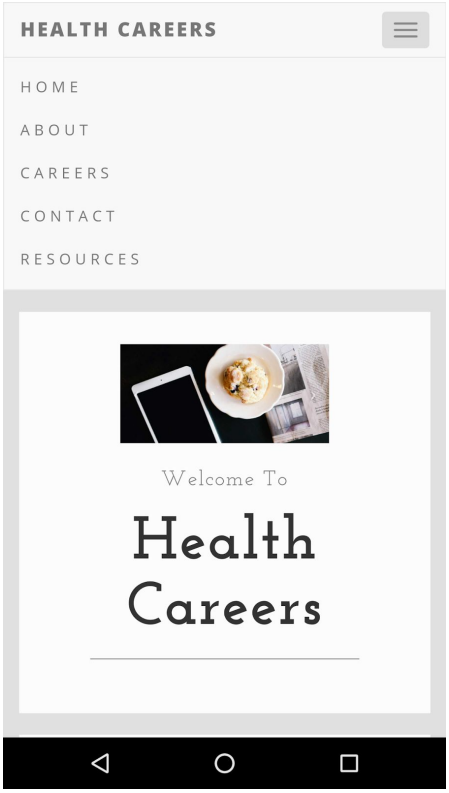
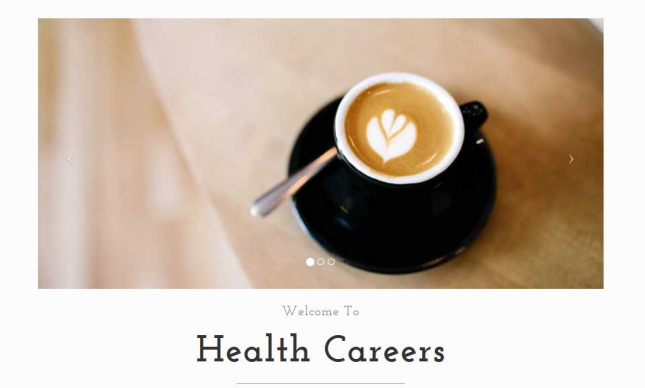


Image Carousel……

In order to change the links or images present in the home page's rotating image carousel certain changes to the HTML code must be made. As depicted below on lines 94, 97 and 100, the destination URL can be changed via the **href** link and the image displayed can be changed via the **src** attribute. Additional images can be added by adding new ** ** tags containing similar structure.



```
<div id="carousel-example-generic" class="carousel slide">
    <!-- Indicators -->
    <ol class="carousel-indicators hidden-xs">
        <li data-target="#carousel-example-generic" data-slide-to="0" class="active"></li>
        <li data-target="#carousel-example-generic" data-slide-to="1"></li>
        <li data-target="#carousel-example-generic" data-slide-to="2"></li>
    </ol>

    <!-- Wrapper for slides -->
    <div class="carousel-inner">
        <div class="item active">
            <a href="careers.php"><img class="img-responsive img-full"  src="img/slide-1.jpg" alt=""></a>
        </div>
        <div class="item">
            <a href="contact.php"><img class="img-responsive img-full" src="img/slide-2.jpg" alt=""></a>
        </div>
        <div class="item">
            <a href="about.html"><img class="img-responsive img-full" src="img/slide-3.jpg" alt=""></a>
        </div>
    </div>

    <!-- Controls -->
    <a class="left carousel-control" href="#carousel-example-generic" data-slide="prev">
        <span class="icon-prev"></span>
    </a>
    <a class="right carousel-control" href="#carousel-example-generic" data-slide="next">
        <span class="icon-next"></span>
    </a>
</div>
```

HTML Page Changes……

Heading Filler:

Information to fill the current header had not been decided upon at the time of development and as such changing this information in existing HTML and PHP files as well as within the /Database Maintenance/template.php file is recommended early on before new pages are generated.

1. The necessary changes should be made in line 43 for most files found at the beginning of the body tag and above the navigation bar. Changing the line from “[Filler Information]” to the desired text should suffice.

```
40 <body>
41
42     <div class="brand"><a href ="index.html" style="text-decoration:none; color: #404040"> <img src= "img/logo.png" height="120" width="120" hspace="30" /> Oregon Health Science Careers</a></div>
43     <div class="address-bar">[Filler Information]</div>
44
45     <!-- Navigation -->
```

External Resources Page:

Our external resources table was implemented using HTML coding.

1. Duplicate lines 91-94 for an example setup

2. Change the tag in line 92 from a href=”#” to a href=”<desired URL link>” as well as the following resource title

3. Change the resource description in line 93.

```
82          <table class="table table-hover">
83              <caption><h4>External Resources</h4></caption>
84              <thead>
85                  <tr>
86                      <th></th>
87                      <th></th>
88                  </tr>
89              </thead>
90          <tbody>
91              <tr>
92                  <td><a href="#">Example Resource</a></td>
93                  <td style="padding-right: 20%">Example Description of Example Resource</td>
94              </tr>
95              <tr>
96                  <td ><a href="#">Example Resource 2</a></td>
97                  <td>Example Description of Example Resource 2</td>
98              </tr>
99          </tbody>
00          </table>
```

About Page:

In order to change the images and names present at the bottom of the about page only requires changing the image sources present on lines 112, 118, and 124 of the about.html file and the corresponding names and descriptions.

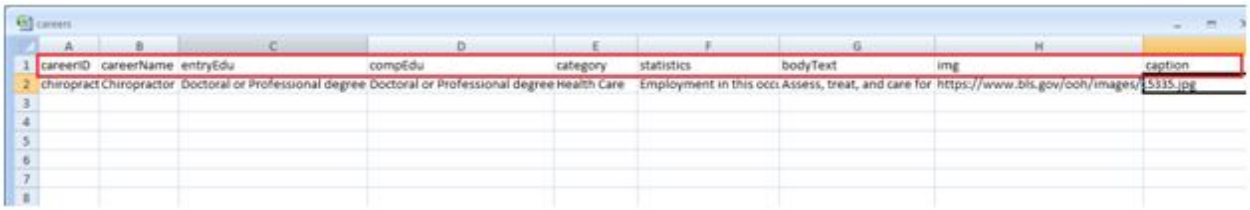
```
102         <div class="row">
103             <div class="box">
104                 <div class="col-lg-12">
105                     <hr>
106                     <h2 class="intro-text text-center">Our
107                         <strong>Team</strong>
108                     </h2>
109                     <hr>
110                 </div>
111                 <div class="col-sm-4 text-center">
112                     <img class="img-responsive" src="http://placehold.it/750x450" alt="">
113                     <h3>John Smith
114                         <small>Job Title</small>
115                     </h3>
116                 </div>
117                 <div class="col-sm-4 text-center">
118                     <img class="img-responsive" src="http://placehold.it/750x450" alt="">
119                     <h3>John Smith
120                         <small>Job Title</small>
121                     </h3>
122                 </div>
123                 <div class="col-sm-4 text-center">
124                     <img class="img-responsive" src="http://placehold.it/750x450" alt="">
125                     <h3>John Smith
126                         <small>Job Title</small>
127                     </h3>
128                 </div>
129                 <div class="clearfix"></div>
130             </div>
131         </div>
```

7. User Guide for Uploading CSV Files

To upload data or information into the database, you must create or to have the 4 main required spreadsheets. The 4 spreadsheets are named **Careers, Opportunity, Schools**, and **CareerLink.** Below are the steps that need to be followed in order to import data or information into the database successfully. Create 4 spreadsheets name Careers.csv, Opportunity.csv, Schools.csv, and CareerLink.csv. **If there is not information existing in the Careers, Opportunity, and CareerLinks tables for any specific career, it's information will not be displayed properly if at all on the desktop site.** Although the key upload features of this functionality are complete, this system was not a part of our designed software requirements and as such only the beginning stages of the Delete CSV page have been implemented due to time constraints. The majority of table deletion features should be handled through the database service's primary interface as seen in our Database Setup section.

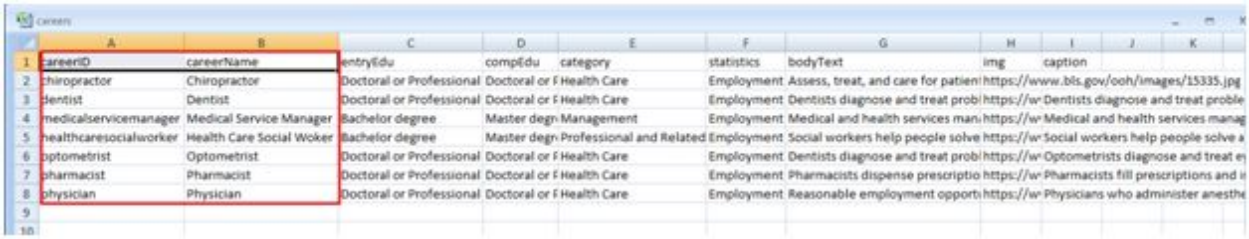
7.1 Guideline for Importing Data Into Careers.csv

1. In Careers.csv, input column names as individual row as follow: **careerID, careerName, entryEdu, compEdu, category, statistics, bodyText, img, and caption**. It is very important that each column names must be valid without spelling or capitalization error.



careerID	careerName	entryEdu	compEdu	category	statistics	bodyText	img	caption
chiropract	Chiropractor	Doctoral or Professional degree	Doctoral or Professional degree	Health Care	Employment in this occ	Assess, treat, and care for	https://www.bls.gov/ooh/images/	15335.jpg

2. After 9 column names are accurately inserted, input a memorable word correlated to each career name in the careerID column. careerID must be unique and distinct from other careerID in order to be valid. Below is the example of many careerID relates to the careerName and distinct from other careerID.



careerID	careerName	entryEdu	compEdu	category	statistics	bodyText	img	caption
chiropractor	Chiropractor	Doctoral or Professional	Doctoral or F	Health Care	Employment	Assess, treat, and care for patien	https://www.bls.gov/ooh/images/15335.jpg	
dentist	Dentist	Doctoral or Professional	Doctoral or F	Health Care	Employment	Dentists diagnose and treat probl	https://w	Dentists diagnose and treat proble
medicalservicemanager	Medical Service Manager	Bachelor degree	Master degr	Management	Employment	Medical and health services man	https://w	Medical and health services manag
healthcaresocialworker	Health Care Social Woker	Bachelor degree	Master degr	Professional and Related	Employment	Social workers help people solve	https://w	Social workers help people solve a
optometrist	Optometrist	Doctoral or Professional	Doctoral or F	Health Care	Employment	Dentists diagnose and treat probl	https://w	Optometrists diagnose and treat e
pharmacist	Pharmacist	Doctoral or Professional	Doctoral or F	Health Care	Employment	Pharmacists dispense prescriptio	https://w	Pharmacists fill prescriptions and i
physician	Physician	Doctoral or Professional	Doctoral or F	Health Care	Employment	Reasonable employment opport	https://w	Physicians who administer anesthe

3. The next important aspect that needed to be inserted correctly is a column name called **category**. There are only three types within the category related to the career name: **Health**

Care, Management, or **Professional and Related.** Each of these categories will determine the area in which the careers will display on the Career web page.

4. The last required aspect that needs to be followed is the **img** name column. This column records one image related to the career. It is highly recommended that the image is in JPG or PNG file.

5. The rest of the information within the columns can be freely input however you desired. This information won't have any restriction and will be recorded willingly.

7.2 Guidelines for Importing Data Into Opportunity.csv

1. In Opportunity.csv, input column names as individual row as follow: **oppID, careerID, oppName, oppLink,** and **oppType**. It is very important that each column names must be valid without spelling or capitalization error.

opportunity

	A	B	C	D	E
1	oppID	careerID	oppName	oppLink	oppType
2	manBF	management	Medical and Health Services Managers	https://www.qualityinfo	State
3	hthSW	professional	Social Workers	https://www.bls.gov/ool	National
4	chiPT	chiropactor	Chiropractors	https://www.qualityinfo	State

2. After 5 column names are accurately inserted, input a memorable word correlated to each opportunity name in the oppID column. oppID must be unique and distinct from other oppID in order to be valid. Also, the each careerID must exist in the Career.csv file. The purpose of it is to make sure the database have each career correspond to its opportunity information.

3. Below is the example of many oppID relates to the oppName and distinct from other oppID.

opportunity

	A	B	C	D	E
1	oppID	careerID	oppName	oppLink	oppType
2	manBF	management	Medical and Health Services Managers	https://www.qualityinfo	State
3	hthSW	professional	Social Workers	https://www.bls.gov/ool	National
4	chiPT	chiropactor	Chiropractors	https://www.qualityinfo	State
5	denST	dentist	Dentists, General	https://www.qualityinfo	State
6	optMT	optometrist	Optometrists	https://www.qualityinfo	State
7	phaMT	pharmacist	Pharmacists	https://www.bls.gov/ool	National
8	phySN	physcician	Physicians and Surgeons	https://www.bls.gov/ool	National
9					

4. In the oppType column, the opportunity type can either be state or national. In the oppLink

column, the information will be in website links as the picture shown above.

7.3 Guideline for importing Data Into Schools.csv

1. In Schools.csv, input column names as individual row as follow: **schoolID, schoolName,** and **url**. It is very important that each column names must be error-free without spelling or capitalization error.

schools

	A	B	C
1	schoolID	schoolName	url
2	OSU	Oregon State Universtiy	www.oregonstate.edu
3	MIT	MIT	www.MIT.com
4	ChmeketaCC	Chmeketa Community	http://www.chemeketa.edu/
5	ClackmasCC	Clackamas Community College	https://www.clackamas.edu/

2. After 3 column names are accurately inserted, input a memorable initials correlated to each university or college name in the schoolID column. schoolID should be unique and distinct from other schoolID in order to be valid. Below is the an example of how it should be done.

schools

	A	B	
1	schoolID	schoolName	url
2	OSU	Oregon State Universtiy	www.oregonstate.edu
3	MIT	MIT	www.MIT.com
4	ChmeketaCC	Chmeketa Community	http://www.chemeketa.edu/
5	ClackmasCC	Clackamas Community College	https://www.clackamas.edu/
6	ClastopCC	Clatsop Community Coillege	https://www.clatsopcc.edu/
7	LaneCC	lane community college	https://www.lanecc.edu/
8	MTHoodCC	Mt. Hood Community College	https://www.mhcc.edu/
9	PortlandCC	Portland Community College	https://www.pcc.edu/
10	RogueCC	Rogue Community College	http://www.roguecc.edu/
11	TillamookbayCC	Tillamook Bay Community College	http://tillamookbaycc.edu/

3. In the url columns each row should have a website or link relating to the university or college.

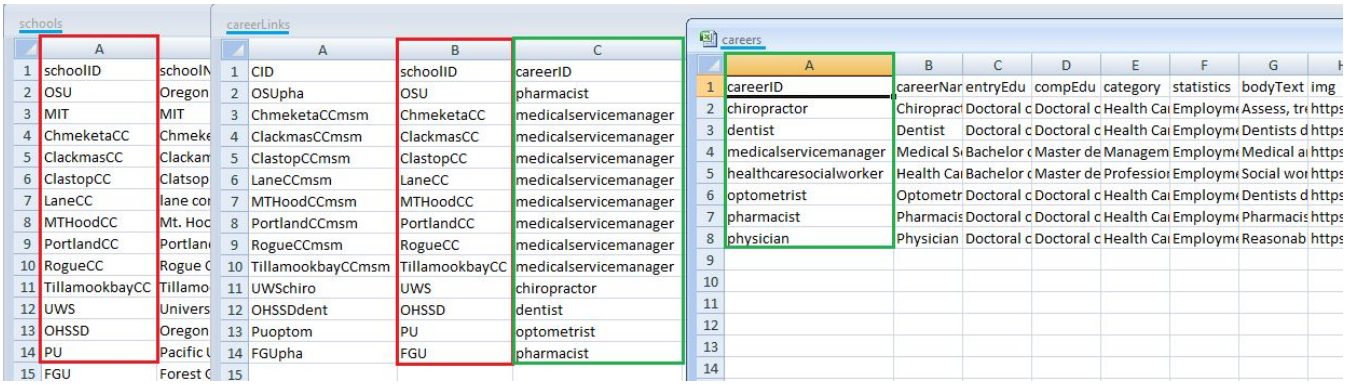
7.4 Guideline for Importing Data Into careerLink.csv

1. In careerLink.csv, input column names as individual row as follow: **CID, schoolID,** and **careerID**. It is very important that each column names must be error-free without spelling or capitalization error.

careerLinks

	A	B	C	D	E	F
1	CID	schoolID	careerID			
2	OSUpha	OSU	pharmacist			
3	Chmeketa	Chmeketa	medicalservicemanager			
4	Clackmas(	Clackmas(	medicalservicemanager			
5	ClastopCC	ClastopCC	medicalservicemanager			
6	LaneCCms	LaneCC	medicalservicemanager			

2. After the 3 column names are accurately inserted, input a memorable initials or word in the CID column. Also, the word or initials in schoolID and careerID columns must exist as the ones in the Schools.csv and Careers.csv files. Below is an example of how the careerLink.csv spreadsheet relates to schools.csv and Careers.csv file.



schools

	A	
1	schoolID	schoolN
2	OSU	Oregon
3	MIT	MIT
4	ChmeketaCC	Chmeke
5	ClackmasCC	Clackan
6	ClastopCC	Clatsop
7	LaneCC	lane cor
8	MTHoodCC	Mt. Hoc
9	PortlandCC	Portlan
10	RogueCC	Rogue C
11	TillamookbayCC	Tillamo
12	UWS	Univers
13	OHSSD	Oregon
14	PU	Pacific U
15	FGU	Forest C

careerLinks

	A	B	C
1	CID	schoolID	careerID
2	OSUpha	OSU	pharmacist
3	ChmeketaCCmsm	ChmeketaCC	medicalservicemanager
4	ClackmasCCmsm	ClackmasCC	medicalservicemanager
5	ClastopCCmsm	ClastopCC	medicalservicemanager
6	LaneCCmsm	LaneCC	medicalservicemanager
7	MTHoodCCmsm	MTHoodCC	medicalservicemanager
8	PortlandCCmsm	PortlandCC	medicalservicemanager
9	RogueCCmsm	RogueCC	medicalservicemanager
10	TillamookbayCCmsm	TillamookbayCC	medicalservicemanager
11	UWSchiro	UWS	chiropractor
12	OHSSDdent	OHSSD	dentist
13	Puoptom	PU	optometrist
14	FGUpha	FGU	pharmacist
15			

careers

	A	B	C	D	E	F	G	H
1	careerID	careerNar	entryEdu	compEdu	category	statistics	bodyText	img
2	chiropractor	Chiropract	Doctoral c	Doctoral c	Health Cai	Employm	Assess, tr	https
3	dentist	Dentist	Doctoral c	Doctoral c	Health Cai	Employm	Dentists d	https
4	medicalservicemanager	Medical S	Bachelor c	Master de	Managem	Employm	Medical a	https
5	healthcaresocialworker	Health Cai	Bachelor c	Master de	Professior	Employm	Social wor	https
6	optometrist	Optometr	Doctoral c	Doctoral c	Health Cai	Employm	Dentists d	https
7	pharmacist	Pharmacis	Doctoral c	Doctoral c	Health Cai	Employm	Pharmacis	https
8	physician	Physician	Doctoral c	Doctoral c	Health Cai	Employm	Reasonab	https
9								
10								
11								
12								
13								
14								

3. Lastly the CID should be unique and distinct from other CID in order to be valid. Similar to other "ID", they are the primary key feature for the database.

After the four required spreadsheets are created, you should able to go on these following web links and upload the individual file into the database. Each web link is responsible for uploading specific spreadsheet. It is important that you must upload the spreadsheets in the following order: Careers.csv, Opportunity.csv, Schools.csv, CareerLink.csv.

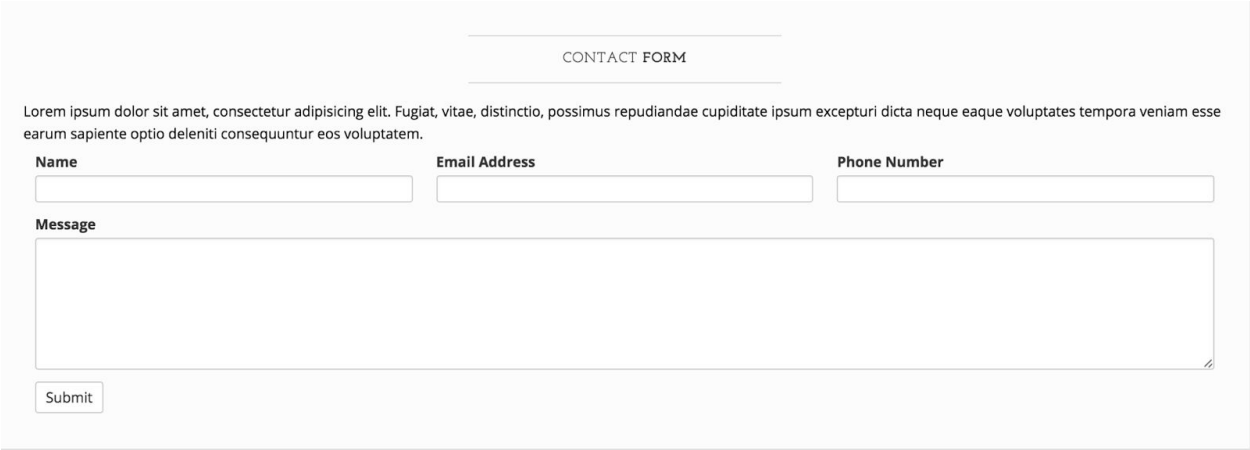
- To upload a spreadsheet on Careers, use the following web link: http://web.engr.oregonstate.edu/~yeja/web/capstone41/Desktop_Site/index.php
- To upload a spreadsheet on Opportunity, use the following web link: http://web.engr.oregonstate.edu/~yeja/web/capstone41/Desktop_Site/indexOpportunity.php
- To upload a spreadsheet on Schools, use the following web link: http://web.engr.oregonstate.edu/~yeja/web/capstone41/Desktop_Site/indexSchools.php
- To upload a spreadsheet on careerLink, use the following web link: http://web.engr.oregonstate.edu/~yeja/web/capstone41/Desktop_Site/indexCareerLinks.php

Each link would provide a simple button where you could click on and upload a required file. After the file is being uploaded, a message in green would be in display to determine if the file is being uploaded correctly or not. When successfully uploaded, the information will be shown on the same webpage.

8. Email Contact Function

On the Contact page of our website, users can submit support emails to a by typing their basic information, and the email will directly go to website administrator's desired email address.

By reviewing the email, website administrator could just go to their email and read the message.

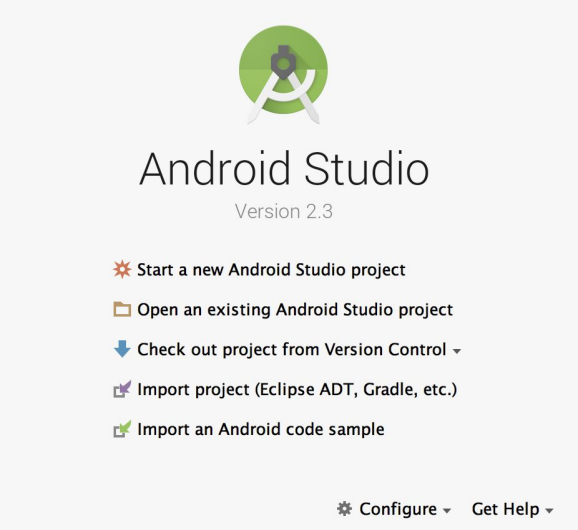


If the administrator would like to change the destination email address in the future, they may access the "Contact. PHP" file and in line 13, change the desired email address at anytime.

```
11  //prepare for email msg
12  $from = $_POST['firstlastname'];
13  $to = 'fengzi@oregonstate.edu';
14  $subject = ' "[".$sitename."]" inquiry';
```

9. Android Studio

Firstly, Administrator need to download a Android Studio and open the Android Studio. In the welcome page, administrator need to open the “Import Project” to open the exist files:



By entering the existing file, user open the files and it will open 4 files together in the Android Studio.

In the android studio, we used a web page to nest in the Android Studio program, there are four files in the Android Studio, web administrator could go to “MyAppWebViewClient.Java” files:

And in the file, administer could go to line 12 and read we use our website address and nest into this android program:

```
MyAppWebViewClient  shouldOverrideUrlLoading()
1   package com.example.app;
2
3   import ...
7
8   public class MyAppWebViewClient extends WebViewClient {
9
10      @Override
11      public boolean shouldOverrideUrlLoading(WebView view, String url) {
12          if (Uri.parse(url).getHost().endsWith("healthcareersoregon.com")) {
13              return false;
14          }
15
16          Intent intent = new Intent(Intent.ACTION_VIEW, Uri.parse(url));
17          view.getContext().startActivity(intent);
18          return true;
19      }
20  }
```

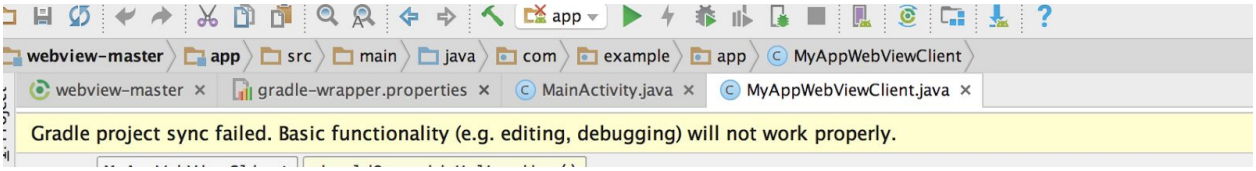
Typo: In word 'healthcareersoregon' more... (⌘F1)

Besides, user need to open MainActivity.Java file and type the address again in line 32:

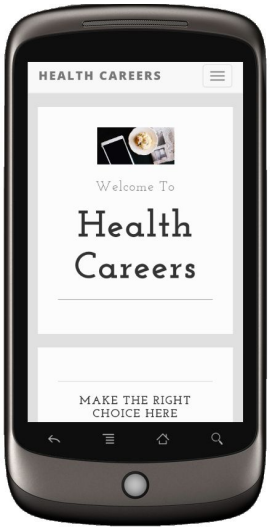
```
Gradle project sync failed. Basic functionality (e.g. editing, debugging) will not work properly.
MainActivity  onCreate()
7   import android.webkit.WebSettings;
8   import android.webkit.WebView;
9   import android.webkit.WebViewClient;
10
11
12  public class MainActivity extends Activity {
13
14      private WebView mWebView;
15
16      @Override
17      protected void onCreate(Bundle savedInstanceState) {
18          super.onCreate(savedInstanceState);
19          setContentView(R.layout.activity_main);
20
21          mWebView = (WebView) findViewById(R.id.activity_main_webview);
22
23          // Force links and redirects to open in the WebView instead of in a browser
24          mWebView.setWebViewClient(new WebViewClient());
25
26          // Enable Javascript
27          WebSettings webSettings = mWebView.getSettings();
28          webSettings.setJavaScriptEnabled(true);
29
30          // Use remote resource
31          mWebView.loadUrl("healthcareersoregon.com");
32
33          // Stop local links and redirects from opening in browser instead of WebView
34          mWebView.setWebViewClient(new MyAppWebViewClient());
35
36          // Use local resource
37           //mWebView.loadUrl("file:///android_asset/www/index.html");
38      }
39
```

As a most effective and popular android program developing tool, if user change something in

the files, for example, administrator change the website address, user could use the Android Studio Emulator to test:

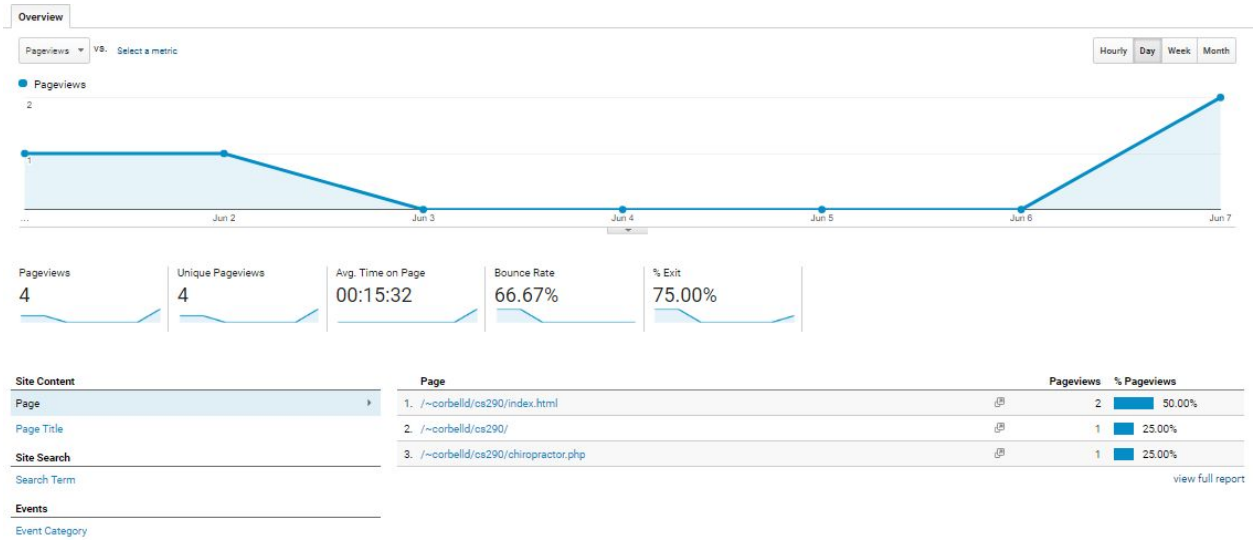


By clicking the “Play” and program will open the emulator directly, and user could play and test the app in the emulator, it is same as the real Android Phone.



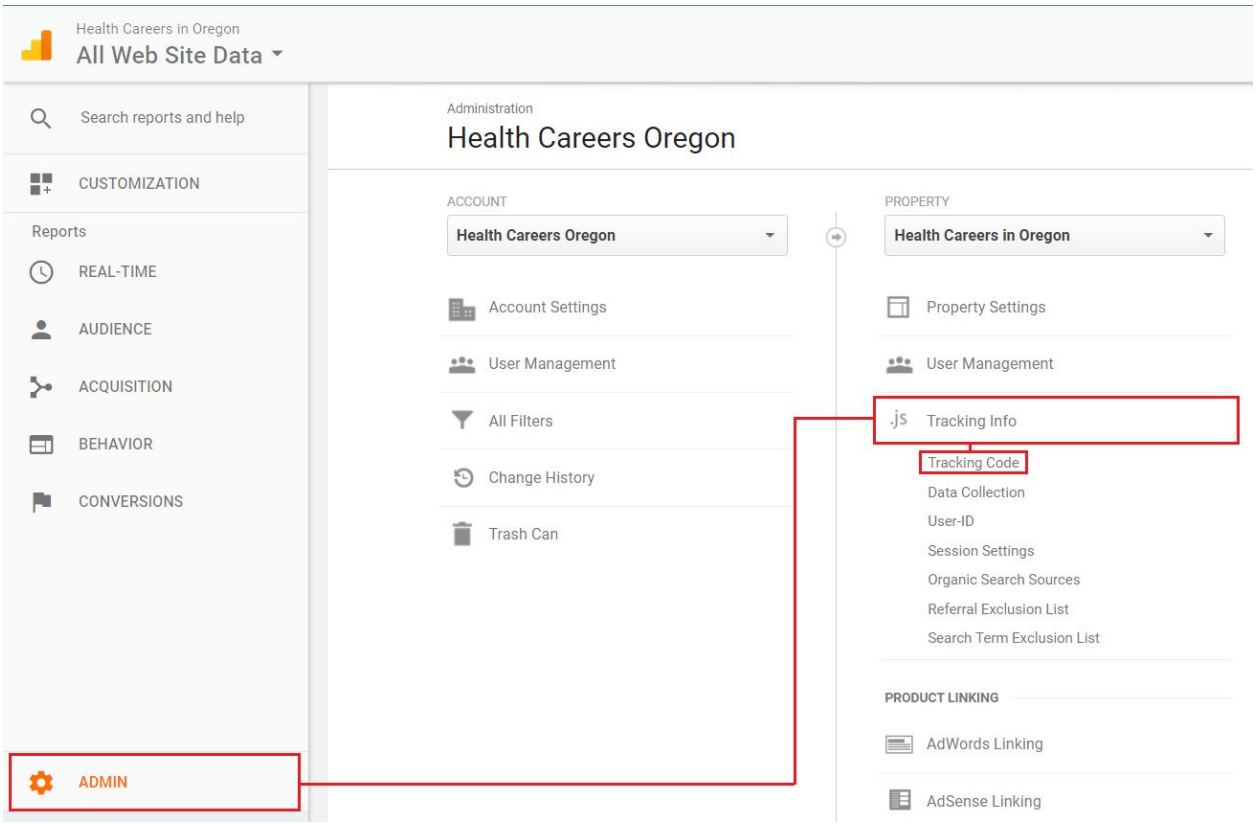
10. Google Analytics

Google Analytics is a web analytics service that tracks and reports website traffic, designed to be useful for businesses and corporations that need to know customer's activities. It is an easy and powerful tool that most company should use. To get access into Google Analytics, one simply makes an account. For the purpose of this guideline, we have created an account for this website. After successfully accessing into Google Analytic using the account, there are many features that can be seem or access for observation. Five features, Real-Time, Audience, Acquisition, Behavior, and Conversions, can be accessed are on the left hand side of the website. The main feature that would be useful for the website is to the Real-Time tab which gives the user the overview of who, where, and when our audience goes on the website. Simply clicking on a sub-category under each navigation would provide valuable data. Its advance and comprehensive data would help user improve any issue or feature on the website if needed to. In addition to knowing the audience, the Behavior tab, which is underneath the Audience tab, shows an overview of the actions or behavior of the audience who goes on the website.



Here it shows which web pages get visited the most and the duration of view on each page. Much functionality can be observed in Google Analytic, a full guideline of usages and purposes on every feature can found on the website.

The ability to track this site information is implemented through a .js script which can be accessed by navigating through the admin panel of the Google Analytics page and clicking on tracking code as shown below. This code is already implemented into the career information page template, but may need to be copy and pasted onto any new webpages created without using this template.

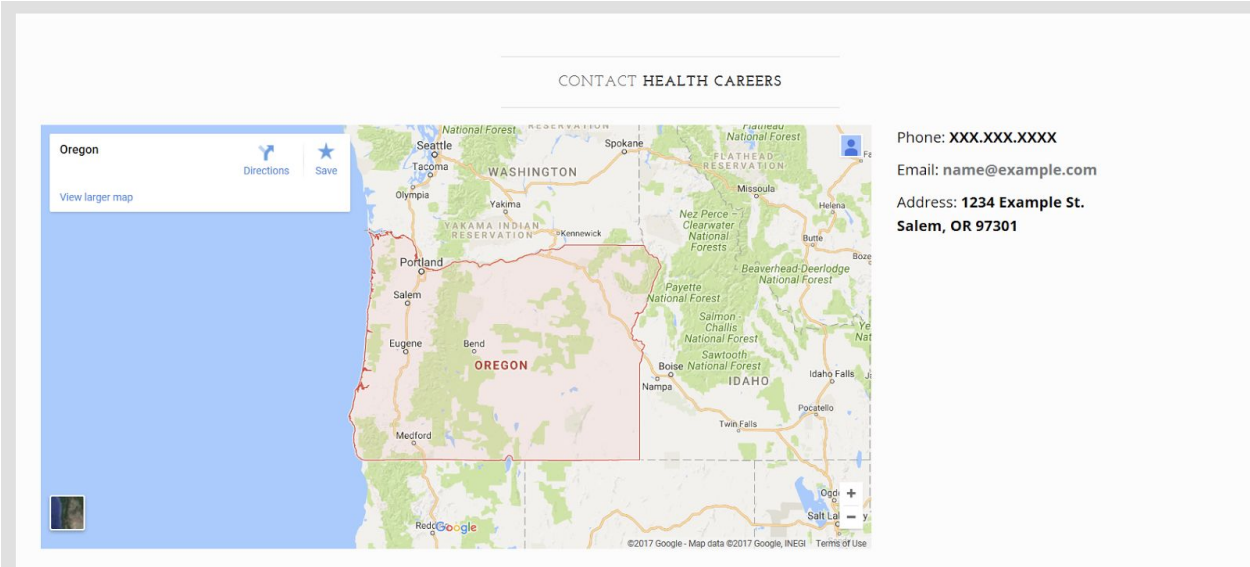


Shown below is the aforementioned tracking script being used in lines 185-191 of the homepage. index.html.

```
183     <script>
184
185     (function(i,s,o,g,r,a,m){i['GoogleAnalyticsObject']=r;i[r]=i[r]||function(){
186         (i[r].q=i[r].q||[]).push(arguments)},i[r].l=1*new Date();a=s.createElement(o),
187             m=s.getElementsByTagName(o)[0];a.async=1;a.src=g;m.parentNode.insertBefore(a,m)
188     })(window,document,'script','https://www.google-analytics.com/analytics.js','ga');
189
190     ga('create', 'UA-97186407-1', 'auto');
191     ga('send', 'pageview');
```

11. Google Maps

In the contact page, user could use the Google Map to locate the office address:

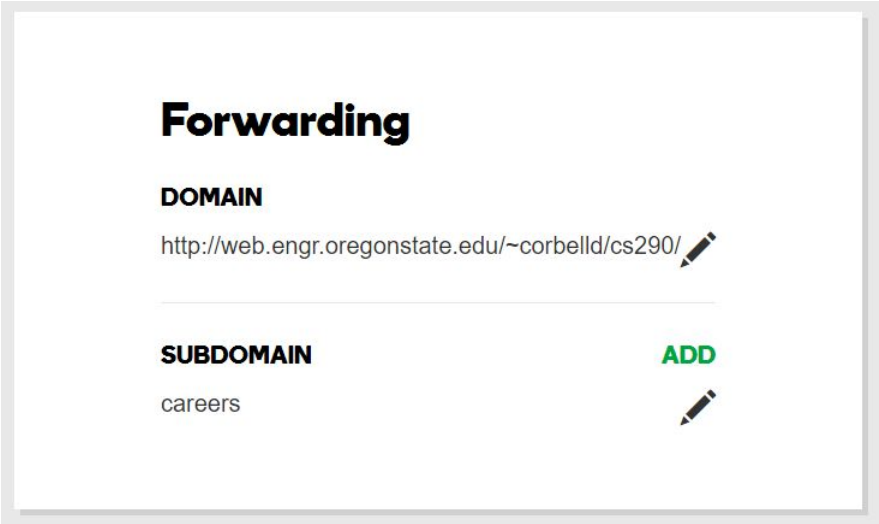


but if user want to change the Map address, website administrator need to go to “Contact. PHP” files, and go to line 118 and read the instruction to change the address. But if Adminstrator want to delete the map for any reason, administrator could just delete line 118 to line 119.

```
116             </div>
117             <div class="col-md-8">
118                 <!-- Embedded Google Map using an iframe - to select your location find it on Google maps and paste the
                    link as the iframe src. If you want to use the Google Maps API instead then have at it! -->
119                 <iframe width="100%" height="500" frameborder="0" scrolling="no" marginheight="0" marginwidth="0" src="
                    https://www.google.com/maps/embed?pb=!1m18!1m12!1m3!1d5872486.397637887!2d-125.02658570110478!3d44.0539319
                    78440524!2m3!1f0!2f0!3f0!3m2!1i1024!2i768!4f13.1!3m3!1m2!1s0x54936e7c9b9f6a55%3A0x7d4c65db7a0bb876!2sOrego
                    n!5e0!3m2!1sen!2sus!4v1488354198531"></iframe>
```

12. Domain Name hosting

The domain name currently in use is: HealthCareersOregon.com, however, this domain is currently licensed to Art Witkowski through GoDaddy.com. Through this service changing the forwarding address away from our Oregon State Webserver, which will get removed once our development team leaves the university, requires navigating through the menus in order of My Domains → <Desired New Domain Name> → DNS settings → Forwarding and then changing the URL listed.



13. Developer Contact Information

David Corbelli
Email: corbelld@oregonstate.edu
Phone: (503) 866-3960

Jason Ye
Email: yeja@oregonstate.edu
Phone: (503) 380-0809

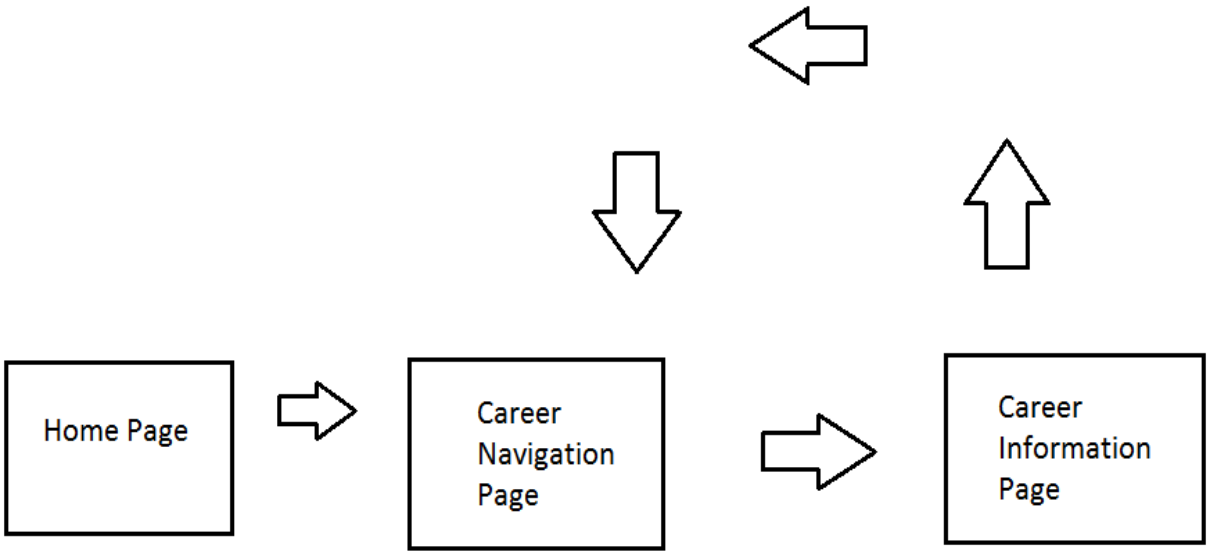
Zixuan Feng
Email: fengzi@oregonstate.edu
Phone: (541) 908-6066

7.2 Mobile Application Installation

In order to install and run our Android application is necessary that the user download and run our app's .apk file from our GitHub repository at: https:github.comcorbelldEECS_Capstone_Group_41_20162017.

7.3 Theory of Operation

In theory, our website or application will be used by middle and high school students looking to gain information about a career path in health sciences. They will begin by visiting our website's homepage and then will likely move on to visit our careers navigation page through our intuitive navigation bar. From here they will access the career information page they find most appealing and repeat this process until sufficient knowledge is gained or their interest is satisfied.



8 Learned Technology

8.1 New Technologies

The majority of the information our group learned was gained through online research. Several of the skills we learned include certain PHP functions used to read-in and process CSV spreadsheet files, SQL code for database construction, CSS code for styling implementation, and the use of Android Studio for mobile application development.

For the PHP functions we looked through similar implementations posted online and took time to deconstruct the processes being used. Through reviewing this code as well as W3Schools' PHP documentation we were able to understand and implement this technology.

Documentation available through W3Schools also aided us in our SQL implementation. We use SQL queries for a variety of tasks including information validation, database updating, database deletion, and for drawing information from the database. In order to ensure we used these queries properly required certain review of the online site.

Our CSS styling, implemented using Bootstrap required research into the usage of Bootstrap's styling framework. Sites referenced include Bootstrap's homepage, which contains in-depth documentation of the majority of Bootstrap's native features, as well as certain blogs detailing additional usage, which can be derived from the original implementation. Aside from Bootstrap we also used W3Schools again for more basic CSS knowledge and for styling changes desired specifically for our website.

8.2 Useful References

Recalling the development process we did, we think there are amounts of books and websites helped us. Before we created this website, researching was always playing a significant role, since we are only senior students, most of the technology related to real website development were still strange for us. As for my part, we used following website to helped me learn the basic website designing: W3C school helped us learned the HTML, PHP and CSS works. The developer. Android. Com (official android studio website) helped us learn the android application development. The Mysql.com helped us learn the MySQL and database skills. GitHub always plays a library role during our development, there a lot open source library we could use for references. Since before the project, we all have never touched the android application before, we also used a book to use as a reference, Android Studio Application Development. In order to list all the website and books, we would rank them in order of helpfulness: GitHub.com, W3Cschool.com, developer.Android.com, Mysql.com Android Studio Application Development. As for people in the campus, we think the previous professor gave our a lot helps. sent several emails about CSS and HTML question to our previous professors. Most of professors are very friendly and willing to accepting questions.
Other useful sources during the process of working on website were looking at existing websites that dedicates to health science career pathways. The websites was based on a specific region which helps and guide students to explore current pathways and health science careers. In addition to using third party websites, we have looked into website templates that would help us create a user friendly site. Our focus was that the website needs to be user friendly, organized, clean and easy to use. A template we decided to use was a bootstrap theme from startbootstrap.com. The templates

theme was business casual and had met all of our desired requirements. The web site was very helpful for starting off of our project. Another useful guide was a website we used as a reference for importing spreadsheet with data into the database. The website, CODEXWORLD.com, give us baby step of how to import CSV file data into MySQL database using PHP. In the site, the helper provided a video along with step-by-step procedures.

9 Individual Learning

9.1 David Corbelli

Through the capstone process I was able to gain knowledge and experience, both technical and non-technical. Technical aspects of my learning include greater familiarity with PHP, HTML, CSS, SQL, relational database structure, and experience with the use of Android Studio. While I had had experience working with many of these technologies at a basic level through my CS classes, this is the first time that a project was given to me without initial requirements as to what functions or technologies needed to be used or implemented. The use of many of these languages and technologies and to what end they were used were decided by our group and we gained much greater familiarity with each by the end of our development.

Learning in non-technical areas came large in-part from the need to work and communicate with a team. With the three of us having different levels of experience with different technologies going into this project, it became necessary for us all to stand at at a shared level of understanding for each component of our website before we could proceed. This project also gave me my first opportunity working and communicating with a client. While I've worked retail and have had customers before, this is my first time working with a stakeholder to complete a project with a vision devised by a second-party. It was often that our group would ask questions, but not fully understand our client's desires and we would need further clarification. From this I learned how crucial it is to formulate a plan and think through questions before hand as to not waste or clients or our developers' time.

Working on a long-term project was a new experience for me. I had never previously worked towards any single product for as long as we developed this website. I was able to learn about work-flow and how the simultaneous development of different components can come together into a functioning final product. It certainly would have been difficult to accomplish what we did alone and I learned the necessity of having a team.

Through this project I was able to gain leadership skills as well as a greater sense of time management. Over the course of the year it was often one of my responsibilities to devise what are team would be working towards at each of our group meetings. Because of this, it was often part of my job to maintain a sense of how much work was ahead of us before our next due date and ensure we were able to each work on a remainder of the project in an efficient manner. I learned that it's necessary to formulate a strong plan early on in development and seek out all requirements towards development before the implementation is needed.

About working in teams, I learned that it's necessary to have strong communication of ideas. It is of utmost necessity for all members to be on the same page before implementing separate functions; in the cases that we did not all have the same vision in mind we lost time developing several functional components of the website. Furthermore, it's not always important whose idea gets used as long as the work gets completed in a timely manner.

If I were to redo this project differently, I would consider pouring much more work into the early planning process of the project and gain a clear vision of the client's vision, expectations, and available resources. The ability to keep all of these in mind from the start would have kept us from needing to halt development while waiting for answers. I believe

that doing a better job of this early on might have allowed us to complete this project to a greater degree.

9.2 Zixuan Feng

As for me, I learned a lot from this whole year. Technical information: Before I attended this project, I have never attach the bootstrap, I learned how to use bootstrap to set up the website frameworks. As for mobile application, I have never learned Language Java before, but I learned from different website to know how to set up the android application by using android studio. We used a open source android application program as a references and nest our main website , which is not only convenient for customers future management but also adjusted our website could fit all size of screens. What is more, I also learned a new method of MySQL, which could allow website users send email through the webpage to website managers. It is a easy way for users and website administrator to have a easy way to communicate.

As for non-technical information, there are three majority information I acquired through the whole year: Firstly, I learned how to communicate with team memebers when we have different ideas. Currently, if I have different ideas I would like to listen first, be more conscious to hearing is better than persuading. Secondly, I learned why the documentation is so important for computer science programming. Before I took this class, I always think programming skills are one of the most important thing, but through the whole year studying, I learned documentation is also important, like progress report, technology designing, etc. Because documentation always could record what I learned, what I solved and what I left. As for designing document, it plays a guideline for next step of development. Thirdly, I learned how to solve the problem if we face difficult situation, there are more than one ways to overcome difficulties, the key is be patient. There were many times, when I tried to give up, but I consist for one more step, I found the hope. This project taught me amount things that I could not learn from regular class. From this project, I learned what are steps to develop website and application. As for the project management, I think the most significant thing I learned is how to communicate with client. Communication could be always important for programming team and client. Keeping communicating frequently, and everytime should know the know the clear missions and requirement from client. If I would redo the project from the fall term, I would tell myself contact with our client tightly, and maybe go to Portland to meet with him. And I would tell myself pay attention at database, this is the main function of our website. What is more, The biggest skill for me I learned how to use the Android Studio to develop a web app, before this class, I have not touched the Android Studio and Java yet. This project provided me a good chance to learn the Android Studio and Java. For me, I think if I could work in some website company, database will be my majority work and if I do the UI design for some websites, CSS and HTML would be my majority language to explore in the future.

9.3 Jason Ye

In the duration of 9 months working on this project, I can confidently say that I have learned the most from it. I was fortunate enough to be worked on this project as one of my top-five choice for most desired project. I have been interested in working with web development two years ago when I made my first website using simple HTML, CSS, and PHP. This project has given me a full potential of deep understanding and insight of web development.

When working with database management system in web programming, there is much functionality such as logical schema, relational tables, ER diagram and many more that needed to be implemented in order to use data efficiently.

ER diagram was the most important aspect that I learned when working with database. With ER diagram, it had save the team a lot of time from perusing the end goal. After successfully setting up the database, there needed to be a way for user to upload data in a large quantity. In the last 3 months of working on the project, I have developed a skill to upload large quantity of data using spreadsheets in PHP. With the help from online tutorials and friends, I was able to implement this essential feature for our client to use.

Some non-technical information I have learned from working on this project was that the importance of communication between worker and supervisor. Throughout the year, my client was the only source of contact for determining the success of the project. Due to our clients busy schedule, we were not communicating with Art enough to discuss about the project. Our meetings were limited and we could not get hold of our client during the end of the development phase for the project. With the help of our professor and teachers assistant, we were able to meet the entire requirement and complete the project. Without them, we would be in a bad position. I have learned that professional communication is very important in business.

Being assigned with a project, the responsibility was more deliberated. I have learned that deadlines are strictly fixed and decisive in project workload. In project management, the most important step is planning. I have learned that planning ahead and on-time is very crucial when it comes to working with a big project. Planning and assigning task to individual team member is important because it determine each members responsibility for the rest of the project. In addition to project management, the skill and knowledge should be equally balanced in the working environment. In a team with more than one person, each member should be reliable and trustworthy. Knowing each members skill and ability to work is crucial in a team based environment.

While working on the project, I have learned that working with people tend to make the project more successful. As the project progress, we contribute our knowledge as a whole to solve problems. Team effort has shown and proven to me that task can be done more successful than working individually.

If I could do the project all over again, the one thing I would do is to implement better features and user interfaces for our target audiences. In addition, polish it with better CSS styling and implement unique functionality. Having a reliable and active client would push this project further in more beneficial ways.

10 Appendix 1: Code Listing

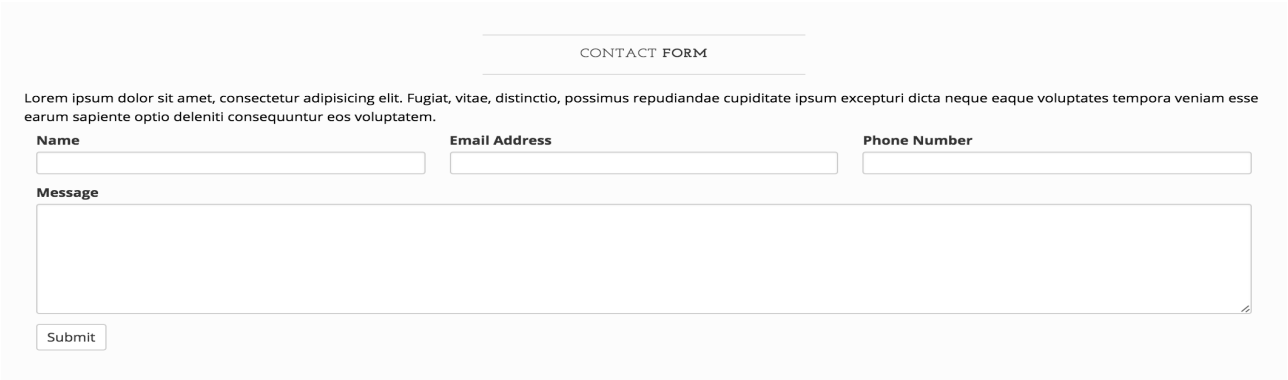
10.1 Email Contact Implementation

```
$name = $_POST['firstlastname'];
$phone =$_POST['phonenumber'];
$email = $_POST['emailaddress'];
$message = $_POST['message'];

//prepare for email msg
$from = $_POST['firstlastname'];
$to = 'fengzi@oregonstate.edu';
$subject = ' "[".$sitename."]" inquiry';



//submit and send confirmation
   if ($_POST['submit']) {
    // if all is well build the message
        if (mail ($to, $subject, $message, $from)) {
            echo '<p class="confirmation">Thank you, '.$name.' Your message has been sent!</p>';
    // if not well, display error message
        } else {
        echo '<p class="tryagain">Something went wrong. Please try again.</p>';
    }
//provide error msg
    }
...
```

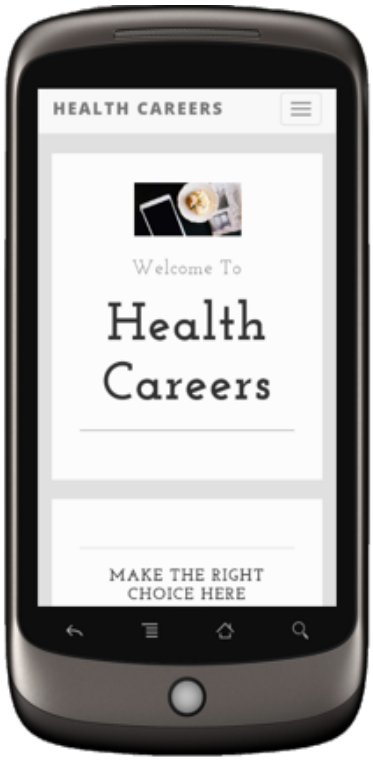


10.2 Android Application Viewport Redirection

```
...
@Override
    public boolean shouldOverrideUrlLoading(WebView view, String url) {
        if (Uri.parse(url).getHost().endsWith("healthcareersoregon.com")) {
```

```
            return false;
        }
...
...
 // Enable Javascript
        WebSettings webSettings = mWebView.getSettings();
        webSettings.setJavaScriptEnabled(true);

        // Use remote resource
        mWebView.loadUrl("healthcareersoregon.com");
...
```



In importData.php, one of the important coding segments is connecting into the database. In order to gain access the data from the database the dbConfig.php must be included at the top of the file.

10.3 Database Connection Variables

```
<?php
        //load the database configuration file
        include 'dbConfig.php';
```

dbConfig.php consist of five variables that verify the connection for database. This part of code is being mentioned in the Usage and Maintain Guide session.

```
<?php
//DB details
$dbHost = 'xxxx';
$dbUsername = 'xxxx';
$dbPassword = 'xxxx';
$dbName = 'xxxx';

//Create connection and select DB
$db = new mysqli($dbHost, $dbUsername, $dbPassword, $dbName);

if ($db->connect_error) {
    die("Unable to connect database: " . $db->connect_error);
}
```

It is important to ensure that the functionality to upload spreadsheet is valid. The only type of file that can be used to upload data to our database is a CSV spreadsheet. A comma-delimited CSV file can be parsed into variables to upload to the database.

10.4 File Parsing

```
//validate whether uploaded file is a csv file
    $csvMimes = array('text/x-comma-separated-values', 'text/comma-     separated-values', 'applic
    'application/x-csv', 'text/x-csv', 'text/csv', 'application/csv', 'application/excel', 'applic
    if(!empty($_FILES['file']['name']) && in_array($_FILES['file']['type'],$csvMimes)){
        if(is_uploaded_file($_FILES['file']['tmp_name'])){

            //open uploaded csv file with read only mode
            $csvFile = fopen($_FILES['file']['tmp_name'], 'r');

            //skip first line
            fgetcsv($csvFile);
```

If the tables exist and error-free, then execute the queries using SQL based on your desire. The SQL can retrieve, insert, update, delete, or create records within the database.

10.5 Uploading to Database

```
if($prevResult->num_rows > 0){
//update member data
$db->query("UPDATE Careers SET careerID = '".$line[0]."',
careerName = '".$line[1]."', entryEdu = '".$line[2]."',
compEdu = '".$line[3]."', category = '".$line[4]."',
statistics = '".$line[5]."', bodyText = '".$line[6]."',
img = '".$line[7]."', caption = '".$line[8]."'
WHERE careerID = '".$line[0]."' ");
}
else{
    ...
}
```

11 Appendix 2: Additional Images

Oregon Health Science Careers

[FILLER INFORMATION]

HOME ABOUT CAREERS CONTACT RESOURCES

DENTIST

Dentists diagnose and treat problems with patients' teeth, gums, and related parts of the mouth. They provide advice and instruction on taking care of the teeth and gums and on diet choices that affect oral health.

Employment in this occupation in 2014 was somewhat larger than the statewide average for all occupations. The total number of job openings is projected to be somewhat higher than the statewide average number of job openings for all occupations through 2024. This occupation is expected to grow at about the statewide average growth rate for all occupations through 2024.

Dentists diagnose and treat problems with patients teeth, gums, and related parts of the mouth. They provide advice and instruction on taking care of the teeth and gums and on diet choices that affect

COLLEGES AND UNIVERSITIES

Oregon Health Sciences School

STATE OPPORTUNITIES

Dentists, General

NATIONAL OPPORTUNITIES

Contact Us

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Oregon Health Science Careers

[FILLER INFORMATION]

HOME ABOUT CAREERS CONTACT RESOURCES

CONTACT HEALTH CAREERS

Phone: **XXX.XXX.XXXX**

Email: **name@example.com**

Address: **1234 Example St.**
Salem, OR 97301

CONTACT FORM

Lorem ipsum dolor sit amet, consectetur adipisicing elit. Fugiat, vitae, distinctio, possimus repudiandae cupiditate ipsum excepturi dicta neque eaque voluptates tempora veniam esse earum sapiente optio deleniti consequuntur eos voluptatem.

Name

Email Address

Phone Number

Message

Members list Import Members

Choose File No file chosen

IMPORT

CID	schoolID	careerID
ChmeketaCCmsm	ChmeketaCC	medicalservicemanage
ClackmasCCmsm	ClackmasCC	medicalservicemanage
ClastopCCmsm	ClastopCC	medicalservicemanage
FGUpha	FGU	pharmacist
LaneCCmsm	LaneCC	medicalservicemanage
MTHoodCCmsm	MTHoodCC	medicalservicemanage
OHSSDdent	OHSSD	dentist
OSUpha	OSU	pharmacist
PortlandCCmsm	PortlandCC	medicalservicemanage
Puoptom	PU	optometrist
RogueCCmsm	RogueCC	medicalservicemanage
TillamookbayCCmsm	TillamookbayCC	medicalservicemanage
UWSchiro	UWS	chiropractor