Lab 2 – ResearchLink Product Specification Outline

Orange Team

Dinah Watkins

CS 411W

Janet Brunelle

November 20, 2016

Version 1
Table of Contents

1 Introduction........................................................................................................................................ 3

1.1 Purpose......................................................................................................................................... 4

1.2 Scope............................................................................................................................................ 4

1.3 Definitions, Acronyms, and Abbreviations .................................................................................. 5

1.4 References..................................................................................................................................... 7

1.5 Overview....................................................................................................................................... 8

2 General Description .......................................................................................................................... 8

2.1 Prototype Architecture Description ............................................................................................. 8

2.2 Prototype Functional Description ................................................................................................. 11

3 Found in Another Document .......................................................................................................... 14

Figures and Tables

Figure 1. ResearchLink Register User Screen ..................................................................................... 9

Figure 2. ResearchLink Register User Screen ..................................................................................... 11

Figure 3. ResearchLink Sitemap........................................................................................................... 14

Table 1. Real-World versus Prototype Features .................................................................................. 12
1 Introduction

Undergraduates are often unaware of the importance and availability of research opportunities, which will better prepare them for graduate school and the research that will be required to be successful in the program and in their future career field. Not only will the participation in undergraduate research encourage them to move forward with transition into a graduate program, they will find that their experience in the program will be more beneficial as they will have already gained crucial experience in research and analysis. With this better understanding of subjects in their field, they will be more appealing to future employers. An increase of involvement in research will also help drive publicity of the university and ultimately drive an increase in student admissions, to include those undergraduates moving on to seek admission into the graduate programs available at ODU. Research involvement will provide additional opportunities for the university to maintain future research related educational experiences that the faculty is able to provide to students.

It was found that the manner in which research opportunities are advertised to the ODU community is not efficient, as opportunities are pushed deeper into the past of faculty and student mailboxes, only to be forgotten and never be reviewed again. Outdated advertising methods, such as using a bulletin board or placing opportunity information on office doors, often leave distance learning students out of the loop. These failing methods that are being utilized to share information prevents students from being aware that there are opportunities available. This can lead to a lack of participation in undergraduate research (Russell et al. 2007). These opportunities can aid in student development and help improve the ranking of the school by conducting research that is meaningful and beneficial to all those involved.
1.1 Purpose

The ResearchLink prototype is a web-based environment that streamlines the dissemination of research opportunities and is being developed for the Computer Science Department at Old Dominion University (ODU). This prototype will be used as a research opportunity portal to demonstrate an environment that is capable of consolidating available research opportunities. It will also allow for the showcasing of both student and departmental successes that occur through the research conducted at ODU.

The prototype will provide the interface for searching available opportunities, send notifications about new and expiring opportunities, allow faculty searches of student profiles, and tracking of student interest in research opportunities. Users will be able to filter and sort research opportunities based on their preferences and identify their interest in a particular research opportunity. The prototype will provide the ability to archive expired research opportunities to help ensure only current opportunities are presented to users.

The prototype will not automatically create research opportunities or profiles for every student or faculty member at ODU. Undergraduates will not be able to apply for an opportunity within ResearchLink, but they will be able to identify their interest in an opportunity and will have access to the contact information for the faculty member in charge of that opportunity. Interfacing with Banner will not be a capability of the prototype, therefore verification of user type will be simulated. The prototype will not automatically delete users as they graduate or leave the university.

1.2 Scope

Undergraduates need to be introduced to research opportunities to encourage their transition to graduate school. The ResearchLink will aid in resolving the inefficiency in the
method that research opportunities are shared with computer science undergraduates by providing a consolidated environment for faculty and research companies to submit their opportunities, to include internships and co-op positions. A last in, first out looping news feed provides a public and internal venue to share ODU research successes. Increased awareness of and participation in available research opportunities and success that occurs due to research conducted will facilitate the increase of recruitment of new students and encourage the transition of undergraduate students into graduate programs. This will help the chances of more students becoming computer researchers.

The overall goals of ResearchLink are to provide up-to-date information on research opportunities and highlight recent departmental and student successes. The organization and access of research opportunities is to be initiative to the student’s interests as entered within their profile. With proper implementation across the department, the objective is to increase research program affinity, attract more undergraduate and graduate students to ODU, and increase the number of ODU undergraduates transitioning into a graduate program.

1.3 Definitions, Acronyms, and Abbreviations

Apache2 Server: Web server software.

Banner: Old Dominion University’s Administration System that provides controlled access to financial, student and personnel data. This system is only available to faculty and staff.

Bootstrap: HTML, CSS and JS framework for developing a responsive web-based project.

Browser: A web browser is a software application for retrieving, presenting, and traversing information resources on the World Wide Web.

CSS: Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language.
Date Object: An object that enables basic storage and retrieval of dates and times.

Engine: In computer programming, an engine is a program that performs a core or essential
function for other programs.

GPA: Grade Point Average.

HTML: Hyper Text Markup Language is the standard language for creating web pages and applications.

JavaScript: A script language for programming on the web.

LAMP: A combination of Linux Apache MySQL PHP.

Laravel: A powerful model-view-controller (MVC) PHP framework, designed for developers who need a simple and elegant toolkit to create full-featured web applications.

LINUX: An open source version of UNIX operating system.

MFCD: Major Functional Component Diagram.

MIDAS: Monarch Identification and Authorization System.

MySQL: Open-source relational database management system.

NASA: National Aeronautics and Space Administration; Offers Undergraduate Research fellowships and internships.

NSF: National Science Foundation (NSF); Offers funded research opportunities through Research Experiences for Undergraduates (REU).

ODU: Old Dominion University.

OECD: Organization for Economic Cooperation and Development.

PHP: Server scripting language for making dynamic and interactive web pages.

Virtual Machine (VM): In computing, a virtual machine (VM) is an emulation of a computer system.

Web Application: In computing, a web application or web app is a client–server software application in which the client (or user interface) runs in a web browser.

1.4 References

CS 410 documents (as applicable)

Computer Science Undergraduate Degree Program. Old Dominion University Computer Science Department.


Orange Team CS 410 Design Presentation. Spring 2016.


Vieyra, M., Carlson, A., Leaver, E., & Timmerman, B. Undergraduate Research: I Am Not Sure What It Is, But I Don’t Have Time to Do It Anyway. Council on Undergraduate Research Quarterly, (Spring 2013, Volume 33, Number 3)

1.5 Overview

This product specification provides the hardware and software configuration, external interfaces, capabilities and features of ResearchLink. The information provided in the remaining sections of this document includes the key features of the prototype. A detailed description of the hardware, software, and external interface architecture of the ResearchLink prototype is also provided.

2 General Description

ResearchLink is a web-based environment that provides a convenient system in which registered users will be able to access all undergraduate research opportunities that are available, thereby enhancing opportunity awareness. The system will greet the users, and the public, with a live-stream news feed of departmental and student successes on the home page of the product. Users have the capability to identify their interests within their student profile, thereby receiving research opportunities targeted for the type of research they are interested in. Automated notifications for opportunity deadlines prevent undergraduates from missing application dates for opportunities they desire to participate in.

2.1 Prototype Architecture Description

The major components of the ResearchLink prototype consist of the web interface, the notification system, and database. The functionality provided by these components provide resolution for the initial problem presented to the Orange team. The purpose for these components are described in this section.

The web interface is the method of accessing ResearchLink and is utilized by all users for account registration, accessing the newsfeed and search engine, and management of user profiles and research opportunities. Account registration includes creating accounts for each of the user
roles will access ResearchLink: student and faculty. A screenshot of the Register User page is included in Figure 1.

![Register User Screen](image)

**Figure 1. ResearchLink Register User Screen**

Within the web interface, users can manage their profiles by input information such as their major, courses taken, and research interests. The looping newsfeed is included in two locations: the landing page of ResearchLink and home page after user login. The landing page version allows public access to view recent successes in research. The internal news feed that loads after user login incorporates the successes but also includes recently added opportunities to the system.

Research opportunity management consists of a form that faculty and administrators utilize to create and manage the opportunities that are displayed to students that access and conduct searches within ResearchLink. The search engine allows for all users to search current
opportunities. Faculty can search for student profiles to learn more about those undergraduates who are interested in participating in their research.

The notification system utilizes a calendar-based system to send notifications to users through the web interface and through email. Student users will receive notifications for new opportunities added to the database. Opportunity deadlines will also trigger notifications for users. Faculty will receive notifications when students express interest in the research opportunity they have posted into the database.

The database for the prototype will be loaded with fake data to ensure there is adequate information to demonstrate the features of ResearchLink. The schema that represents the ResearchLink database is depicted in Figure 2. Each type of user account will be made to demonstrate the functionality within each, to include student, faculty, and administrator accounts. Research opportunities will be included to demonstrate the search functionality, deadline notification, and auto-archival features. User profiles will be created to demonstrate how it is beneficial to incorporate research interests within a student’s profile.
Figure 2. ResearchLink Register User Screen

2.2 Prototype Functional Description

The ResearchLink prototype will represent all real-world product capabilities, except for integration with ODU systems (Banner, Shibboleth, and MyODU), as is outlined in Table 1. Risk mitigation will be incorporated in the prototype through provision of user guides. Table 1 describes the real-world versus prototype features.
Table 1

*Real-World versus Prototype Features*

<table>
<thead>
<tr>
<th>Feature</th>
<th>Real-World</th>
<th>Prototype</th>
</tr>
</thead>
<tbody>
<tr>
<td>News Feed</td>
<td>Present on launch page and internal to ResearchLink</td>
<td>Present on launch page and internal to ResearchLink</td>
</tr>
<tr>
<td>Searchable</td>
<td>Opportunities and profiles are searchable</td>
<td>Opportunities and profiles are searchable</td>
</tr>
<tr>
<td>Filterable</td>
<td>Searches are filterable based on user selections</td>
<td>Searches are filterable based on user selections</td>
</tr>
<tr>
<td>Automatic Notifications</td>
<td>Customizable notifications for faculty and students</td>
<td>Customizable notifications for faculty and students</td>
</tr>
<tr>
<td>User Profiles</td>
<td>Customizable profiles for faculty and students</td>
<td>Customizable profiles for faculty and students</td>
</tr>
<tr>
<td>Banner Integration</td>
<td>Banner information used for user authentication during profile creation</td>
<td>Simulated through SQL Database</td>
</tr>
<tr>
<td>Shibboleth Integration</td>
<td>Shibboleth used for login credentials; integrated with MyODU portal</td>
<td>Simulated through SQL Database</td>
</tr>
<tr>
<td>Interface</td>
<td>Hosted on ODU server, in conjunction with system integrations</td>
<td>Hosted on CS Virtual Machine</td>
</tr>
<tr>
<td>User Guides</td>
<td>Tutorials to provide new users with guidance on how to utilize ResearchLink</td>
<td>Tutorials to provide new users with guidance on how to utilize ResearchLink</td>
</tr>
<tr>
<td>Testing Environment</td>
<td>Does not exist</td>
<td>Environment in which to test features controlled by date and time</td>
</tr>
</tbody>
</table>

The update user profile functionality is conducted on a web page form that provides an authenticated user the ability to edit their profile information. Fields on the web form are based on the user type and are prepopulated with any information that has previously been saved in the
database. Students will have the capability to create and update their student profile, with the option to add interests, completed courses, and their GPA. Interests and completed courses may be selected from a repository by using keywords. Faculty will have the capability to create and update their professional profiles within ResearchLink.

Research opportunity creation is conducted on a web page form and inserts records into the database as they are created by administrator and faculty users. Each of these records are stored as active opportunities until the expiration date has passed. A calendar-based archival feature assists in the designation of an opportunity being accessible by active searches.

Research opportunity search is conducted on a web page and retrieves records from the database. Records are presented with the most recent opportunities at the top of the list. Registered users are presented with a sortable list of active research opportunities. Records may be sorted by application deadline, opportunity start date, or any GPA requirements.

Faculty will have the capability to search student profiles to try and locate students that would be great candidates for participating in their research opportunity. This functionality is presented on a web page form and pulls records from the database. Records are presented with the ability to sort records by GPA.

ResearchLink will push notifications to users, both through email and within the ResearchLink environment, depending on the user’s notification settings. A calendar-based system will control the triggering of notifications. Notifications may include new research opportunity creation based on a student’s interests and account status changes. If a student has chosen to incorporate their interests with their profile, they will receive notifications containing the information pushed by the faculty member. Users will have the capability to mark notifications as being read and deleting notifications.
The newsfeed will be present on the public landing page and the internal home page, as is depicted in the sitemap in Figure 3. It consists of a looping feed embedded in a web page that displays news/highlight records that are retrieved from the database. Faculty and administrators will have the capability to add information to the newsfeed while students will only be able to view those records that have been shared. These records will be stored to the database by utilizing a web page form. A calendar-based feature will assist in the archival of records. The timeframe in which those news/highlight records are considered active may be set by the user entering the information.

![ResearchLink Sitemap](image)

Figure 3. ResearchLink Sitemap

3 Found in Another Document