Lab 2 – ResearchLink Prototype Specification

Old Dominion University

CS411

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Version 1
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Lab 2 – ResearchLink Prototype Specification

1. Introduction

Research is a fundamental component in the progress of mankind. Most of the academic institutes promote a research culture among students. Old Dominion University (ODU) is one of such institutes offering 54 master programs, and 42 doctoral programs (University Facts & Figures, 2016). At ODU, undergraduate and graduate enrollments in 2016 are 81% and 19% respectively (University Facts & Figures, 2016). There is a gap between undergraduate and graduate enrollment rates. Most of the ODU undergraduate students are not participating in the research because of the lack of research opportunities and receiving information in a timely manner. It is also found by American Council of Learned Societies, and referred by Council on Undergraduate Research, that students are not engaged in undergraduate research due to; lack of time and interest, or rarity of information and lack of available opportunities (Vieyra, 2013). Hence, students can be inspired towards research if they can receive information for research opportunities well in time. The ODU administration aims to improve the different issues: awareness of updated information regarding research activities, the creation of communication channels among all stakeholders, and capitalization of available opportunities.

At ODU, one of the major reasons for low interest in research programs is minimal research culture, which fails to attract research-oriented undergraduate candidates. Currently, ODU is using the conventional method to announce research opportunities. This method attracts few undergraduate students. Currently, a research opportunity is posted on one or more notice boards. In today’s era of technology, such an obsolete method of announcements does not work; students usually are not aware of all opportunities. Outdated opportunities remain on the notice boards, which is another barrier for interested researchers in capitalizing such opportunities.
Moreover, an electronically updated notification system to announce deadlines is missing at ODU. An absence of such a system results in research not being publicly recognized for completion of research projects.

According to Council on Undergraduate Research, students who participated in research activities during their undergraduate studies were more inclined towards graduate programs (Vieyra, 2013). Hence, the promotion and systematic sustainability of research culture can increase the enrollment rates in graduate programs. Therefore, focus on improving the current system of information dissemination through electronic announcements of research opportunities, reminders for deadlines, and recognition of achievements is required.

The proposed solution, ResearchLink, would create a hub for students, faculty, and administration. This hub would decrease the communication gap among all related stakeholders. By creating more undergraduate research opportunities, ODU would improve its enrollments in graduate programs. The proposed system would not only aim to facilitate the students in terms of research opportunities but also through announcements of available internships and scholarships. Thus, the students at undergraduate and graduate levels would have an opportunity to explore more in terms of their professional grooming and financial assistance. With research, a pool of talented students could be expected to be sustained at ODU.

1.1 Purpose

ResearchLink, a research opportunity portal will be developed for the ODU Computer Science department to provide research opportunities available to undergraduate students. ResearchLink will highlight the student or departmental success stories not only to the ODU community but also at public platforms. These success stories will attract new undergraduate students and encourage them to enroll in graduate programs.
ResearchLink will send new, and ending, research opportunity notifications to the related users. ResearchLink will be capable of archiving an expired research opportunity. The students and faculty will be able to post their research opportunity experiences. Students will be able to search a research opportunity according to their personal available interests. Faculty will be notified about the student research interests, and they will have the option to connect a specific student after critical analysis of students' profile. ResearchLink will provide a bidirectional communication between student and faculty. ResearchLink will provide searching and filtering option for all research opportunities.

ResearchLink cannot create a research opportunity automatically. An authorized user has to create a research opportunity. All stakeholders have to make their own profiles. The users need to apply for their interesting research opportunity through ResearchLink portal. ResearchLink cannot interface with the ODU Banner database.

1.2 Scope

ResearchLink will be able to put the research related news on the ResearchLink product launch page with a last in, and first out, looping structure. ResearchLink will be a convenient and an intuitive research portal for all users. All users can interact with each other under one umbrella according to their research interests. Moreover, undergraduate students will be able to connect with research organizations via ResearchLink portal. ResearchLink will also promote internships and co-op opportunities which will be helpful for both students and companies.

ResearchLink will provide up-to-date information for most recent research successes and opportunities as well. These research success stories on the research portal will increase a research culture among students and attract more students. Moreover, ResearchLink will help undergraduate students with a congenial transition into the world of graduate academia.
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


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

The product prototype specification gives a general description of ResearchLink. It illustrates the overall structure, features, logical components, and the logical interrelationships of the different units of the research portal. The ResearchLink prototype features are used to create, control, and manage the research portal in terms of output, displays, and user interaction. The structure of the prototype defines the hardware and software configurations.

2 General Description

The ResearchLink prototype provides all basic functionality for research portal. All users can create and update their profiles. Research opportunity creation, newsfeed, and search engine with notification system are the basic components of the research portal. For the prototype, dummy records are populated in the ResearchLink database for demonstration.

2.1 Prototype Architecture Description

The ResearchLink prototype is compromised of a web interface, notification system, and MySQL database. ResearchLink can be accessed by web only. The Web interface provides user account creation for administrators, faculty members, and students. Users can edit their profiles according to their research interests. Faculty and administrator can fill out the research opportunity form and can post on the ResearchLink's website. The newsfeed can be found on landing and homepage of the ResearchLink. Users can search current and expired opportunities. Faculty can search student profiles. A notification system can provide web and email messages to users about all opening and closing opportunities. Faculty can also see a notification message when a student shows interest in a research opportunity. User accounts, profiles, and research opportunities are using dummy records for prototype demonstration in the ResearchLink database. Figure 1 illustrates prototype major functional components diagram(MFCD).
2.2 Prototype Functional Description

The ResearchLink website has a user interface. A user can navigate to different web pages after accessing the ResearchLink website. The ResearchLink sitemap illustrates the different web pages in figure 2.
ResearchLink accepts only authenticated users who can edit profile information saved in the ResearchLink database. Any user has to register before accessing the ResearchLink database.
An email with ODU domain name is accepted on the user interface. Figure 3 represents the register user page.

Figure 3. User register page diagram

After the registration, the users can login to their accounts. Users can create or edit their profiles and search or create research opportunities. Figure 4 illustrates login page.
A research opportunity is stored in the ResearchLink database. Users can find an opportunity by using different keywords according to their desired search. Faculty can search a student who has a profile on a research portal. Both faculty and students can search an active and expired opportunity. The calendar based feature is capable of removing an active opportunity and marking as an expired opportunity. Figure 5 represents the create opportunity web page.
The ResearchLink website notification system will send notifications about research opportunity creation, a user’s account status changes, and information related to the Computer Science departments. Users will be able to mark the read messages and delete a message notification. The ResearchLink email notifications system will have the same features as a website notification system with the exception of the turn off email notification capability on the user side.

ResearchLink will use public and internal newsfeed feature to promote research culture among students. A calendar based feature will use a looping structure by archiving the newsfeeds more than 60 days. ResearchLink database will provide security, efficiency, and flexibility required for maintaining the data.

Testing is necessary in order to ensure the delivery of the high-quality product which requires lower maintenance cost and hence result into more accurate, consistent and reliable results. The ResearchLink database has been populated with dummy records for testing purpose.
Three types of user's data have been inserted in the database - administrators, faculty members, and students.