Team Blue

Career Tracker

Feasibility Report

William Ntumba, Scott Shrout, Anthony Freitas

Product

The product to be delivered in this project, "Career Tracker," will be an application that allows the Office of the Dean of the IUS School of Natural Sciences to:

- upload a Graduation Report spreadsheet received from the Office of the Registrar containing various information about graduates for processing; this process shall extract the relevant data elements and store the data in a database for later consumption.
- view relevant reporting or data views that allow a user to determine:
    - the number of graduates who have enrolled in a post-graduate program and where they are attending.
    - the companies with whom graduates are employed.
    - various other insights relevant to the collected data.
- search for, view, edit, and delete database records as needed.
- send text messages (SMS) to alumni regarding reunions, parties, etc.

Technical Feasibility

Though the product in this project is able to adopt little from the prior "Student Alumni Database" project effort, we do intend to continue utilizing:

- Angular, a Typescript-based open source web application framework, for client-side rendering.
- Express, a Node.JS server framework, to serve the content and communicate with the backend database.
- MySQL, an open-source relational database management system (RDBMS), to store the data.

All of these solutions are available open source for a variety of web server operating systems.

In addition, it has been confirmed that there are a number of existing libraries available for these solutions that could potentially be used in developing the required functionality for this project.

Social Feasibility

Based upon our current plans for the product and the discussions that have taken place thus far with the project sponsor, we do feel that the solution will be considered "acceptable" for the end users. The application is intended to be accessible via a web browser with a layout similar to a number of commonly used information systems employed by the university.

Given the relatively narrow scope of the project, we do not foresee a need for any extensive retraining of the workforce. Although the product will simplify the process of maintaining and accessing needed data related to graduates, implementation of the product would not be expected to require re-location of the workforce nor is de-skilling expected.

In order to ensure that our design continues to align with the expectations of the customer, we intend to maintain regular communication with the project sponsor and submit requests for feedback regarding product design proposals throughout the project.

Economic Feasibility

In analyzing the economic feasibility of the proposed system, we consider the expected benefits as well as potential development and maintenance costs though admittedly much of this is speculative due to limited information.

Based upon communications with the project sponsor, the Office of the Dean of Natural Sciences currently spends a significant amount of time reviewing the data received from the Office of the Registrar each semester, utilizing spreadsheets that require manual data extraction and analysis. This data is used for a variety of purposes, such as understanding students' post-graduate needs and determining if the university is meeting the expectations of area employers in preparing students for the workforce.

At present, we assume the Office of the Dean of Natural Sciences spends approximately 15 hours each semester extracting the needed data, analyzing the data for needed insights, and maintaining the records. Also, assuming an annual salary of $49,000 for office staff it is estimated approximately $700 is spent annually by the office on these specific activities.

We feel our solution can reduce the amount of time required for these activities each semester to 5 hours. This would reduce the cost associated with these activities by approximately $470 annually.

As this product is being developed by students who are receiving no monetary compensation for their efforts using open source solutions, there are no direct development costs associated with the product though there will be some ongoing costs for server hardware and software maintenance. At this time, we understand the solution can be hosted on an existing shared IU server without the need for any immediate additional spending. Assuming a minimal associated time commitment by IU IT support staff (2 hours annually at a rate of $19.98 hourly) and $100 in yearly server maintenance costs associated with this product, we would expect a time savings equivalent to $330.00 in compensation to be realized annually. In addition to saving time/effort, this would allow the university to potentially better serve the needs of students and the community.

While it is not unexpected that additional development effort may be needed in the future to align with evolving business requirements, at this time we assume these updates can be made through additional student-led projects.

Market Research

At a time when college enrollments are on the decline nationwide, post-secondary institutions are understandably focused on attracting prospective students. The emergence of increasing international educational opportunities, evolving technology, as well as shifts in economics and higher education funding strategies have required universities to find new ways of interacting with the societies they serve.

Being able to effectively promote and develop their degree programs requires that universities sufficiently understand the needs of prospective students as well the needs and views of area employers. To that end, IUS collects relevant information about alumni, including their current employer and post-graduate educational plans. According to the project sponsor, this data is used, for example, to determine the top companies with whom past students are employed in order to

facilitate communications with these employers to determine whether the university's programs are adequately meeting their needs in preparing students for the workforce.

As this data, especially when viewed across several semesters, can be voluminous, it seems understandable that the university departments responsible for reviewing, maintaining, and acting upon it might seek to make the process more efficient and effective by utilizing a software solution. As the need to extract and mine data in this manner is certainly not unique to this university or industry, a variety of software solutions addressing these needs have emerged, many of which are commercial and some of which are open source .

While these solutions could likely fulfill the data extraction requirement, finding a single, open source solution that also allows the university to easily filter, visualize, and maintain the collected data ongoing while also potentially allowing for other enhancements in the future, such as the ability to maintain related data such as employer contact information and the ability to update job data using web data scraping or processing updates from other databases, would be more challenging. There are a number of commercial solutions available that likely provide much of this functionality, but these solutions generally include a significant amount of functionality unrelated to that requested here and generally require costly licensing fees.

While the current state of higher education has made solutions like that proposed here attractive, as evidenced largely by the number of commercially marketed solutions available, this product is intended to meet the specific needs of the IUS School of Natural Sciences. Accordingly, certain functionality, such as the ability to extract specific data elements from the Office of the Registrar reporting, would likely not be viable outside of this university without significant modifications. While it is certainly possible to make these functionalities customizable to the point where they would be, the time and effort required to do so most likely extends beyond that available for this project; we therefore do not intend to directly "compete" with other products. It is, however, plausible that this solution could be utilized outside of the School of Natural Sciences with little or no additional development effort.

Alternative Solutions

There is a number of potential alternative solutions, including:

- Implementation of a commercial solution, such as Salesforce for Education, Hivebrite, or Naviance.
    - **Differences:**
        - Most of these solutions include significantly more functionality outside of the scope of this project, such as management of current/prospective student data, that would likely overlap with existing student information system functionality.
        - These commercial solutions generally require an annual per-user license fee; the proposed solution does not require such a fee.
        - These commercial solutions are generally hosted on cloud-based platforms provided by the service; the proposed solution would be hosted on a server owned by the university.
        - The commercial solution generally include ongoing updates and support; the proposed solution will require some ongoing server maintenance costs,

will not likely have end user support services available for the product itself, and additional development effort would be required to update the product.

- Implementation of a desktop application solution
    - **Differences**
        - Implementation of these solutions would involve development of an application that runs on the user's desktop, using libraries such as the .NET Winforms library or Java JavaFX library; the proposed solution is a web application that would run within a user's web browser.
        - These solutions could introduce constraints on the user's choice of operating system, such as with the .NET Winforms library that is currently only supported on the Windows operating system; the proposed solution will use libraries available on a variety of operating systems.
        - These solutions could introduce new design constraints as web application technologies generally offer significantly more abilities to customize the user interface.

Though it appears the university does use one of these solutions currently in some capacity, some of these solutions are highly modularized and it appears that the Office of the Dean of Natural Sciences is not currently able to use it for the purpose suggested here. Given this limitation, the apparent lack of funds to implement additional commercial solutions, the relatively limited scope of the project, and the fact that the university utilizes several different operating systems, we feel the solution proposed here is the most viable at this time.

Project Risks

- The delivered solution does not meet customer's expectations due to lack of communication and feedback. We intend to mitigate this risk by ensuring ongoing communication with project sponsor as well as requests for feedback on product design.
- The delivered solution does not meet customer's expectations and/or project goals due to lack of effort on the part of the development team. We intend to mitigate the risk by ensuring all team members are actively engaged in the project and that progress on deliverables is as expected based on the project timeline.
- The potential for IU server software/hardware constraints not realized during design. To mitigate this, we will work to understand the software and hardware available on IU servers.
- After project development, there are potential security risks if the system is not implemented on properly secured IU resources prior to loading actual alumni data. We will ensure these risks are appropriately documented and communicated.