Pathways Mobile

Building a Mobile App for Students and Universities from the Ground Up

SCALE Learning Technologies

Mentors:

Tiffany Reiss, Osman Bakari, Jack Wharton, Jimmy Zheng, Christopher Nathman, Matthew Johnson, Ernest Spicer

Team LD:

Ganeshram Krishnamoorthy, Caleb Lee, Yihui Fang, Wenda Liu

Table of Contents

I. Introduction

Students choosing to pursue higher education face many difficult decisions. These include choosing the institution that best fits their needs, selecting the degree(s) they wish to pursue, and picking the individual classes that they will be taking each semester or quarter. These considerations are incredible pain points for students; it has been found that 32.9% of undergraduates are not able to complete their degree program [1]. The factors that cause these students to drop out include attending an institution that does not match the individual's preferences, switching majors after a change of heart, and having too difficult of a course load. Students are overwhelmed by the incessant number of decisions regarding universities, degrees, and courses that they will have to make during their higher-education journey. SCALE *Pathways* will be a cross-platform mobile application that aims to address these issues. It will streamline the process of selecting a degree from an institution, tracking one's progress through time for their degree, and making adjustments from any hurdles faced. With these solutions, *Pathways* hopes to take a load off the shoulders of students around the country.

II. Background and Related Work

Team LD's primary contribution to *Pathways* will be implementing the mobile version of a robust course planning website. This mobile app will be a more handy tool for universities to post courses and allow students to create a personalized schedule leading them to their degree. Choosing paths during university is a critical issue. In addition to the compulsory professional courses, students must take some elective courses. In particular, some students have experienced online courses due to the pandemic, and their learning efficiency has dropped significantly. This resulted in many failing grades and not meeting the standards. Repeated courses did not only affect students' progress to the next stage of their study but also affected their graduation time.

SCALE *Pathways* web will allow universities to attract students and give them the information they need to fully understand the path to earning their degree. It also allows students to compare university degree plans side by side in a familiar format. However, to attract customers effectively and improve the user experience, Team LD is responsible for building a mobile app version of the SCALE *Pathways*, using existing functionality from the current application. The mobile app version would offer better personalization and ease of sending notifications to the user. SCALE *Pathways* app provides a prospective schedule for their degree plan, changing that schedule to fit their same degree across different universities. Once a student has enrolled in a university, they would continue to use SCALE *Pathways* to determine the class schedule they need each semester to complete their degree in four years. Team LD's first task would be to gain the necessary background and technical skills to complete the project. To build the application, we will use React Mobile, which is a JavaScript framework that can be used to create native mobile applications for iOS and Android. The benefit to using a tool like this rather than creating separate iOS and Android applications in Swift and Kotlin respectively is that this method results in a single, unified codebase. This streamlines the process of finding bugs, implementing new features, and much more as these changes are only made once rather than twice. The app side will use the HTTP protocol to write pages, write interactive logic and data communication. Also, back-end computing concepts will be implemented to help us identify and correct system issues before it is known to the public. For the backend, we may use Bootstrap and jQuery to build a virtual background system. We will also be responsible for making the user interface design and collecting user experience surveys.

III. Project Overview

With multiple fields of study in a university, it is intimidating for students to plan an optimal course schedule throughout their years in college. SCALE *Pathways* Mobile is an application that assists current and incoming students with their scheduling based on their major. On a basic level, students will be able to input their university, major, and courses taken. With this information, the application will automatically generate the most optimal schedule for the student throughout university.

This schedule will be modular and can be revised or regenerated based upon class availability, changes to graduation requirements, and if a student needs to retake a class. The schedule will be divided into separate terms to clearly show the student which classes to sign up for. Classes will also be categorized and highlighted (i.e., UCORE, Major Class, CAPSTONE, etc.). Classes can be added in bulk via CSV (.csv) files. The schedule can be saved or reverted based upon each user. Previous saved schedules can also be accessed, as well as making multiple schedules for each student.

University admins will be able to customize different courses as they see fit. Adding details such as course codes, credit hours, descriptions, and availability. Additionally, admins will be able to generate their own pathways to graduation based on specific majors.

This project is based upon an existing web application “SCALE *Pathways*”, however, the mobile version will be built from the ground up. Using the React Mobile framework, the application will be built to support both iOS and Android devices. In previous iterations of the web application, there was implementation of graphs to build the schedule. We will be iterating on that code and improving the functionality to fit all major requirements. A validation algorithm was also used to check and maintain course dependencies to ensure a correct schedule. We will be iterating on top of the previous version to improve handling and a possible refactor.

SCALE *Pathways* Mobile must be built to be iterated upon, different classes and majors are always being added and removed. Major requirements can change from year to year, so it is essential that the code uses precise software engineering and object-oriented principles to maintain scalability.

An optional objective that Team LD would like to include is automated functionality with university systems. For example, if a student drops a class in the middle of the semester in myWSU, SCALE *Pathways* mobile will detect that a student would not be able to complete a certain requirement and auto generate another schedule for that specific student. This objective will be difficult to scale as different universities use different legacy APIs with their scheduling software. However, implementing this feature with WSU would be our primary objective for this year.

IV. Client and Stakeholder Identification and Preferences

Our team has identified two clients, which are students and universities. Students are clients since our app aims to help students to build their schedules using the major that they have picked. If students are using the app, Team LD can gather data with their consent and improve the app. Universities can be a client if they choose to cooperate with the team. This is because the app would require full access to a university’s API in order for the app to aid the students in creating a schedule for them. The stakeholders are Tiffany, Osman, Jack, Jimmy, Christopher, Matthew, and Ernest. The project requires the team to build an app from the ground up that helps students build a course schedule based on their major, and the university they are

attending. The stakeholder already has a website up and running with the features. The team is tasked with transferring the features to IOS and Android.

V. Glossary

API: Application Programming Interface

CSV: Comma Separated Values

UCORE: University Common Requirements

VI. References

[1] M. Hanson and F. Checked, “College dropout rate [2022]: By year + demographics,” Education Data Initiative, 21-Jul-2022. [Online]. Available: https://educationdata.org/college-dropout-rates#:~:text=College%20dropout%20rates%20indicate%20that,up%20to%2040%25%20drop%20out. [Accessed: 21-Sep-2022].