Building a UVA Course Catalogue and Schedule Builder

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ABSTRACT

For University of Virginia (UVA) students, course scheduling has been made more difficult by the existing user interface (UI) of UVA-affiliated course scheduling websites. In the fall semester of 2022, I worked on a project for CS 3240 to build a website that would improve the average UVA student's experience in scheduling courses. For this project, my team followed the agile development process: we elicited requirements from UVA students, and then we designed, developed, and tested our code to eventually launch a final product. We created a platform where students could add courses to a calendar view and view or interact with each other's schedules. The courses were more organized and there were more search options, reducing the time and confusion from finding and choosing courses. However, there is room for improvement: students were interested in Google Calendar integration, and they hoped to see a feature that allowed them to review courses or professors or view links to course or professor reviews.

1. INTRODUCTION

Students are routinely required to schedule their courses, and the pressure of trying to meet degree requirements within the standard for their career path already makes it a stressful process. In the fast-paced and dynamic landscape of higher education, efficient scheduling is not merely a convenience, but a fundamental necessity. At UVA, students struggle to find courses navigating a combination of websites that are cluttered and slow. As it directly impacts their educational experience, it is important that the university provides resources to make the process as streamlined as possible.

Effective course scheduling allows students to optimize their time, and it impacts their well-being and academic performance. Understanding the flaws of the existing system for UVA students and students' needs, my team and I strived to improve the existing system by addressing key problems, streamlining processes, and enhancing user experience. My project outlined the challenges faced by students in course scheduling and introduced our website as a solution to these challenges, providing a user-friendly platform that prioritizes UVA students' needs and improves the way they plan their academic journeys.

2. RELATED WORKS

Dills and Hernández-Julián (2008) examined the relationship between course scheduling and student achievement, using grades as a measure of performance. They found that students earn slightly higher grades when enrolled in preferred course times, and they also found that students tend to earn higher grades in classes that meet more often. However, this study did not measure other indicators of student achievement, and it did

not examine the relationship between course scheduling and post-graduate success in students. My project was motivated by the relationship Dills and Hernández-Julián studied between course scheduling and student achievement. If students exhibit improved performance due to their enrollment in preferred courses, an effective course scheduling system facilitating efficient discovery and enrollment in such courses may enhance their performance.

Shore (2021) describes the principles of agile methodologies. Shore emphasizes iterative development, collaboration, and adaptability, and these align with my project's approach to continuously refining the course scheduling website. By integrating agile principles, we created a website that adapted to changing requirements. Shore provides a theoretical framework that informs the practical application of agile methodologies in our project, emphasizing the importance of continuous improvement and adaptability in software development–principles that are equally significant to our more effective course scheduling system.

3. PROCESS DESIGN

Given the dynamic and evolving nature of the project, the Scrum framework offered the flexibility to adapt to changing requirements, respond to user feedback, and incrementally develop the system. The project was divided into a series of two-week sprints, each with its set of user stories, tasks, and objectives. With this iterative approach, my team was able to develop the website incrementally, addressing the most critical issues first, while maintaining flexibility for changes.

3.1 Requirements Elicitation

To gather valuable insights into UVA students' perspectives on existing course scheduling websites and their desired improvements, my team conducted a comprehensive survey of 38 UVA students and engaged in interviews with 10 UVA students. The focus was primarily on two key components: Lou's List, the UVA course catalogue, and the Student Information System (SIS), the official enrollment platform.

3.1.1 Lou's List

From the survey and interviews, we found that most students regularly use Lou's List to help them schedule courses. In the survey, students also did not strongly dislike the UI of Lou's List, and many students indicated that they were very content with the current usability of Lou's List. We noticed that students either felt strongly or neutral about whether using Lou's List helps prevent time conflicts in their schedule. My team felt that this was most likely because Lou's List has no features to keep track of courses users are interested in.

3.1.2 SIS

In the interviews we conducted, most interviewees said that they only used SIS to enroll in courses (not to find courses or build their schedule), and they unanimously claimed that they would have to use SIS if Lou's List went down. Students expressed frustration about SIS's slow load times and its lack of a full list of courses to scroll through. They also noted that it is difficult to navigate because of the number of filters and clicks required to run a search, especially when they may not be sure what they are looking for.

There are two main reasons students use SIS. First, students must enroll in courses via SIS, and if there is no open UVA API that allows third party sites to make enrollment calls, this feature cannot be implemented in our project. Second, students valued being able to see their schedule in a calendar view.

3.1.3 Schedule Sharing

From the survey, we saw that most students were curious about their peers' schedules. In the interviews, most students also said that they share their schedules either verbally or with screenshots and expressed interest in having a scheduling sharing application.

Although many students were indifferent to the inclusion of a comment section on a schedule building website, most students were interested in getting feedback on their schedule, suggesting that comments were not as important to many as the general course scheduling functionality itself, but feedback was appreciated.

3.2 Key Components

Based on sentiment and data gathered during requirements elicitation, my team decided to implement three key components: 1) a course catalogue very similar to the structure of Lou's List; 2) a calendar-view schedule builder; and 3) a social platform in which users can view and comment on each other's schedules.

3.2.1 Course Catalogue

Our team chose to largely base our project on Lou's List because of how familiar students are with it and how usable students found it to be. The advanced search and browse pages in our project mimic the format of Lou's List. Students can filter search results as necessary. There is also a minimal search bar on the home page that allows students to search for courses without having to navigate the clutter in the advanced search page. Our project integrates Google log in, so when signed in, students can add or remove courses as they browse.

3.2.2 Schedule Visual

As evident in requirement elicitation, students valued being able to build their schedule with a calendar view. When a user is signed in, they can access their schedule page which consists of courses they have added on a calendar week format. Students can click on the courses in their schedule to see more information about the course and section in their schedule, like professor, location, spots available, etc. They also have the option to remove courses from their schedule when they click on a course in their schedule.

3.2.3 Social Platform

Students expressed interest in sharing their schedules and receiving feedback, so it was important that we integrate a social platform in our project. When signed in, users can access a social page where they can search for friends, send or accept friend requests, or remove friends. From this page, they can click on their friends' names to view their schedules and leave comments. On their own schedule, they can also view, add, or remove comments.

4. RESULTS

Our course scheduling website was deployed on Heroku for a few months from November 2022 to January 2023. In that time, the implementation of the course catalogue, schedule builder, and social pages significantly enhanced user interaction and engagement. Users reported a more seamless experience when visualizing, adding, and removing courses from their schedule. Loading course information, updating schedules, and navigating between different views were executed with minimal latency, contributing to the overall responsiveness of the platform. Beta tested by six students, the website showed consistent performance across various devices and browsers, affirming the platform's stability.

5. CONCLUSION

Working on a course scheduling website allowed me to hone the skills I have learned from the computer science curriculum and apply them to a realistic web development process. Throughout this project, I gained valuable insights into the importance of user-centered design, and how to effectively collaborate in a team with a Scrum Master, DevOps, Testing Manager, UI/UX, and Requirements Manager. Additionally, collaborating with the team taught me the significance of effective communication, version control, and agile development methods. I experienced firsthand that successful web development extends beyond coding proficiency as an individual; it requires a holistic approach that considers the needs and preferences of end users as well as emphasizes teamwork.

Understanding the flaws of the existing system for UVA students and students' needs, my team and I strived to improve the existing system by addressing key problems, streamlining processes, and enhancing user experience. With enhanced information hierarchy, improved accessibility, and simplified UI, this website is designed to alleviate cognitive overload, enhance decision-making, and reduce user frustration.

6. FUTURE WORK

In our surveys and interviews conducted when eliciting requirements, we asked students if there was anything else they would like us to know or consider. There were a few features that were brought up that we did not implement. For instance, students were interested in 1) seeing links to other relevant course pages on course scheduling sites or links to course or professor reviews; 2) having a calendar-view schedule that can be exported to Google Calendar; and 3) being able to view multiple departments at once while browsing.

Students also expressed frustration about SIS's load times. Our project addressed searching for courses and building a schedule, but it did not directly improve the process of officially enrolling in courses. Many students would be interested in a faster and more navigable alternative to SIS.

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