Improving the UVA Course Scheduling User Experience

(Technical Paper)

Evaluating the UVA Course Scheduling User Experience

(STS Paper)

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Relate Assignments

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Evaluating the UVA Course Scheduling User Experience

Students must routinely 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 necessity. At the University of Virginia (UVA), students grapple with finding classes while navigating a combination of websites that are cluttered and slow. As it directly affects 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 the effectiveness of their course scheduling affects their well-being and academic performance. 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 show 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.

My technical report will outline the existing challenges faced by students in course scheduling and introduce 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. My STS research will focus on how the UVA's existing course scheduling user interface is lacking as well as how it can be improved with respect to user interface (UI) and user experience (UX) methodologies.

Technical Discussion

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. The project looked to create a solution to improve flaws in the existing course scheduling experience for UVA students. Students expressed dissatisfaction in sites like SIS or Lou's List because it was slow at loading results, difficult to navigate, or did not incorporate adequate features that would allow them to plan which courses they could enroll in without overlap. It was a class project that took a semester to complete, and resulted in a website that improved and streamlined the process of scheduling courses as a UVA student. I will outline how I applied Agile development principles to create a student-centric course scheduling website, emphasizing the methodologies described in Shore's "The Art of Agile Development" (2021) and highlighting their impact on the project's success.

The first step in this project was identifying the need for an improved course scheduling system. My team and I surveyed and interviewed students at UVA, which allowed us to identify the pain points of the existing system. We found that most students found it valuable to be able to visualize their schedule and often share their course schedule with their friends by either verbally telling them or sending them a screenshot of their schedule. However, most students found it inconvenient to use a single resource for this purpose, often switching between Lou's List and SIS. The feedback collected served as the foundation for the project's goals and informed the team's initial user stories. This process aligns with Shore et al.'s (2021) principle of "Collaborate

with Customers," where the project team actively engaged with the end-users to understand their needs and preferences.

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. This approach encouraged regular communication and collaboration among team members, fostering a sense of ownership and shared responsibility for the project's success. This iterative approach also allowed the team to develop the website incrementally, addressing the most critical issues first while supporting flexibility for changes.

The project's foundation was a well-maintained product backlog. User stories and features collected from students were refined iteratively. Using Shore's (2021) principle of "Plan to Learn," the team prioritized backlog items based on their importance and impact, with a focus on delivering the most valuable features early in the development process. This iterative backlog refinement aligned with the Agile concept of continuous learning and adaptation.

Agile development emphasizes continuous integration and testing. The team employed automated testing to identify and address issues early in the development process. Unit testing was integrated into each sprint to maintain quality throughout the project, aligning with Shore's (2021) principle of "Incremental Quality." Later in the semester, we also beta tested our website with several UVA students. Regular reviews were also a fundamental part of the Agile process. At the end of each sprint, the team demonstrated the progress made and gathered feedback. This feedback loop allowed for quick adjustments and helped ensure that the project was on the right track.

Shore (2021) describes the principle "Embrace Change" underscoring the significance of adaptability and flexibility when unanticipated challenges arise during a project. When a bug was found towards the end of the semester which prevented students from being able to view the detailed course information for certain courses in their schedule, the team was able to adapt quickly to accommodate these changes without derailing the entire project.

The Agile development process continued through a series of sprints over a semester, with the project evolving and improving with each iteration. The website gradually incorporated enhanced features, including a more intuitive course search and registration process, personalized dashboards, and responsive design.

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. Over the course of 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 an integrated approach that considers the needs and preferences of end users as well as emphasizes teamwork.

STS Discussion

Bessiere et al. (2003) studied what factors affect frustration as a result from computer-related tasks and their "study of 108 computer users show high levels of frustration and loss of 1/3 to 1/2 of time spent." They suggested that software developers should prioritize reducing user

frustration with better user interfaces and clearer instructions. Yablonski's (2020) "Laws of UX,"

a set of principles that guide user experience design, offer valuable insights into how university

course scheduling systems can be improved to provide a more effective user experience. This

discussion explores the UI/UX methodologies that are lacking in the existing UVA course

scheduling system with respect to Yablonski's Laws of UX and offers recommendations on how

they can be addressed to enhance the overall student experience and reduce user frustration.

Figure 1. Lou's List Search.

Figure 2. SIS Browse Page.

Hick's Law states that the time it takes to make a decision increases with the number of choices available (Yablonski, 2020). In the context of university course scheduling systems, this law highlights the importance of providing students with a clear information hierarchy. While Lou's List does provide a well-structured hierarchy that categorizes courses by school, department, and level, it employs a cluttered search page, making it challenging to make informed decisions quickly (Figure 1). On the other hand, SIS's "Browse" page is only organized by department and not by school (Figure 2). Clear visual cues and filters can help students narrow down their options, reducing decision-making time and cognitive load.

Figure 3. Lou's List Course List under Department.

Figure 4. SIS Course List under Department.

Fitt's Law emphasizes that the time to reach a target is a function of the target's size and distance (Yablonski, 2020). In the context of university scheduling systems, this law highlights the importance of supplying accessible and easily clickable touchpoints for students. Many existing systems require students to click several times to reach critical information, making it difficult for students to interact with the platform efficiently. Lou's List's organization allows students to expand and minimize categories or section information as they need (Figure 3). Ensuring that buttons, links, and interactive elements are appropriately sized and spaced can significantly improve the usability of the system. Furthermore, ensuring that navigation elements are well-suited for various screen sizes is essential to comply with Fitt's Law.

Miller's Law suggests that the average person can only retain about 7 (plus or minus 2) pieces of information in their working memory (Yablonski, 2020). Many university course scheduling systems overload students with information, presenting extensive course lists, complex prerequisites, and intricate registration procedures. This can lead to cognitive overload and decreased comprehension. Lou's List provides a summary of course information in a digestible table format (Figure 3). However, the same information summarized in Lou's List is hard to access on SIS even when the course information is expanded (Figure 4). These websites can achieve clarity and simplicity by displaying essential course information concisely, offering clear prerequisites, and breaking down complex registration steps into manageable segments. Providing easily digestible information helps students make informed decisions without feeling overwhelmed.

Figure 5. SIS Degree Progress.
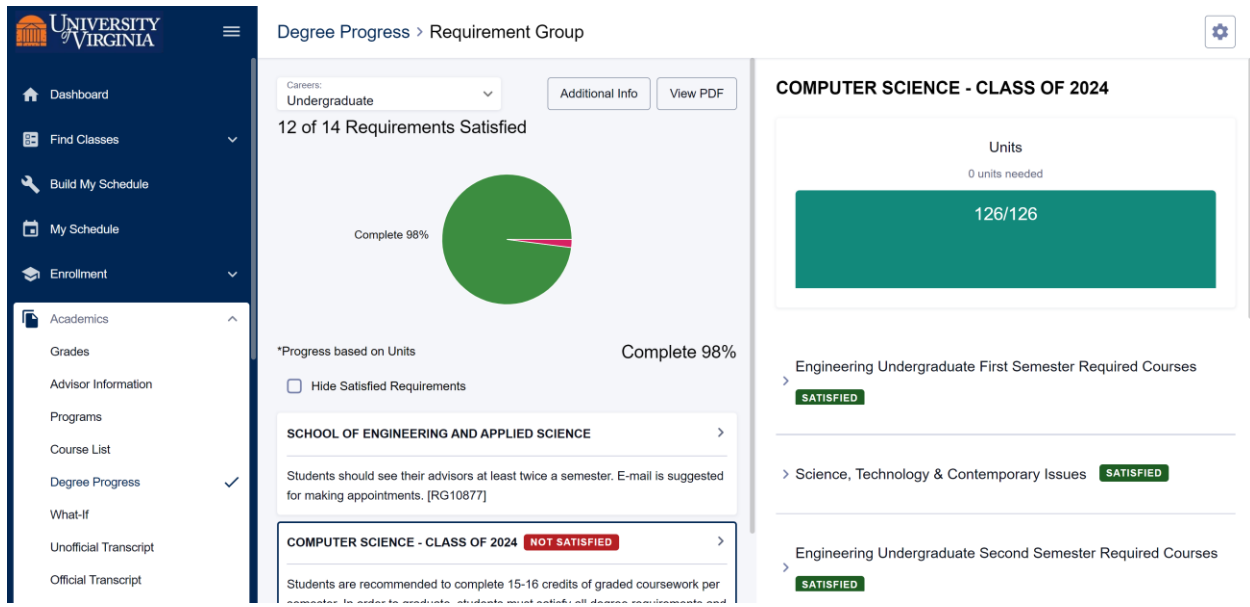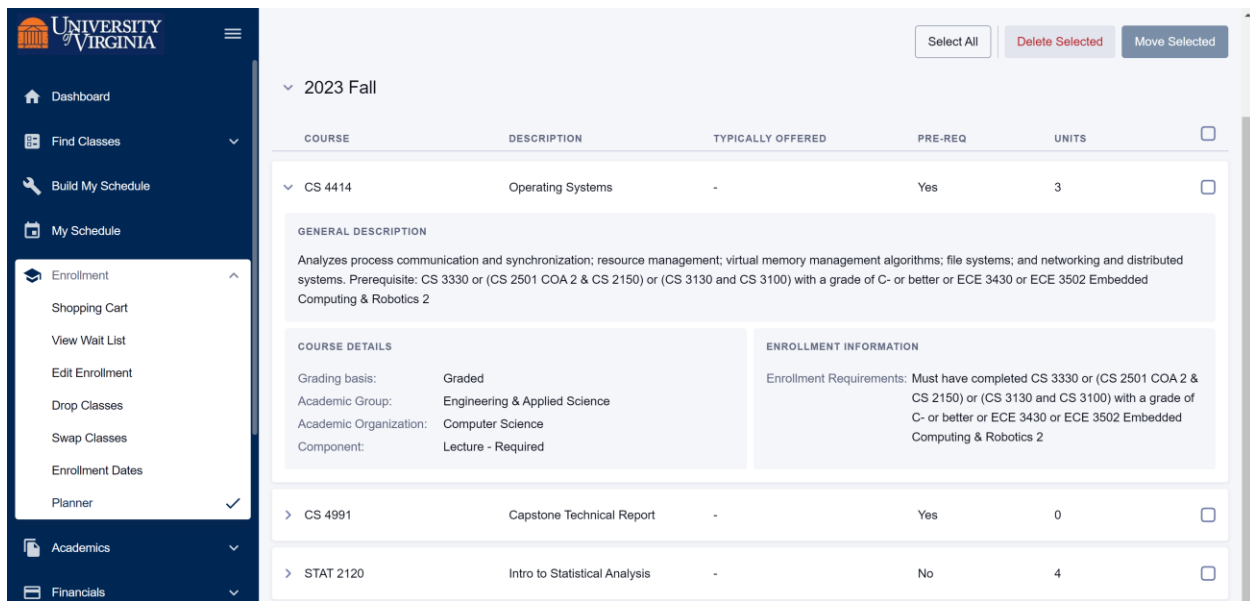

Figure 6. SIS Planner.

The Zeigarnik Effect suggests that people tend to remember uncompleted or interrupted tasks more than completed ones (Yablonski, 2020). In the context of university scheduling systems, this principle underscores the importance of assisting students in tracking their course selection progress. Many existing systems lack features that help students remember which

courses they have selected, making it easy to forget or overlook important steps in the registration process. SIS has a page that keeps track of your degree progress (Figure 5) as well as a page with the courses you are enrolled in and whether you have met their pre-requisites (Figure 6). However, these pages are far apart and may be difficult to navigate to if you do not know where to look: "Degree Progress" is accessed under the "Academics" tab, whereas "Planner" is located under the "Enrollment" tab. Lou's List does not have a login feature, so it does not track a student's progress toward their degree or whether they have fulfilled a course's prerequisites. To address this, scheduling systems can implement progress trackers that can easily be viewed alongside course searches or on a dashboard, allowing students to see their registered courses and providing reminders for any incomplete actions. The progress trackers would enhance the overall user experience by reducing anxiety and helping students manage their course selections effectively.

Tesler's Law, often summarized as "less is more," encourages a minimalist approach to UI design (Yablonski, 2020). Many university course scheduling systems suffer from cluttered interfaces with excessive information, which can overwhelm users. Embracing minimalism by simplifying the design, reducing visual noise, and prioritizing essential content can improve the overall user experience. A clean and uncluttered interface helps students focus on what matters most, making it easier for them to navigate, find, and register for courses.

The application of Yablonski's (2020) Laws of UX provides a valuable framework for identifying and addressing the UI/UX methodologies that are frequently lacking in university course scheduling systems. By adhering to these principles, institutions can create scheduling systems that support users' habits psychologically. It is essential for universities to recognize the

significance of these laws and prioritize their integration into the design and development of course scheduling systems to better serve their students.

Research Question and Methods

How is UVA's existing course scheduling user experience lacking, and how can it be improved?

The first phase of this research involves the development of the student-centric course scheduling website. This website served as the intervention designed to address the existing issues in the UVA course scheduling system. The development process adhered to Agile development principles, drawing inspiration from "The Art of Agile Development" by James Shore and Shane Warden (2021).

In the design phase, user-centered design (UCD) principles were implemented. This included gathering feedback from UVA students and conducting usability testing to ensure that the website's interface is intuitive, user-friendly, and responsive to different devices. The input from students was crucial in shaping the website's features and interface.

To manage the development and deployment of the website, the Scrum framework, one of the Agile methodologies described in "The Art of Agile Development," was utilized (Shore et al., 2021). The project was divided into sprints, each with specific goals and tasks. This methodology provides a flexible and adaptable approach that aligned with the dynamic nature of the project.

Beta testing was conducted with students to identify bugs with the new website. These in-depth interviews were used to collect qualitative information about the students' experience with

the new website. These tests and interviews allowed us to evaluate the website's impact on user satisfaction and opinions on the potential effect on academic performance.

Conclusion

The challenges in the existing UVA course scheduling system, as outlined in this discussion, point to significant shortcomings in user interface (UI) and user experience (UX). By applying the principles of Yablonski's (2020) Laws of UX and integrating Agile development methodologies, the course scheduling website that I have developed offers a comprehensive solution to address these issues.

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, simplified user interfaces, and progress tracking features, this website is designed to alleviate cognitive overload, enhance decision-making, and reduce user frustration.

These deliverables will not only address the problems presented but also significantly contribute to the overall well-being and academic performance of UVA students. They prioritize user needs, improving the efficiency of academic planning and, in turn, enhancing the educational experience.

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