

UVA Automated Course Advising Assistant Research Project
(Technical Report)

Semiotic Approaches & Software Development
(STS Research Paper)

An Undergraduate Thesis Portfolio

Presented to the Faculty of the
School of Engineering and Applied Science
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Bachelor of Science in Computer Science

By

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Socio-technical Synthesis: Semiotic Approaches & Software Development

My technical work and STS research are connected through University of Virginia's (UVA) Student Information System (SIS). In my technical work my team developed a web application to help Computer Science students plan their curriculum for each semester based on the requirements provided by SIS. We started this project because SIS did not currently have a way for students to create and verify a plan for themselves, so students have to rely on their advisor. In my STS research I analyzed many of the shortcomings of SIS and why it has failed as a tool for students. While it provides a lot of useful functionality it is missing a curriculum planner and the workflow it creates is extremely frustrating and unintuitive, so students are forced to rely on third party tools in order to create a schedule. My technical work was meant to help students by bringing some of these tools together and presenting them on an official platform backed by UVA.

In the technical project I helped develop a web application where students can log in and add classes to a 4-year curriculum plan. The application was created primarily using Python, Django, and ReactJS. Students upload a PDF of their transcript and it will automatically parse it and fill up the student's course history. The tool then shows what classes the student still needs to take and automatically creates a plan based on how many semesters the student has left and how many credits they want to take each semester. Students can also manually create their own plan.

In my STS research I discussed how SIS prioritizes functionality over usability and this creates an extremely negative experience for the users. The designers failed to take into account the goals and identity of the users. Many of the common tasks users want to perform require them to jump back and forth between pages in an endless and repetitive loop. This caused the workflow of the design to fail to match up with the workflow of the users. Resulting in them being forced to create and use workaround tools in order to accomplish the task of creating a schedule.

By conducting both of these projects together I was able to enhance the web application I created and gain a better understanding of developing software for real world use. In the STS research I learned the importance of understanding the user in order to create software that matches their desires in order to help them accomplish their goals. I used this understanding to plan out the design of the application in order to be easy and intuitive for students to use. By conducting my technical projects, I was able to learn more about web development and gain a lot of experience. I also understand that designers may make poor decisions because it might be much faster to implement. By doing both of these projects together I was able to understand when it was not okay to take these shortcuts due to how important usability is to the user.