**Thesis Project Portfolio**

# The University of Virginia's CS Curriculum: A Proposed "Path Program" to Prepare Graduates for Specific Industry Careers

(Technical Report)

# Black Representation in Design and the Evolution of HCI

(STS Research Paper)

An Undergraduate Thesis

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**Alexandra Martin**

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Department of Computer Science

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**Sociotechnical Synthesis**

Throughout my journey with the Computer Science Department at the University of Virginia, I've taken various courses over the past eight semesters that helped me to establish a foundation in the field of Computer Science. The content of these classes has ranged from fundamental concepts like data structures and algorithms to more industry-specific topics like Cybersecurity, Databases, and Cloud Computing. While this CS curriculum is certainly broad, I have found throughout my time that the curriculum does not promote a focus on a specific field of computer science. Rather than pursuing multiple courses related to cybersecurity or machine learning, students, as a result of a lack of direction, resultantly take multiple classes related to differing fields. While this is not negative, at other universities with CS programs there exist concentration paths that allow students to obtain extensive knowledge and hands-on experience in relation to specific Computer Science topics. They are then able to leverage this knowledge to obtain internships and job opportunities after graduation. Additionally, many of these students at other universities pursue capstone projects within these concentrations. This results in Capstone projects that are more cohesive and focused. Because of my personal experiences and research of other CS programs at Universities, I was motivated to propose, in my Technical Capstone Paper, a new program in the CS department at UVA called the "Pathways Program" where students can learn more about and gain hands-on experience with a Computer Science topic.

My STS research topic was primarily developed through personal experiences, in addition to some of the Human Computer Interaction courses elective courses I have taken in the last two years. Through these courses, I learned the importance of User Experience design, and how the decisions we make in font size, symbol choice, color, and other factors can truly have an impact on the user's experience. This made me want to explore how the Black community has

been impacted by these design choices, and if there are any current methods in place to ensure that members of the community are represented.

Although many CS graduates from UVA will go into industry, only a few classes in the CS curriculum actually provide graduates with skills like conflict resolution, prioritizing equity, and working with diverse clients which they need to be an effective engineer. To improve the CS curriculum, I propose adding a "path" program that each graduate can choose to complete. This path program would be composed of elective classes related to the specific field, in addition to a 3-credit class which would govern their capstone. In my Technical Capstone, I analyzed the electives offered to B.S computer students in the last three years, surveyed students to understand their industry fields of interest, and studied course curriculums to design a capstone program that could be formed that accurately prepares graduates to be successful in their chosen field. After doing this research, I create five individual "field paths" that match student interests. I proposed that the university would have to find business professionals and/or professors with a vested interest to head the program and capstone class. Additionally, additional decisions would need to be made regarding when to launch the program.

For my STS research, I chose to reflect on how UX design in the context of software application design has contributed to the marginalization of the Black community, primarily through a lack of research and true understanding of the primary qualities of Blackness. To perform this research, I spent most of my time analyzing the design-for-all movement. I collected evidence that informed my claim that while this movement has positive intentions in ensuring that there is more presentation, in actuality, it prohibits the intimacy of design that could facilitate truer Black representation. Further, I found through research that as it pertains to expanding design choices in the UX context, much of the focus has gone towards creating

representation for those of other cultures and languages, but there is still a lack of focus in designing for Black users. Because of the pervasiveness and depth of technology, this lack of focus and proper research have contributed to and will continue to contribute to the marginalization of Black individuals if not improved.

Although these projects are very different, working on my STS research paper and better understanding the strength and impact of the HCI field definitely helped me to be creative in the pathway programs I created for my CS technical report. Instead of solely including programs for traditional fields such as Cybersecurity, Data Analysis, and Machine Learning, I also branched out to include programs for both HCI Design and Software Development. Throughout my research for my STS topic, I learned about the increase in jobs in the UX field and the urgence of companies to find employees who are educated in the work. This not only informed the solidification of my Technical Capstone topic, but it also prompted me to be innovative in including classes for the path program focused on design and creativity from the College of Arts and Sciences.