

Thesis Project Portfolio

A Proposal for a Modern UVA Computer Science Curriculum Design

(Technical Report)

**AI in College Admissions: Transformative Tools, Ethical Considerations, and Implications
for Applicants and Institutions**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Spring, 2024

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Sociotechnical Synthesis

This research focuses on modern computer science developments and how it is affecting students. Transformative shifts are happening in many areas, including college admissions and new curriculum development. One of the catalysts for this shift is Generative Artificial Intelligence (AI), where new tools have been becoming increasingly prevalent. It is changing the ways in which students learn and complete assignments. Generative AI refers to a subset of AI that involves computers generating new content, such as text, images, or even music, based on patterns learned from existing data. These systems are not just mimicking existing content but are capable of generating entirely new outputs that can be indistinguishable from human-created content. In the realm of college admissions, generative AI is impacting how students craft their applications and how colleges review the applications. Generative AI can assist in personal statement writing and resume creation. In terms of curriculum design, the emergence of capable generative AI represents one of many technological advances that necessitates a review of current curriculum. Not only is AI changing how students learn and process information, it also sheds light on the mismatch between computing developments and legacy curriculum.

The University of Virginia's (UVA) Computer Science curriculum, despite recent modernization efforts, remains outdated and fails to align with the evolving technology landscape. This technical report proposes restructuring the CS major into five distinct disciplines: Software Engineering, Theoretical Computer Science, Computer Engineering, Data Science & Machine Learning, and Cybersecurity. Each discipline will have its own degree requirements tailored to provide students with more specialized knowledge. By aligning the curriculum with current industry demands and offering specialized tracks, this proposal will enhance student engagement, career readiness, resource optimization, and academic excellence.

The implementation plan involves expanding course offerings, hiring faculty with expertise in specific disciplines, and reorganizing the curriculum gradually. Anticipated benefits include increased student motivation, better preparation for the job market, improved course quality, and enhanced institutional reputation.

The integration of generative Artificial Intelligence (AI) in the college admissions process has significantly impacted how applicants craft essays and navigate the application journey. The STS research explores the influence of AI technologies, such as ChatGPT and educational chatbots, on the essay creation process during the 2023 academic year. This paper examines software tools available to applicants and analyzes their impact on essay quality and authenticity. From the applicant's perspective, AI tools offer efficiency and accessibility, making it easier to generate ideas more quickly and refine them. However, there are concerns regarding their potential impact on creativity and critical thinking skills. Despite the AI-powered essay review services being much more affordable than a human college counselor, this research discusses how applicants need to strike a balance between using AI assistance and actively engaging in the writing process to express their own voice. For educational institutions, AI technologies present opportunities to streamline admissions procedures, enhance efficiency, and even promote fairness. However, institutions need to maintain transparency and uphold the importance of human judgment in holistic evaluations. Clear guidelines for the ethical use of AI in admissions are necessary to address these concerns. In summary, while generative AI offers benefits in efficiency and accessibility, its integration into the college admissions process necessitates careful consideration of its implications for applicants and educational institutions.

The integration of generative AI into both the educational and admissions worlds marks an important transformation in how students engage with school. AI is fundamentally reshaping

how students engage with the college admissions process. While the STS portion of this portfolio focuses specifically on the college admissions process, it can be used to show how other academic processes might be affected as well. It is likely that the ways in which students learn and create in school will change in ways that will necessitate modifications in curriculum design. While the curriculum design proposed in the technical project considers developments in AI, it also considers other technological developments that will affect schooling.