

Thesis Project Portfolio

**UVA Computer Science Curriculum: Preparing Computer Science Students for the
Changing Technical Landscape**

(Technical Report)

**Artificial Intelligence in Education: How ChatGPT Can Affect Students' Learning and
Comprehension of Subject Material**

(STS Research Paper)

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Executive Summary

The format of education has changed with the advent of technology. My technical report, *UVA Computer Science Curriculum: Preparing Computer Science Students for the Changing Technical Landscape*, analyzes how the undergraduate computer science (CS) curriculum at the University of Virginia (UVA) needs to adapt to prepare students for the workforce. UVA students have limited resources to build interview skills and need to learn current programming languages and specialty areas to be competitive for the CS industry. My sociotechnical research paper, *Artificial Intelligence in Education: How ChatGPT Can Affect Students' Learning and Comprehension of Subject Material*, studies how an artificial intelligence (AI) chatbot, ChatGPT, has influenced students' education. ChatGPT's popularity stems from its ability to help students by explaining complex topics; however, concerns have arisen regarding whether students hinder their learning by over-relying on AI for assignments. Both papers focus on the advancement of education within schools using technology. Understanding the structures and technologies that influence education can maximize students' potential to learn and thrive.

In my technical report, I proposed the following changes to the CS curriculum: requiring students to take classes in three specialty areas and a career readiness course and updating programming languages in certain courses to align with industry standards. Students will broaden their knowledge beyond software engineering by taking courses in the specialty areas of cybersecurity, software engineering, computer systems, AI, and digital media. The career readiness course, which is not required in the current curriculum, will provide networking, interviewing, and resume workshops to prepare students for the workforce. Changing programming languages in select courses will align students with job requirements.

By adopting the proposed changes into the curriculum, we can expect that students will be more competitive job applicants and feel more prepared for the transition from school to the

workforce. Students will be aware of specialties they can focus on, master multiple programming languages prevalent in the CS industry, and be prepared for job interviews. Taking classes within multiple specialties will help students understand what type of field they would like to work in. Additionally, the career readiness course will prepare students for internships and full-time jobs.

My sociotechnical paper focuses on the following research question: How can ChatGPT affect students' learning and comprehension of subject material? ChatGPT is an artificial intelligent chatbot that can answer almost any prompt given, such as by generating practice problems for studying. However, using ChatGPT constitutes the question of academic dishonesty. For students to truly learn subject material, they must work on problems of the right difficulty. Using ChatGPT to complete work removes the challenging aspect that helps students learn. My paper answers the research question by performing a literature review using actor-network theory on ChatGPT, how people learn, and the role of ChatGPT in academia, as well as by analyzing interviews with current college students to study how they use ChatGPT.

In a Spring 2024 study of 31 undergraduate students at the University of Virginia, 61.3% of students use ChatGPT, with 73.7% using it to study concepts and 42.1% for assignment help. Many students found ChatGPT beneficial to their education because it provides constant support by aiding in grammar, explaining concepts, and reviewing work. While ChatGPT is useful, some cautioned that it can hinder learning because they could complete assignments without full comprehension of subject material, limiting understanding on more challenging concepts. Overall, ChatGPT can inhibit or help the education of students depending on how they use AI. ChatGPT can be useful to study concepts but should not be relied on wholeheartedly.