**Thesis Project Portfolio** 

## StorySprout: On-Demand AI-Generated Children's Stories Leveraging AI to Create Customized Children's Stories in a Web Application

(Technical Report)

## Examining the Societal and Environmental Impacts of AI Development: Inequities and Infrastructure Problems

(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

> > **Ryan Chung**

Spring 2025 Department of Computer Science

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#### **Sociotechnical Synthesis**

### Ryan Chung

5 May 2025

# STS 4600

Artificial-intelligence tools have begun to play a large role in our lives. From ChatGPT to the content we see on the internet, we will see AI content everyday. It can also be used to widen young minds but, at the same time, widen social divides. My technical capstone project, StorySprout, shows how a large language model, in this case ChatGPT, can aid in early childhood education by turning a child's own friends, pets, and families into instantly generated stories. My STS project acts in juxtaposition with my capstone technical project. It reveals how the same AI boom that makes technology like StorySprout possible, is financed, built, and governed in ways that concentrate benefits in elite hands while off-loading environmental and economic costs onto marginalized communities. Examining the two projects together therefor offers a full picture of what it means to engineer responsibly in the age of generative AI.

StorySprout works to address the long-standing problem that early readers often take reading as a chore rather than a story that relates specifically to them. By pairing a frontend framework in Next.js with Firebase for backend and authentication, and generating content with OpenAI's GPT-3.5-turbo to deliver stories, the app lets a user specify characters, settings, and specific plot elements, then generate an interesting narrative in seconds. Teachers and parents found that this level of personalization kept children engaged and more excited to read. Yet, the very LLM that powers these light-hearted stories depends on ever-larger data centers and venture funding cycles that are invisible to the classroom but central to AI's footprint.

My STS research therefore asks: who benefits from, and who bears the burdens of the infrastructure behind tools like StorySprout? The research utilized a mixed-methods approach

that combined a quantitative analyses of venture cash flows with a thorough case study of Northern Virginia, a region with the most data centers in the world. The study found stark gender and pedigree biases in AI funding, more specifically, only two percent of U.S VC dollars go to women-only founding teams. It also found that YCombinator cohorts are dominated by male graduates of a few elite universities. Downstream, Loudoun County now hosts about 200 data centers, consumes a quarter of Virginia's electricity, and has seen housing prices jump 65 percent, a pattern described by some as a "digital plantation" that enriches tech firms while displacing lower-income residents. These findings show that AI's social and environmental externalities scale just as quickly as its technical capabilities.

Viewed in concert, the two projects work in a juxtaposition. On one hand, StorySprout demonstrates AI's capacity to generate meaningful content and advance technical capabilities. On the other, the same application relies on capital, compute, and energy flows that produce inequity and climate risk. Future work must put together technological innovation with structural reform, more specifically, broadening who receives AI funding, siting and cooling data centers sustainably, and ensuring communities share in the value their resources enable. Only by integrating human-centered design with society-centered governance can we realize AI's promise for technological innovation without writing new chapters of exclusion.