

Thesis Project Portfolio

A Financial Literacy AI-Enabled Voice Assistant System for Educational Use

(Technical Report)

Development of Educational Technology Using Co-Design

(STS Research Paper)

An Undergraduate Thesis

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

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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

Much of the educational technology developed today fails to account for the needs of all stakeholders, specifically teachers. The design is built with the focus being on the technical aspects as opposed to the entirety of the system, which results in key needs often getting overlooked. Highlighted below are the technical and STS theses that discuss the development of educational technology and using the approach of codesign to improve development of the technology.

The technical thesis proposes the development of a virtual voice assistant that serves to improve financial literacy in American students from kindergarten through twelfth grade. The educational technology was intended to complement a teacher's lesson by providing students a short lesson addressing different financial literacy topics that meet the National Standards in K-12 Personal Finance Education educational curricula. The final prototype built did not include educational experts' opinions, but looking ahead, much improvements can be made if the experts are included. The tool does successfully walk through two lessons for fourth graders and kindergarteners, and the data from the two lessons were analyzed. Results indicate lots of room for growth, which may have been minimized if the process of codesign was utilized.

The STS thesis explores what is good educational technology and how engineers and educational experts can collaboratively work together to merge the technical and non-technical expertise of both parties to develop effective educational technology. Several differing case studies in which engineers work with experts such as physicians, farmers, and more are used to establish the basics of the two parties working together. The case studies indicate that equal, continuous contributions from both engineers and external experts throughout the entire project is key to effective collaboration. However, prior to any design or implementation phase, engineers must identify the key needs/issues educational experts are facing. These two main concepts will establish a proper codesign relationship and promote better development of edutech.

My past year's work explored educational technology in depth as a result of being prompted for a senior design project that involved developing it. This project sparked the interest in how to effectively develop good edutech to ensure it meets the needs of students and teachers. My senior project team intended to consult experts in education, but did not have enough time to do so. The result of this was a prototype that was more universal than personal to students, which limited the effectiveness for teaching students. Several improvements could have been made to the final prototype if the process of codesign was utilized.

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