

Thesis Project Portfolio

Embodied AI for Financial Literacy Social Robots

(Technical Report)

Using Scripts to Improve the Efficiency of Developers and the Usability of Previous Developments

(Technical Report)

Financial Literacy Courses in U.S.'s K-12 Education

(STS Research Paper)

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Sociotechnical Synthesis

To gain a better understanding of the factors that may contribute to the lack of finance courses across the United States, my STS project focuses on why students lack the opportunities to learn about finance concepts in their K-12 education. On the more technical side, my technical project addresses the issue of financial illiteracy by programming a Nao robot to interactively teach elementary school students, specifically fourth and fifth graders, about certain topics within finance, topics like credit. My STS project and my technical project are closely related in that one attempts to understand the reasons for the limited finance courses while the latter attempts to implement a way to address the financial illiteracy in students. These perspectives will provide a new insight into why finance courses are not offered and discover new ways to allow students to gain the necessary finance knowledge they need while they are in school.

For the technical capstone, a Nao robot was used to interact with students to teach them about a finance topic and encourage them to learn about new finance topics starting at an early age. We chose to use a Nao robot because it is commonly used in the education and research fields, making it a suitable technology for our research. It is also able to move, speak, and listen to someone as they interact with it. Since this project is a continuation of last year's project, a lesson plan was already created from last year. We incorporated the lesson plan into Choregraphe, a technology that is used to program Nao, and used the Wizard of Oz method to test if a Nao robot is a good way of keeping students engaged in their learning. Wizard of Oz is when someone is controlling a piece of technology behind the system to allow someone to interact with that technology. At the same time, if a student needs help at any point in the lesson plan, we will give them a hint verbally or through the robot and record that data to analyze the effectiveness of using a Nao robot to teach students. To see if teaching through a robot is a good

way to keep students engaged, we had one group of students learn through robots while another group learn through worksheets. It was found that students enjoyed learning through robots much more than worksheets while both groups improved in their understanding of the finance topic that was taught.

For the STS research paper, different relevant social groups were analyzed through the lens of the Social Construction of Technology (SCOT) framework to see why there is a lack of finance courses in K-12 education in the U.S. It was discovered that teachers had low financial literacy and because of it, they lack the ability to teach finance to students. Teachers also have a lot of materials to teach to students earlier on in K-12 education, which makes it harder for more teachers to offer finance to students in early education. School boards and districts realize that finance is a complex topic that not many students take, and because of this, not a lot of resources are put into finance programs. Students also lack exposure to finance topics from not only at school but also from the people around them. Some might argue that students may not even need exposure to finance topics until after K-12 education.

Since the technical capstone and the STS project were completed at the same time, they built on each other in terms of considering a technical project from real world perspectives, especially when the two projects both try to solve the same issue in different ways. Without the STS project, I would not have understood why a robot that teaches finance was needed to help more students learn about finance, especially elementary school students. Without the technical capstone, I would not have been able to given the chance to help in the development and testing of a way to compensate for the fact that there is not a lot of teachers qualified for teaching finance. The value of having both projects at the same time introduced me to a new relevant

issue that is important to future generations' education and career and can help in discovering new ways to decrease the socioeconomic gap.