Student Information

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College: College of Engineering Iowa State University

Major(s): Software Engineering

Mentor Information

Mentor: Dr. Nicholas Fila

Department: Electrical Engineering

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Award term (select one): **Summer** or Fall

Personal Statements:

Briefly describe the research project and your role:

The research project I have been working on is creating a web-based toolkit for engineering educators based on the design thinking process. Design thinking is an iterative process commonly used in innovation and problem-solving. The five stages of design thinking are: empathize, define, ideate, prototype, and test, and there are many tools to help users throughout this process. Dr. Fila has shown that the design thinking process can be helpful in course design. The goal is to educate engineering professors in design thinking and step them through the process so they can utilize it in their course design and development.

My role as an undergraduate research assistant is to design and develop a website that will engage engineering educators in design thinking. Through our development, Dr. Fila and I have used the design thinking process, which has been very useful. We started with the empathize stage, which consisted of interviewing engineering educators at Iowa State University and understanding their needs in course design. Then, we brainstormed how to fulfill those needs in a web-based toolkit. After keening in on a journey-like structure for educators, I started developing the website in HTML, CSS, and JavaScript. We are now showing engineering educators the progress and building off their ideas and critiques, then going through the process again.

How will participating in this research experience enhance your undergraduate education and preparation for the future?

My undergraduate research with Dr. Fila will enhance my software engineering degree in many ways. First, I have learned to be proficient and engaged in a creative design process. During my courses thus far, I have been given problems and told to find a specific solution. While that is very important in a software degree, I was curious if this is how it would be in real-world development. Through research, I have discovered that problem-solving processes are more than just learning formulas and algorithms; it also includes brainstorming and creative planning. Learning about design thinking has taught me the importance of understanding users and receiving feedback.

Another way undergraduate research has prepared me for the future is by advancing my software development skills and teaching me new languages. Through developing the toolkit, I

have learned HTML, CSS, and JavaScript, three languages I did not know before. I now have experience in web development, and as I work on this project longer, I will become more advanced in front-end and back-end development. This research allows me to apply the software engineering techniques I have learned from my coursework and apply it to a creative, real-world project.

How else do you plan to present the results of this project beyond the Summer Undergraduate Research Symposium (e.g., written report, poster presentation, departmental seminar)?

After this summer, I plan to present my research at poster presentations and departmental seminars. Dr. Fila has stated that many undergraduate research assistants he has had in the past have presented at poster presentations, and he highly recommends I participate. Another way that I plan to share my research passed this summer is through departmental seminars. Dr. Fila is a part of his department's seminars and said I would be able to share and test the toolkit with the professors in the group. Since the website is designed specifically for engineering educators, I believe this would be a great way to earn feedback and better understand the users.

Student's Signature

Date: 4/09/2023

Mentor's Signature

Date: