DATE: **March 29th, 2021**

TO: **Dr. Deirdre Hunter**

FROM: **Joseph Urso**

SUBJECT: **Self-Reflection - Development of Engineering Identity**

I chose to study engineering because I enjoy problem solving and being challenged. I chose chemical engineering because of my love for chemistry and the opportunity to work in various industries. Additionally, it provides a strong foundation of general engineering knowledge. I enrolled in this course because it provides real engineering experience, such as going through the design process, working on teams, and solving real world problems.

This course has reinforced my interests. I have had the opportunity to develop skills that are not completely relevant to my major. I have enrolled in every OEDK workshop in order to develop these new skills, such as modeling or working with electronics. My team members are extremely hardworking and kind, it has been a pleasure to work with them this semester. Additionally, this project is exactly the kind of hands-on work that I’ve been searching for, while also having a significant impact on the world.

In the clarify team assignment phase, we had nearly a week to brainstorm questions for our client and to get a better understanding of the project. This is probably the most important step within the engineering design process. It’s important to understand the problem to ensure you solve the right problem. Otherwise, this could result in a significant waste of resources. This is extremely important in the workforce, as companies typically work with larger projects and resources.

In the understand problem/context phase, we primarily did research. This step allows us to identify resources and topics to further explore. Additionally, we determine which topics are irrelevant to our project. In the workforce, one should only consider topics that are relevant to the success of the design. There are tight deadlines, and time cannot be wasted on researching concepts or solutions that are irrelevant to the project.

When we defined our design criteria, it gave us quantitative goals/constraints to follow. Quantitative goals are better than qualitative goals because it is difficult to track progress on qualitative goals. In our case, when we had a qualitative design criterion, we were required to define a User Defined Scale, which helped quantify our qualitative characteristic. Defining design criteria will be important in the workforce when defining constraints or objectives of the project.

During the brainstorming process, it is important to be receptive and inclusive of all ideas. During brainstorming, a team should be thinking of all possible solutions to a problem. All ideas are welcome, there are no “bad” or “crazy” ideas. Wacky ideas can inspire other creative alternatives. No criticism is allowed so members feel inclined to share wacky ideas. It is important to be inclusive in this stage to ensure that everyone’s ideas are heard.

During the screening and scoring process, we had to choose our best solution that would move forward into prototyping. We went through the decision-making process and had to prioritize our design criteria against each other. For our solution that won, it scored very highly in all design criteria except size, which had a score of 2. Additionally, size was our most important design criteria. However, a score of 2 still satisfied our initial design criteria for size. Ultimately, we chose to continue with this solution despite its low score in our highest weighted design criteria, as this solution satisfied all of our design criteria. Decision making skills and prioritization are key skills in completing successful projects.

Currently, we are in the prototyping phase. I have learned that jumping right into your final solution is a bad idea. There are many small issues that can arise during the construction of a prototype. Prototyping in different fidelities can save a significant amount of resources. Additionally, prototyping allows room for failure. This failure can be utilized to improve the design. Prototyping is important in the workplace because ideas/solutions can be tested without using significant resources.

An engineer is someone who designs, builds, or maintains a product or service to improve the lives of other people. I chose this specific project because I have the opportunity to save lives. I felt that this project’s goals aligned the most with my goals as an engineer. When I graduate from Rice, I want to work in either the energy (renewables or oil/gas) or medical industry. As an engineer, I will have to be an effective planner, communicator, and team member. I believe my time in this course has given me the opportunity to develop the skills required to deliver successful projects in my future career.