Career Readiness Challenge

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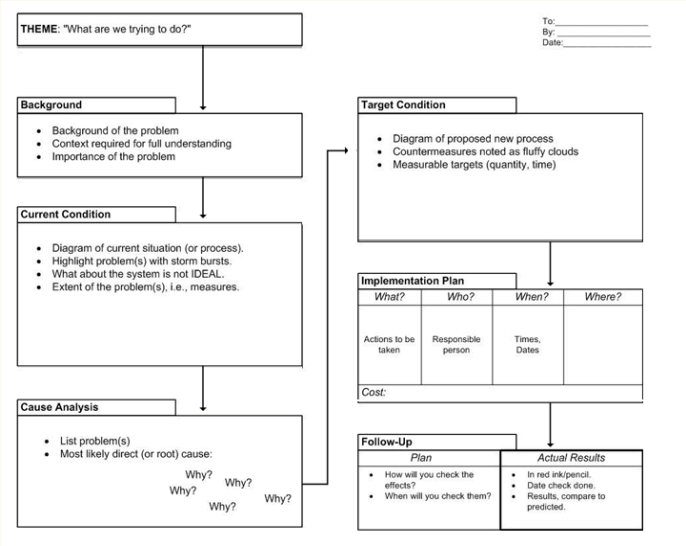
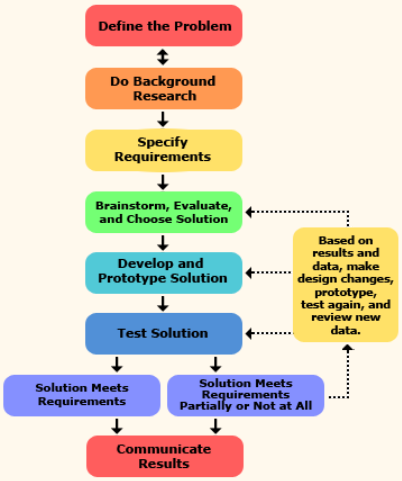
Isaiah Davis was interviewed for this challenge.





Chosen Career

For this career readiness challenge, I decided to choose Grainger as the STEM company of choice. I chose this company because in 2020, Grainger invested in automation known as the I-Pack to remedy the problem of finding bottlenecks on their conveyors. This was a big factor because of the process that the company used to find the solution. The process, which is called A3, is a way for companies to easily identify the root of their problems, and find solutions to them quicker. As you can tell, this process sounds very similar to the engineering design process. While trying to mitigate the issues in the workplace, the operations team used the A3 process to identify the root cause, while the engineering team used the engineering design process to implement the best solution.

Step One: Identify The Problem

Isaiah Davis, the Senior Director of Distribution Operations, stated “Bottlenecks were found in the conveyors, and it delayed shipments, affected sales, and impacted customer relationships with the company.”

When our team runs into a problem with our robot, we usually notice it pretty quickly because it messes up the way we perform during scrimmages. For example, we had a major weight issue that we needed to fix at a competition.

Step Two: Background Research

“The team set up cameras along the converter line over a week period of time, all while sending leaders to make observations during peak hours of the day. We also pulled data to measure the frequency of how often the line stopped during the day.”

Once we know what is wrong with our bot, we usually look back in our meeting notes and see if we have encountered any problems like this before, and if so, we see what our solution was and if it will work the issue we are currently dealing with. On our very first robot from the season, we had a similar weight issue. We fixed the problem by making both sides (front and back) equally proportional.

Step Three: Specify Requirements

“We identified our peak volume day for the three highest volume months of the year. That meant that on average we needed to be able to process thirty thousand lines on an eight hour shift, with the ability to flex plus or minus 5%.”

Our goal for our robot, no matter which one it is, is to have it score maximum points with efficiency during test runs, and eventually during competitions. We also need to be able to pick up blocks so we can score without having the weight issue hold us back from doing so.

Entire consolidation

Step Four: Brainstorm, Evaluate, and Choose Solution

“At that point, we partnered with the engineering team, and they identified that improving our consolidation process would have the most positive impact on our ability to meet our requirements. They proposed several automation solutions, and selected the best option for our facility.”

After knowing how much time we have to work with, we might think of possible solutions that we know could work for our specific problem. If nobody can think of an immediate solution, we will search online to see if anyone has ever encountered a problem like ours before and use their solution as inspiration for our own. For this particle problem of weight, we talked to other Fisher robotics teams and asked if this problem has ever occurred with their robots.

Step Five: Develop and Prototype Solution

“They used CAD Models to show what the consolidation area would look like after installations of the I-Pack machine. We also visited other companies that are currently using that technology.”

At this point, we would usually add our solution onto our robot and hope that when we test it, our robot will be at least better than it was before, and not worse. Our first prototype was to simply take off parts from the front of the robot in hopes that both parts would be equal.

Entire consolidation

Step Six: Test Solution

“What we did was, once the equipment was installed, we did a phased cutover. Meaning, we continued to consolidate products using our original method, while transitioning the process to the new automation technology.”

At step six, our team would usually test our new solution on one of the practice fields and see if our problem was fixed at all. It usually takes a couple of different versions of that one solution for it to actually work. After taking the pieces off the front, we ran into the problem of the front/intake mechanism being super flimsy. So instead we added an extra motor, that has no use other than to be weight, to the very back of the robot.

Step Seven: Solution Meets Requirements

“Once we identified that the process was successful, we transitioned the entire consolidation process over to the new automation system.”

If our solution is successful, we will permanently add it to our build and use it in our future scrimmages and competitions. The motor on the back worked a whole lot better than taking pieces off and we were able to remedy our problem.

How Robotics can be beneficial to students in the future

Personally, being in robotics has taught me how to be more cooperative in team settings and how an extra set of eyes on a problem can be beneficial in the long run of solving a problem. Being a part of the robotics team has also required me to learn how to adapt to other people’s personalities in order to be successful. As someone who plans on going into a STEAM centered career, I believe that these values can stay with me throughout the rest of my school career and into my professional one.