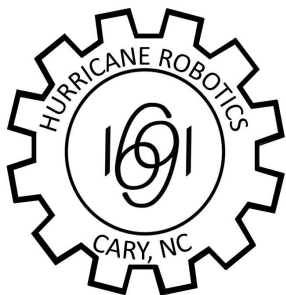# How VEX Robotics strengthens workplaces fueled by innovation

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During my time in VEX Robotics, I have found that my team's design process is heavily reliant on collaboration and research. No matter your experience in the subject, team role, or seniority, every member of the team pitches in ideas in order to design a successful robot. I have found that our design process is similar to that of the engineering design firm IDEO. IDEO is not only known for their revolutionary design work, but also for their unique approach to problem solving. I first learned of IDEO through an ABC Nightline News TV segment titled "The Deep Dive". What David Kelly, founder of IDEO, describes as "focused chaos", the IDEO design process is composed of many individuals from different backgrounds, working together to find a solution to a given problem. In the example of redesigning a shopping cart, as shown in the Deep Dive segment, design members first go out and research what the current problems with the product are by interviewing and observing. We also do research before concept development by taking a closer look at the game, the rules, and any ideas that have already been built by other teams.

Pictured: IDEO design team members interviewing a grocery store worker about any problems they commonly have with shopping carts.

When it comes to developing a solution, every member of the design team takes turns sharing possible ideas to criteria given. Ideas are chosen by voting, not by a boss or capitan. I feel this resembles our design process on my team, because not one person has a true executive decision, but the team comes together to discuss the best possible solution. Even though one member may have the most experience, as stated by IDEO project manager Peter Skillman: "Enlightened trial and error succeeds over the planning of the lone genius".

Pictured: This image shows off our group brainstorming process, in which we discuss, illustrate, and record any ideas, much like the IDEO team members in the photo to the right.

The design team at IDEO then splits into teams to solve specific criteria, just as our team splits into groups to solve specific programming and building issues. While both design processes warrant collaboration, it is sometimes best to split up the workload of certain criteria amongst the members, then reconvene for the final product.

Pictured: Shown here is the build team and programming team splitting up to accomplish different tasks needed for the final build.

After the teams have each brought an important component to the criteria, a piece from each of the prototypes is taken into account for the creation of the final design.

Pictured: These were the mock-ups of shopping carts that were made for certain criteria, such as accessibility, safety, and convenience

For the final build, everyone works together. Drawing parallels between our design process, I find that this is what we do in our final build, as it is crucial to have both the building and programming team working in unison to create a successful robot. We believe that communication is key, and too much isolation between the two parties will create an overall disconnect between the two aspects in design and functionality.
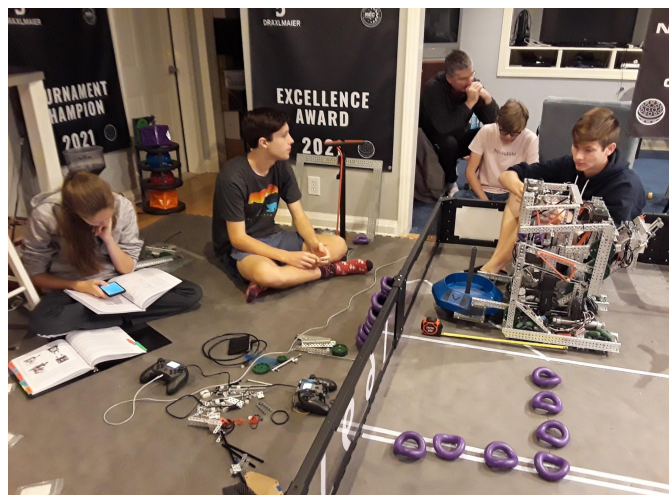
Pictured: The builders and programmer are currently working on a solution for a more effective controlling mechanism for mobile goals

So how does VEX Robotics prepare us for a future career? As the world's population grows and new problems arise every day, STEM jobs continue to arise in order to solve these issues. In this new age, IDEO's design process has become standard, as innovation thrives under collaboration. The design process is evident in every engineering field, and outlines crucial steps in solving any problem. I believe that VEX has opened up the design process in an accessible way, and has allowed many young minds to master it, rewarding us with key skills that allow us to stand out, and help us be more effective employees in the ever-growing field of STEM.

Resources Used:

https://youtu.be/izjhx17NuSE
(Highly recommended in order to further understand IDEO's design process)

https://youtu.be/GYkb6vfKMI4

https://www.ideo.com