Zooming in on the zoom Design Process

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WHY ZOOM?

Zoom is certainly no stranger to anyone after the recent COVID-19 pandemic. Created by Eric Yuan in 2011 and launched in 2013, Zoom slowly gained popularity as it continuously made improvements. In 2020, a major pivotal change occurred, COVID-19. On March 15, 2020, Zoom's popularity soared almost overnight. Since then, there has reportedly been a 2900% increase in users. Even now, with the pandemic over, Zoom still has 300 million users daily and roughly 3.5 trillion meeting minutes per year. Gaining and maintaining this success is no easy feat, and this is why we chose to analyze Zoom's design process.

To know this process better, we chose three courses of action. First, we investigated Zoom's own website to see what insight it could provide. Second, we looked at case studies published online that talked about Zoom's methods and techniques to improve and fix problems. Lastly, we interviewed Xiandong Wang, a lead technical officer at Zoom.

The Design Process

The core of engineering is fixing problems and improving. Design is a function of such. After reading “Zoom Redesign Case Study” and looking at a specific approach that Zoom employees took in response to a problem, we identified five key steps. Identifying the Problem, Analysis of the problem, Researching, Ideas, and finally Showcasing, or PARIS for short.

Identifying the Problem

Zoom identifies the first step as "...[creating] a problem statement that [summarizes] the issues that [need] to be addressed and improved" by using data gathered about the problem.

Zoom engineers also believe in formulating a "guiding question" to help lead them throughout the design process.

Similarly, we also have a guiding question in VEX: how can we make our robot the most efficient and effective?

This helps us create a problem statement that relates to maximizing the number of points we can score in our current game.

Zoom's problem statement:

How might we create a Zoom experience that centralizes and simplifies the invitation process?

Our problem statement:

How might we create a robot that maximizes points earned by both our own team and our alliance team while preventing our opponents from doing the same?

Analysis of the problem

To do this, Zoom tells us to first analyze the information we know about our problem.

We know that:

Each *Disc Scored* in a *High Goal*	5 Points
Each *Disc Scored* in a *Low Goal*	1 Point
Each *Owned Roller*	10 Points
Each *Covered* Field Tile	3 Points
Winner of the *Autonomous Bonus*	10 Points

Therefore, we must prioritize rollers and shooting discs in the high goal because this will maximize our points while also minimizing the time taken because we will not waste time with lesser point values.

Research potential solutions

The next step is research. Zoom's approach is "analyzing competitors" by creating a table of their strengths and WOW points. They also take user surveys and interviews.

We apply this to ourselves by researching other bots and watching robot reveals on YouTube. This gives us insight into what works well for other robots. An overall trend is seeing flex wheel intakes as well as Mechanum and X-wheel drivetrains.

Zoom's table

COMPANY	STRENGTH	WOW FACTOR
Google Meets	Simple and user-friendly dashboard for many age groups	Google meets is fully integrated with the Google Suite, meaning users are able to join video calls through Google Calendar and Gmail.
Microsoft Teams	Offers a seamless experience for users to create and invite participants to meetings	Microsoft teams offers a calendar page that allows users to easily see their upcoming meetings and invite others on the same platform
Skype	People-oriented application that promotes conversation	Skype offers the ability to customize groups and allows users to communicate through a simple chat feature

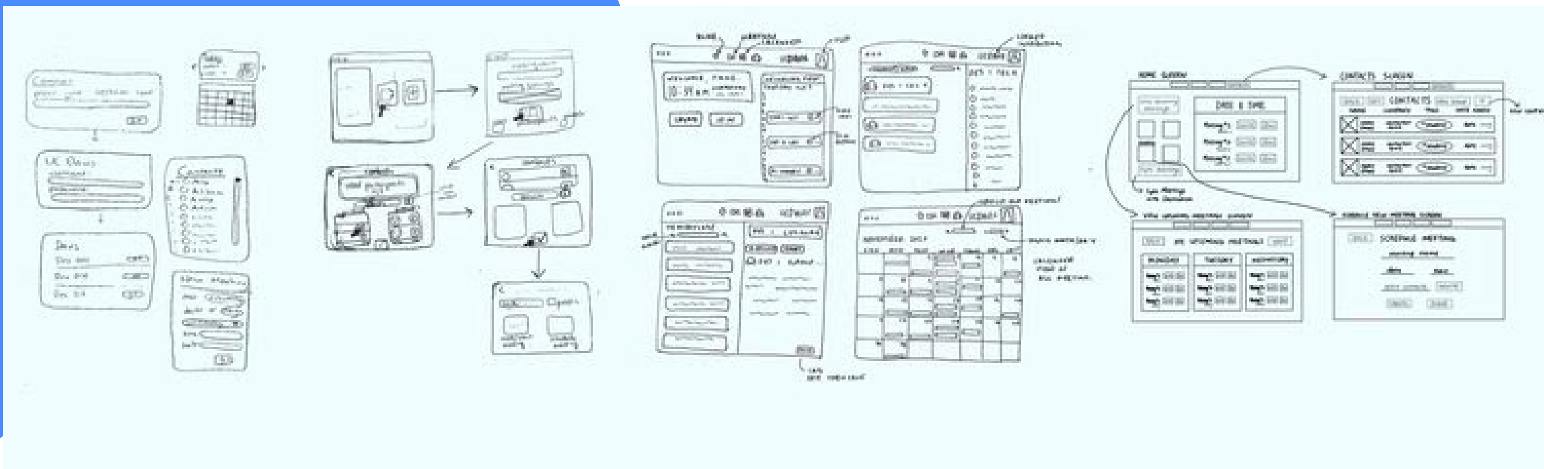
Our table

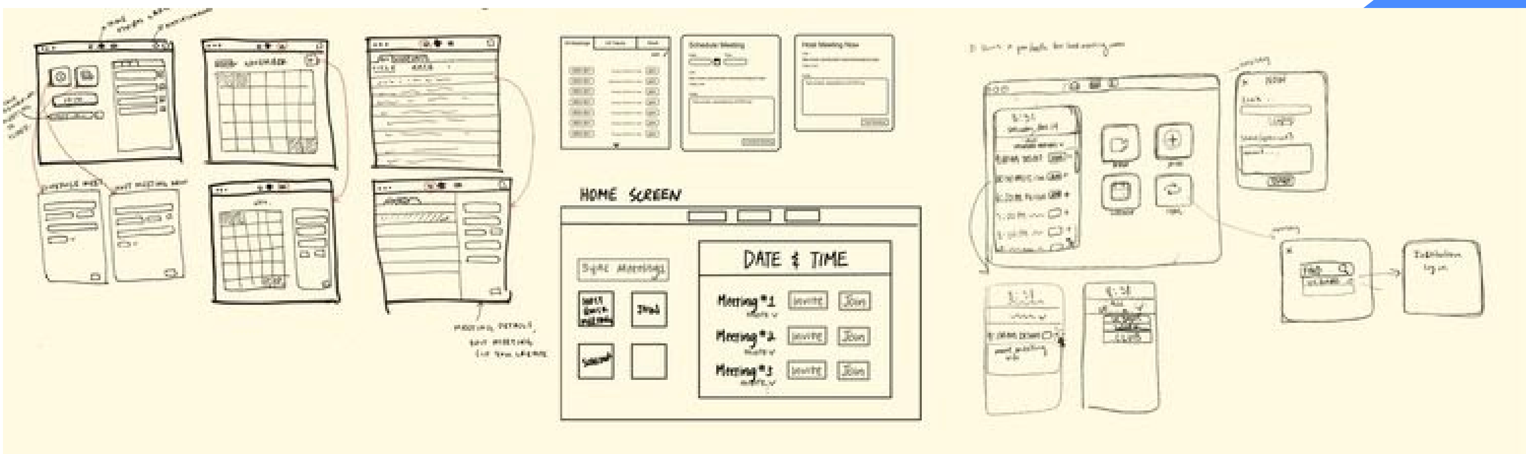
Mechanism	strength	WOW factor
Mechanum Drive	can move quickly and get over rough terrain (disks)	can move LEFT and RIGHT without having to turn, allowing easier aiming and rollers
X-drive	can move quickly and get over rough terrain (disks)	can move LEFT and RIGHT without having to turn, allowing easier aiming and rollers + easier to code than mechanum
Flex-wheel intake	intakes disks smoothly and easily	Seamlessly takes in disks while the robot is running around which allows intaking and shooting to be more efficient
Pneumatic launcher	shoots extremely well, just a flick of the pneumatic piston	Very simple design but does the job extremely well and is better for aiming because it shoots straight
Flexwheel launcher	shoots well as well as easy to integrate	works extremely smoothly and can shoot further and higher

Zoom used an "affinity mapping activity in which [they] wrote out [their] findings and organized each thought into specific categories." They then voted on the points that were most frequently brought up.

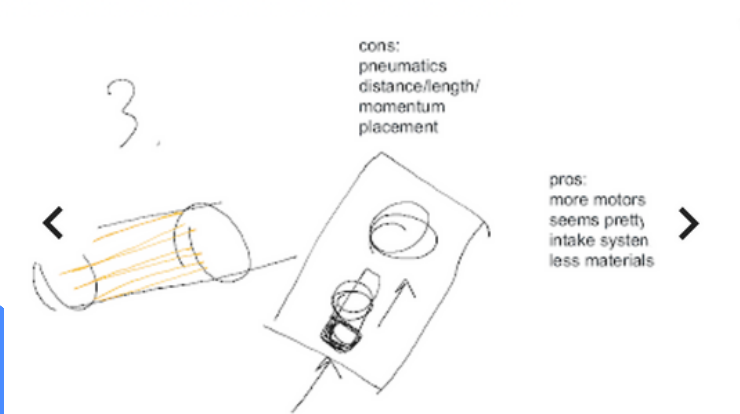
Following this, we used a Jamboard and put different mechanisms on each slide and voted. We ended up voting on a omni-directional drivetrain, flex wheel intake, flex wheel shooter, pneumatic extensions, and a conveyer belt system.

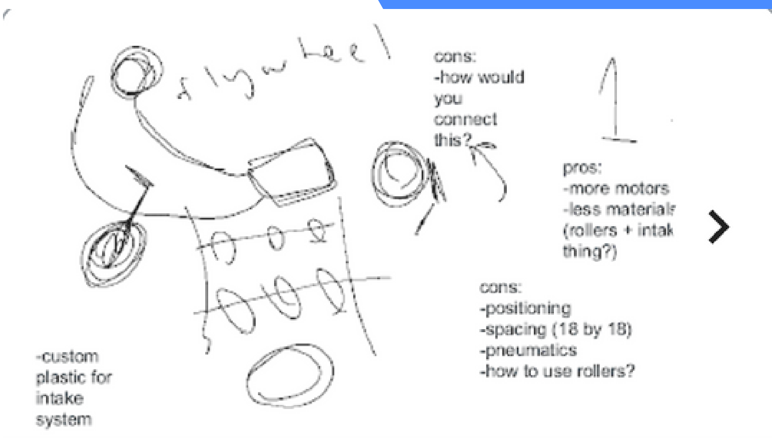
Zoom's sketches:

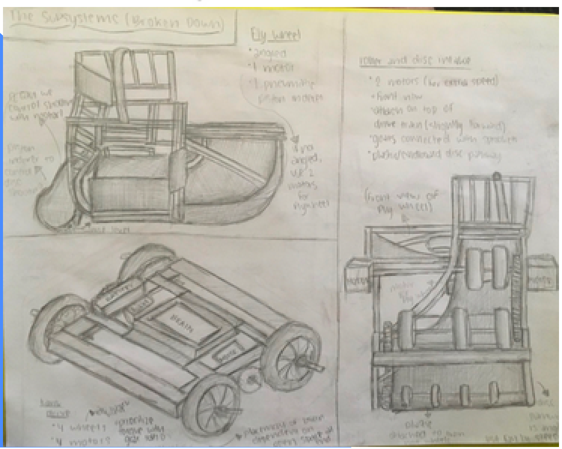


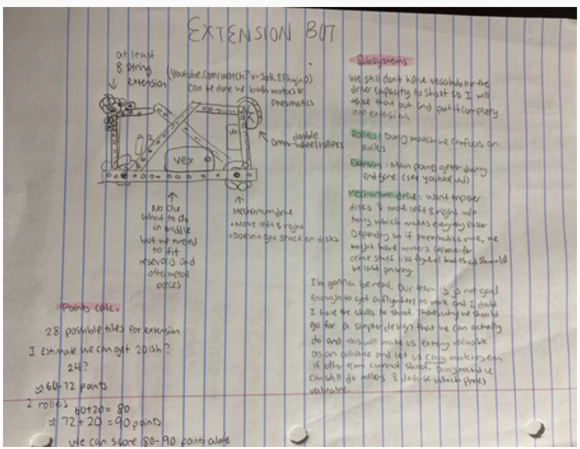


Our sketches:









Ideation/prototyping

The Zoom team began their own round of sketching designs using the functions that they voted on together. This was to help them see “whether or not [their] ideas were cohesive and created a setting that addressed [their] users’ pain points.”

We did that and came up with a final design that we were all happy with.

Prototyping:

Zoom noted that during their prototyping stage, they would “conduct user testing to see if [their] designs were actually effective.” We implemented this by consulting the driver after every mechanism was built since the driver was the main ‘user.’

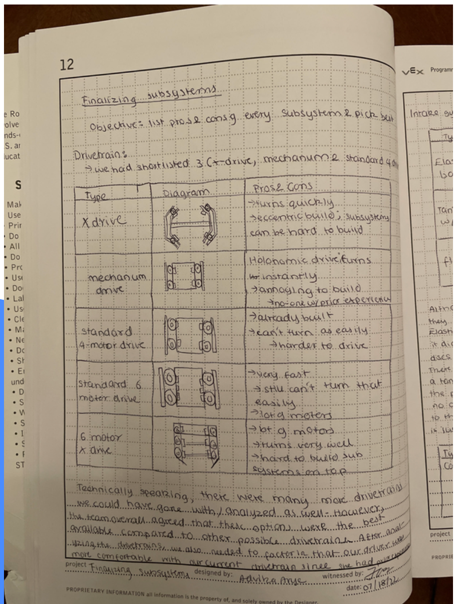
Some examples:

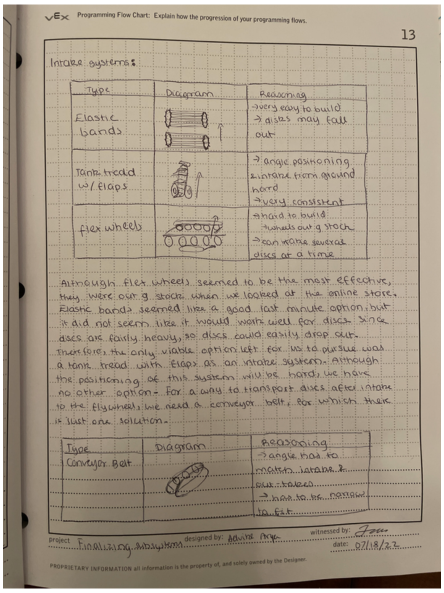
After building the drivetrain, we asked our driver to test it out, and we realized that the c-channels were too low to go over the disks. We then moved the c-channels up higher, making it easier to drive over discs.

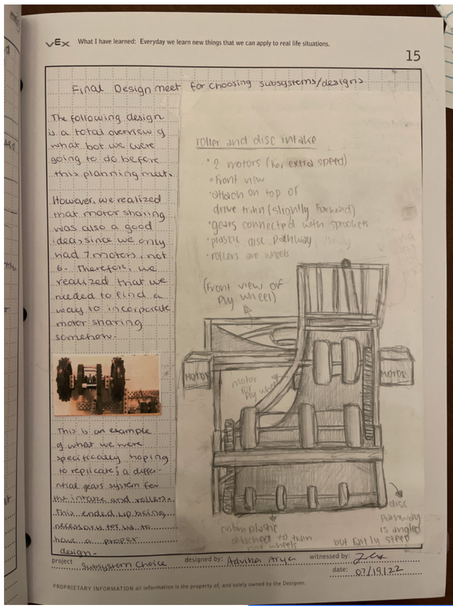
At first, our conveyor belt was a two-part system so that we could store discs inside our conveyer belt. However, after the driver tested it, she noted that it was confusing because there were too many buttons, so we removed it and created a more straightforward, one-part system.

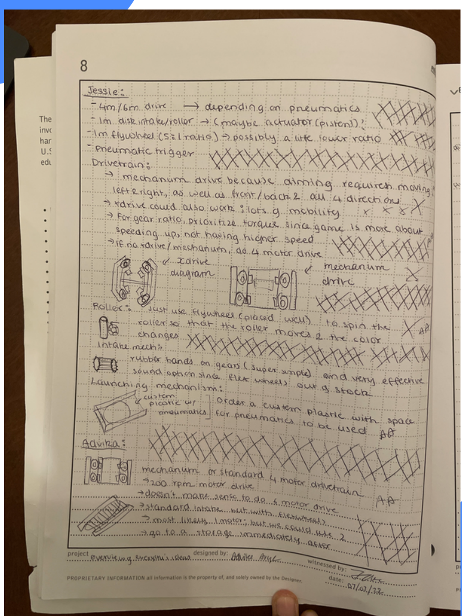
Showcase

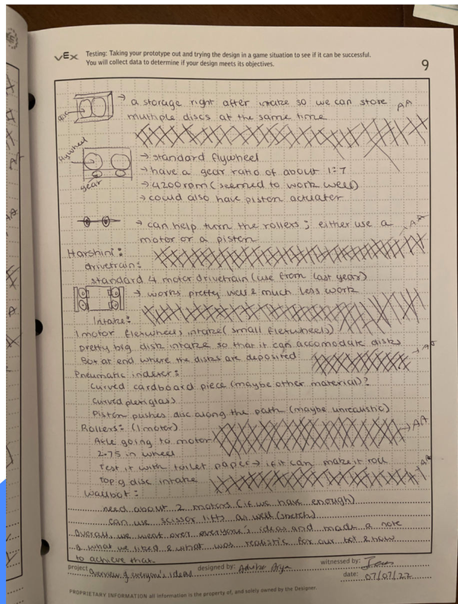
Now that the prototypes are finished, we recorded the steps into our notebook to be able to recreate and redesign later on.

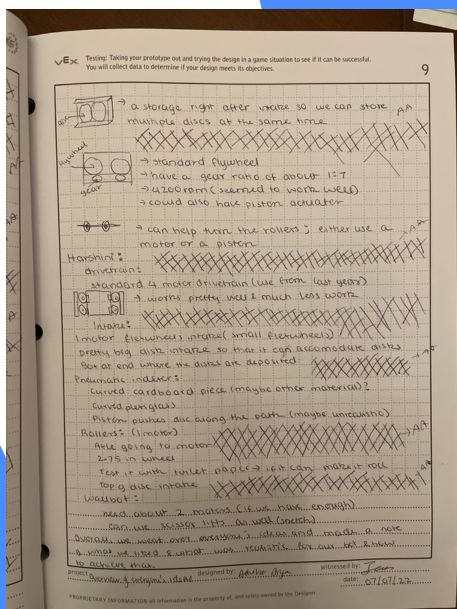












Zooming into the future

Researching Zoom and its design process has shed light on the important characteristics of all STEM companies and careers. Not only do students strengthen their technical skills of building, coding, strategizing, and documenting through their involvement in VEX, but they also learn the important fundamentals of working in a team: collaboration, leadership, and communication.

In companies like Zoom, to maximize efficiency and time, work is split between different groups, each with its own task. Similarly, our VEX team has many different groups, each with a role to contribute to a finished product, a robot in this case.

Furthermore, VEX sharpens students' problem-solving skills. In companies like Zoom, there are many possible errors that could occur. This includes security issues, glitching, etc. Similarly, in VEX, these errors will occur. Your robot's battery may overheat or the gears may stop meshing. In situations like this, it is important for team members to be ready to face any challenge that comes their way.

By introducing students to successful aspects of a team and skills crucial to any company, VEX Robotics prepares students for their future careers!

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