

Make It Real
CAD Engineering
Challenge Sponsored by Autodesk



MEET WRITY



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Word Count: 880
(not including title page)



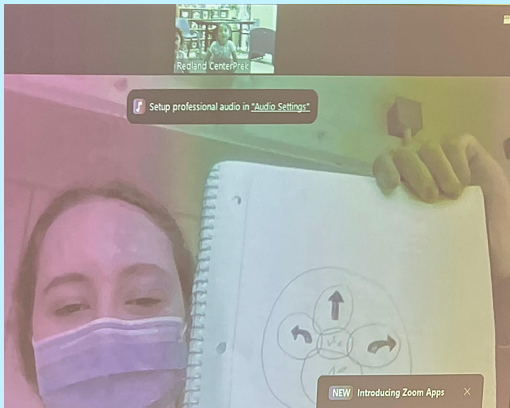
INTRODUCTION

Four years ago, members of our team started a non-profit called RoCOut. RoCOut, which stands for Robotics Community Outreach, links high schoolers with robotics experience to elementary and pre-schools interested in starting robotics programs. Over the years, RoCOut has helped found and coach VEX IQ teams at local schools, as well as teach preschoolers about robotics using the VEX 123 product line.



INTRODUCTION (CONTINUED)

Each time we taught at the pre-schools we work with, somebody would say a special word. The word itself didn't matter so much as the letter it started with, which was what made it special. RoCOut volunteers were introduced to the concept of a "letter of the day." The pre-schoolers were learning letters at the same time we were teaching them about robotics; we thought integrating the concepts would help them learn both better. This was the inspiration for Writy, our 2023 Vex Online Autodesk CAD Engineering Challenge Submission.



DESIGN

Wryty's design features two main components: one that affixes to the VEX 123 robot using the VEX-provided extension and the second that holds onto the writing device. The first part ("the affixer") uses 1x1 connector pins that links Wryty to the VEX 123 robot. This component has a 1x2 beam that is placed to interface with the robot. The second component was made for a children's marker, but can hold various writing instruments (up to 10 mm diameter). The insets in the second component allow for a rubber band that can hold onto different writing instruments.

Figure 1

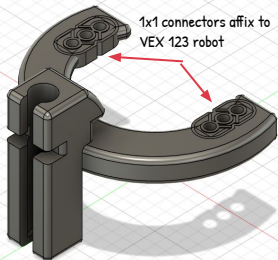
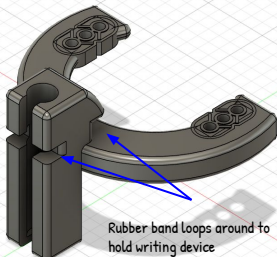


Figure 2



DESIGN (CONTINUED)

We rounded the edges to avoid any sharpness. We also printed the object using a moderately flexible material (nylon) so that it would be as safe as possible.

The empty space above allows access to the VEX 123 robot's buttons.

Figure 3

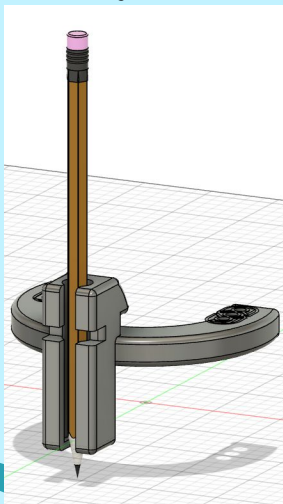
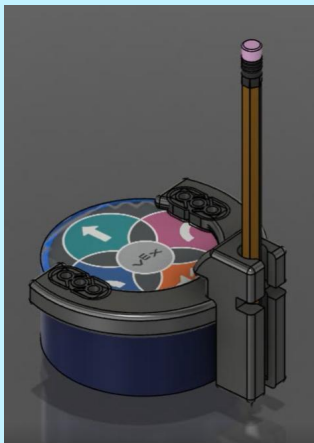


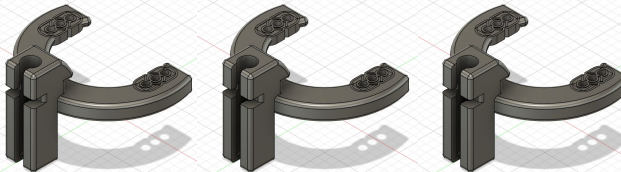
Figure 4



USING FUSION 360

To construct Wriety, we used Autodesk Fusion 360 version 2.0.14793. We began by making two cylinders, then using the smaller cylinder with the join function to cut out the empty space. Next, we used a box again with the join and cut functions to remove the front part of the empty cylinder. This allows more access to the robot's buttons. Then, using the Fillet function, we rounded the edges. We added a box and used the chamfer function to create an overhang where a rubber band could be placed in the front. Another box and the join cut functions created the other inset where the rubber band would go. A smaller slender cylinder was used to construct the part of Wriety that held the writing device (again using join and cut functions). This was repeated at the base of the writing utensil holder to make a hole for the tip of the writing device. Making a box and using join and cut allowed for the opening at the back. The fillet function was used again to round out the rest of the edges. Then, a 1x2 beam was imported into Autodesk Fusion 360 and placed appropriately to line up with the VEX 123 robot. Lastly, we also used the animation functions.

Figure 5



3D PRINTING

We printed Wriety with a Dremel 3D45 printer using nylon filament. At first, we printed Wriety with the writing utensil base down, as this used less scaffolding. However, due to the printer and the material this made an unusable product due to excess filament depositing in areas we could not clear. Changing the orientation to mimic how Wriety would be used allowed for a more successful print at the expense of using more filament for scaffolding. This is one of the many things we learned while competing in the Autodesk “Make It Real” Challenge.

Figure 6



TRIALING

The first lesson in many programming courses usually instructs students to write a program that says hello to the world. We thought Writy should say hello first, too. Figure 7 and 8 below show our program and the result, respectively. You may also view the accompanying video to watch Writy write.

Figure 7

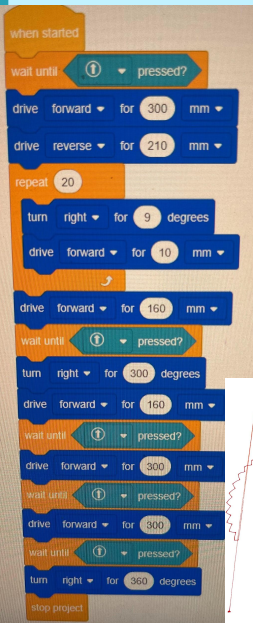


Figure 8



CONCLUSION

The VEX online challenges are a great way to augment learning. Through participating in the Autocad “Make it Real” Challenge, we problem solved and deepened our understanding of Autocad Fusion 360 and 3D printing in general. The online challenge also inspired us to think about how we can make RoCOut more effective. The purpose of Writy is to connect robotics with learning to read and write. By crossing multiple disciplines and providing a dynamic platform for learning, Writy makes learning more engaging and memorable.

An aspect of the VEX platform we admire is its ability to bridge all age groups. RoCOut strives to teach STEM to pre-school through elementary age groups. With the VEX product lines and small additions like Writy, our mission is easier to accomplish.



ACKNOWLEDGEMENTS

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Background from Slidesgo

