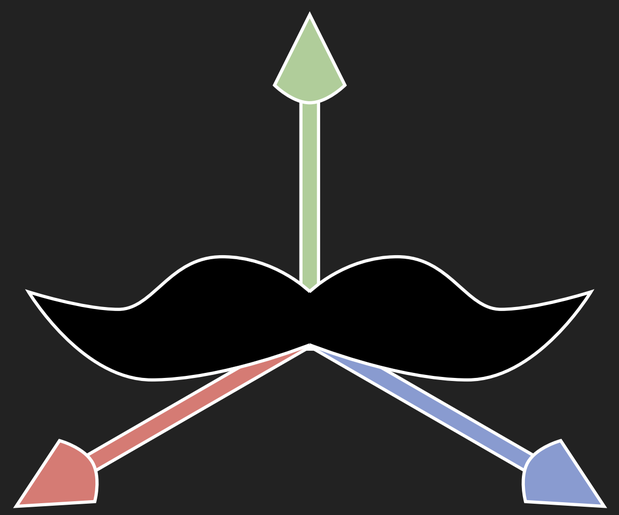

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a math learning tool for the future
on Hololens 2

DUBHACKS

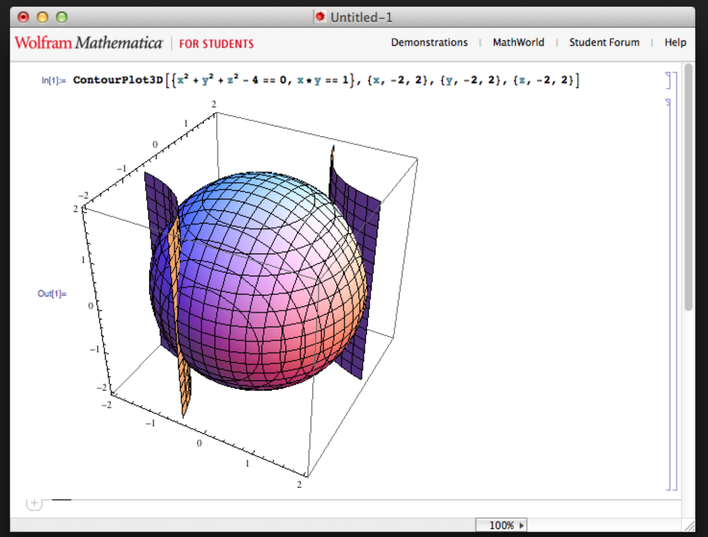
Problem Statement

How might we allow teachers and students to better visualize and understand complex math equations?

DUBHACKS

Research

Existing math visualization solutions include online graphing tools such as Wolfram Alpha and GeoGebra. However, they fall short in interactivity and ease of use. Studies have shown that the incorporation of interactive learning technologies help students, including disabled students, learn better.



Castaño-Muñoz, J. , Duart, J. M. and Sancho-Vinuesa, T. (2014), The Internet in face-to-face higher education. Br J Educ Technol, 45: 149-159. doi:10.1111/bjet.12007

García-Carrión R, Molina Roldán S and Roca Campos E (2018) Interactive Learning Environments for the Educational Improvement of Students With Disabilities in Special Schools. Front. Psychol. 9:1744. doi: 10.3389/fpsyg.2018.01744

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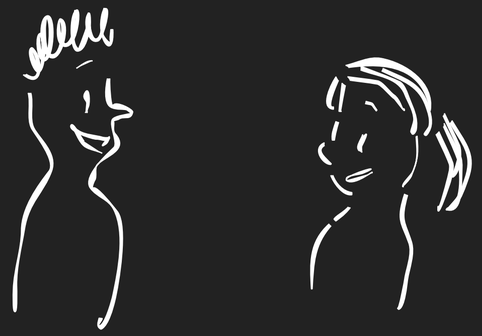
Design Requirements

Interactive

Users are able to explore visualizations in a meaningful way



Engaging

Users are encouraged to interact, it should be fun!

Ease of use

Controls and UI are intuitive and accessible for users of all abilities

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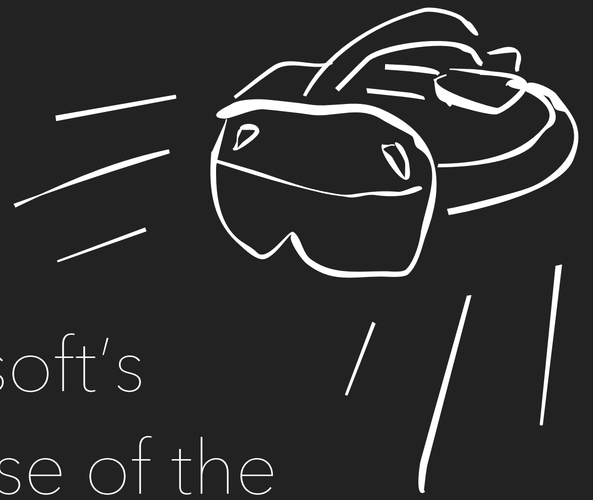
Ideation



The technology that drove our ideation was Microsoft's Hololens 2. We wanted to utilize this device because of the inherent interactivity which comes with mixed reality and precise controls it affords.

We considered different ways of inputting and visualizing equations, and ultimately settled on converting handwritten equations into 3D graphs which can be manipulated.

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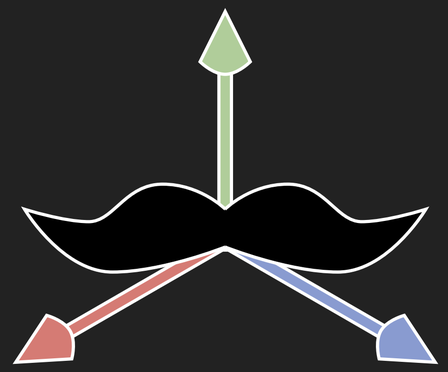
Our Solution



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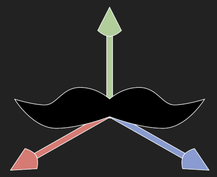

How It Works

1. Write a math equation you would like to graph
2. Look at it through the Hololens 2
3. Set the bounding box around the equation and press 'Submit'
4. See and interact with the generated graph

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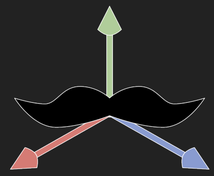

Next Steps

- Implement support for long distance collaboration and ability for multiple users to view the same graph
- Tooltips on the graph to show details about the graph such as extrema
- Implement ability to view multiple graphs overlayed simaltaneously and details about their intersection

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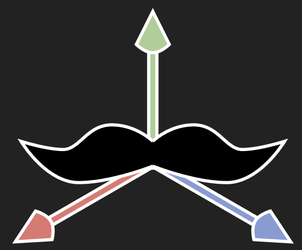
Thank you!



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