



**Mentor**  
Dr. Anton Dahbura

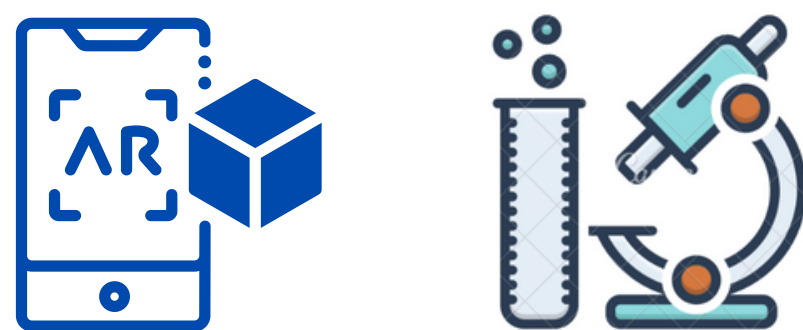
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## Introduction

The Quest2Learn program uses gaming and simulation to engage students in the learning process, and we are studying its effectiveness as an educational tool for virtual lab classes during the COVID-19 pandemic. Our team has developed 6 lab modules for iOS and Android devices to help students practice lab skills without physical equipment and improve their tactile-based learning skills.

With guidance from Dr. Pearlman and Dr. Johnson, we integrated our virtual lab into biology and biochemistry labs and collected feedback through post-lab surveys and interviews to enhance our UI/UX.



## Objective

The Quest2Learn app aims to make learning more interactive and accessible, regardless of the students' location and available resources. We intend to expand the app's scope and cater to a wider range of scientific disciplines, such as physics, environmental science, and geology.

Additionally, our team aims to gather feedback from users to refine and improve the app continually. The app's success will be measured by its ability to improve students' learning outcomes, increase their engagement with scientific concepts, and enable them to develop practical skills that can be applied in the real world.

## Methodology

The implementation of our app for virtual labs involves several stages of methodology.

- **User research:** Conduct in-depth research to understand users' needs and requirements.
- **Prototype development:** Create a working model of the app for testing and refining features.
- **User interviews and feedback gathering:** Collect feedback from users to identify areas of improvement.
- **Refinement of prototype:** Refine the prototype based on user feedback.
- **Focus on improving UI/UX:** Emphasize improving the app's user interface and user experience.
- **Collect surveys from students:** Gather surveys from students to evaluate app engagement and satisfaction.
- **Analyze phone recordings from interviews:** Analyze recordings of user interactions for further insights.
- **Refine and finalize lab module:** Make iterative changes to the app based on data and feedback.
- **Ensure app meets needs of target audience:** Aim to create an AR app that meets the needs of the target audience through an iterative approach.

## Conclusion

Our AR virtual lab app offers an immersive and interactive laboratory experience using augmented reality technology. Users can engage in virtual lab activities to gain hands-on experience and improve their lab skills in a safe environment. The app helps users prepare for real-life labs by allowing them to practice and familiarize themselves with lab techniques and equipment. It can also serve as a cost-effective substitute for simple labs, making it accessible to educational institutions. Our goal is to revolutionize laboratory education by offering a dynamic and engaging learning experience through our AR virtual lab app.

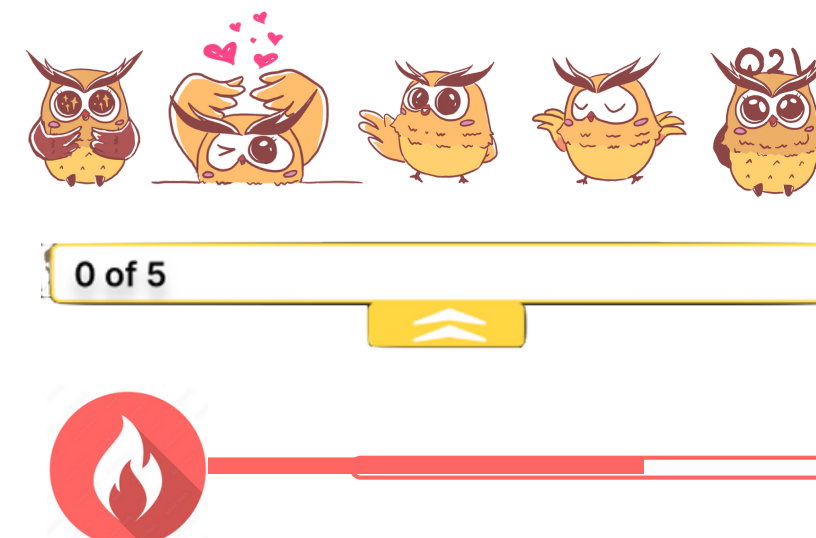


## Results

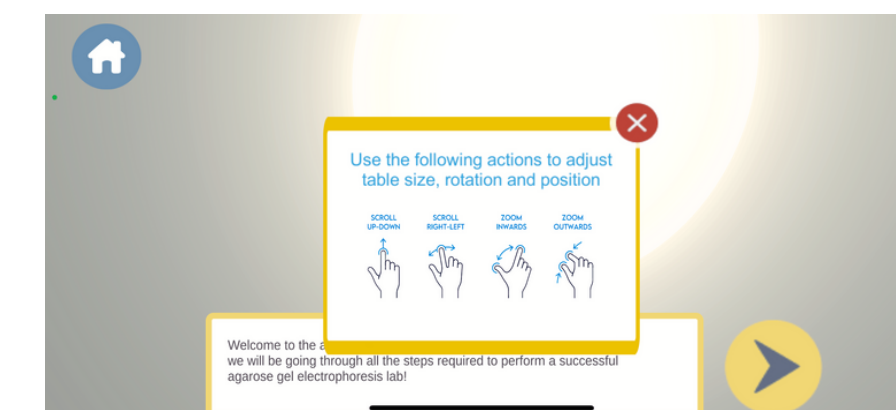


We have successfully implemented a variety of virtual labs in our system, including the **Analytic Lab**, **Calibration Lab**, **Centrifugal Concentrator Lab**, **Horizontal Gel Electrophoresis Lab**, and **Micropipette Lab**.

Our virtual lab app offers several key features to enhance the user experience. Users can choose laboratory equipment based on instructions and add them to a table for easy reference. They can also zoom in and out for a detailed 360-degree view of the equipment. Interactive animations provide visual demonstrations of equipment operation. Additionally, the app includes other interactive items, such as manipulating a micropipette or practicing filling up a gel tank. These features create an immersive learning experience where users can actively participate and practice skills in a safe virtual environment. Our virtual lab app is designed to facilitate effective learning and skill development through a combination of equipment selection, detailed views, interactive animations, and additional interactive items.

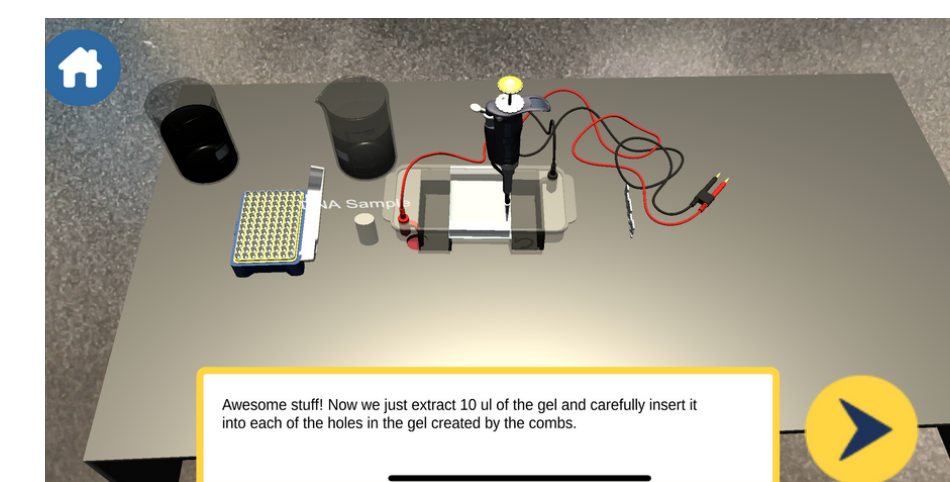
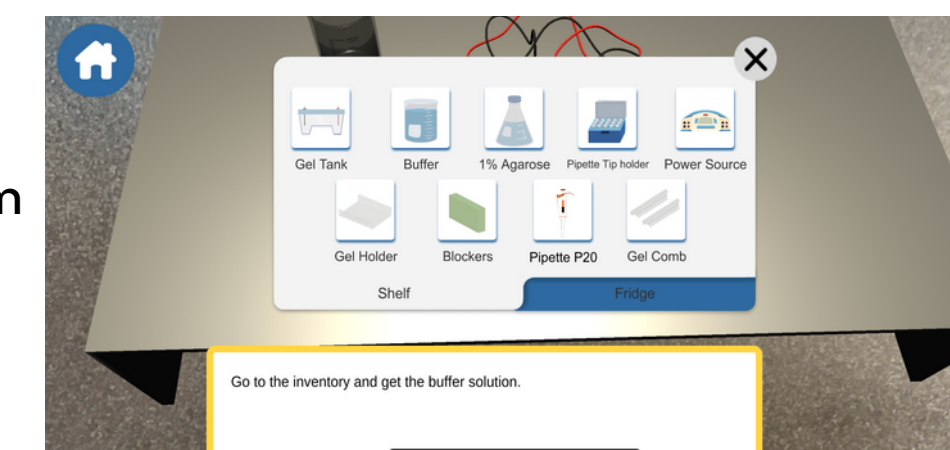


We are prototyping new features for our virtual labs, including a mascot owl for playful engagement, a progress bar to track user progress, and streak counts to encourage consistent learning habits. These features aim to enhance user experience, motivation, and progress tracking.



According to the opinions and advice we got from surveys, interviews and observation UX testing, We decided to make a pop-up window that reminds the user of the rotating and scrolling feature.

## Horizontal Gel Electrophoresis Lab



# Explore more labs with our app!