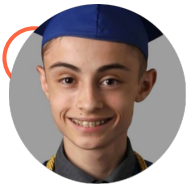


# Diverse Makers



**Daniel  
Minichetti**  
Lead



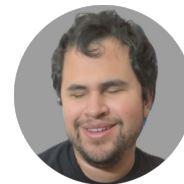
**Kane  
Davidson**  
Architect



**Eduardo  
De La Rosa**  
QA



**Elleana  
Negrelli**  
Recorder



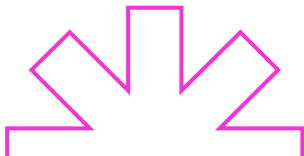
**Aaron  
Ramirez**  
Communicator



**CS Faculty**  
Isaac  
Shaffer



**Capstone Mentor**  
Vahid  
Nikoonejad Fard



# About our Client



**Dr. Jared Duval**

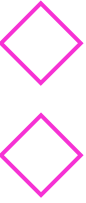
*Assistant Professor* – SICCS NAU  
Director of Playful Health Technology Lab

## Experience in the Field

- Uses research through design to develop therapy games and playful applications that help improve and maintain health

## Research Focus

- Specializes in serious games for health that emphasize human-computer interaction with assistive technology





# Lack of STEM Accessibility



## Current STEM Landscape

*“Over 40 million Americans have a disability, however, research shows that disabled people are severely underrepresented in STEM fields. So much so that only 3% of people in the STEM workforce have a disability.”*

## Potential Solution

- STEM learning opportunities are not equally accessible to those with disabilities
- Makerspaces offer hands-on STEM learning outside school

**cocoop**



# Issues in STEM Accessibility



## Limited Physical Access to Makerspaces

- Many makerspaces are not physically accessible to individuals with disabilities



## Lack of Accessible Learning Resources

- Current STEM materials and maker project guides do not cater to diverse learning needs



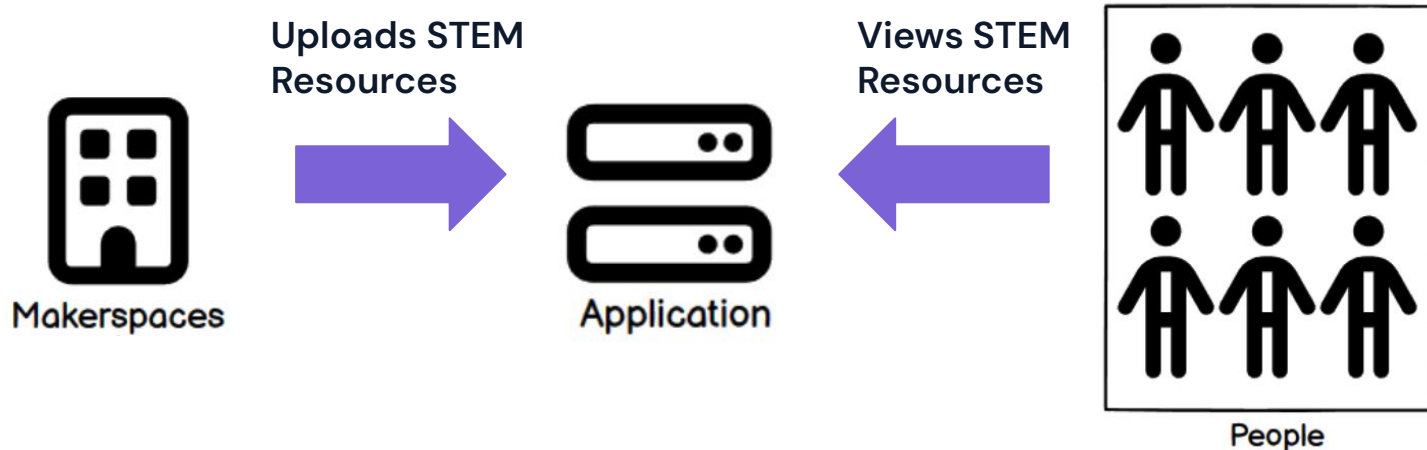
## Social Isolation in STEM Fields

- Those with disabilities face social barriers leading to a lack of community

# Making STEM More Accessible

Crowdsourced mobile application serves as a central hub for sharing STEM resources

- Provides STEM resource hosting and sharing for makerspaces
- Accessible interface and STEM content supporting multiple disabilities
- Allows users to discover and connect with local makerspaces with custom profiles



# Requirements and Specifications

## Functional Requirements

- Secure user authentication
- Resource hosting for STEM content
- Accessible UI for multiple disabilities
- Location-based makerspace discovery
- Search and filter system



## Performance Requirements

- Cross-platform compatibility
- Responsive layout and design
- Optimized data retrieval for STEM content
- Real-time updates and synchronization

# Architecture and Implementation

## System Architecture Components

- User Interface
  - Buttons, navigation, and accessibility options
- Business Logic
  - Data validation, organization, and rules
- Data Access
  - Data storage, modification, and retrieval



## Implementation Details

### Frontend: React Native

- Cross-platform consistency
- Accessible UI components with React Paper
- Material Design principles

### Backend: Google Firebase

- User authentication services
- Real-time database for hosting
- Search and filter functionality



# Prototype Demonstration

## Scenario 1: Visual Impairment User

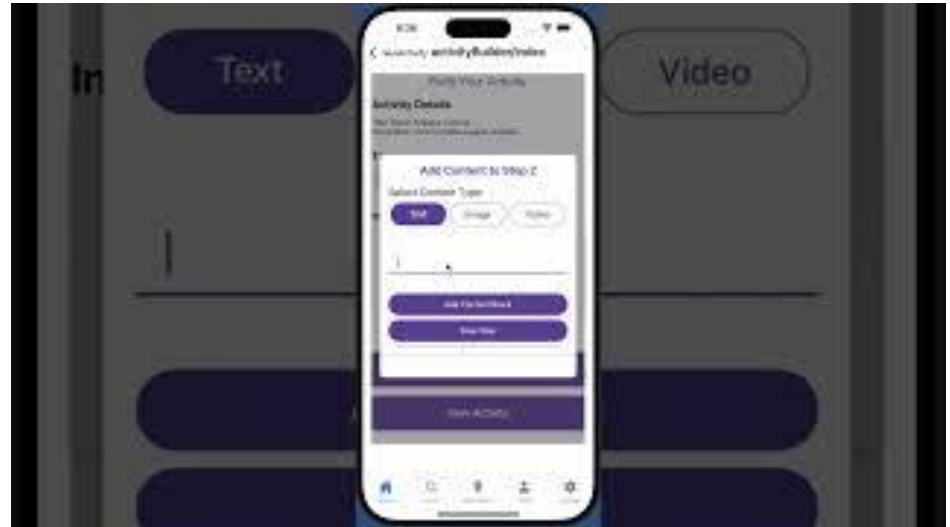
- Account creation and login
- High contrast mode
- Font size adjustment

## Scenario 2: Content Creation

- STEM Resource creation and upload

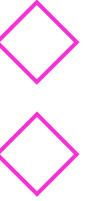
## Scenario 3: Community Connection

- Makerspace discovery
- Profile interaction





# Challenges and Resolutions



## Unintuitive system for Makerspaces

- Problem: Poor design of application could lead to low usage and contribution
- Resolution: Communication with client and key stakeholders



## Disability Negligence

- Problem: Unintended negligence of certain disabilities when accommodating for others
- Resolution: Follow proper design principles such as WCAG



# Testing Plan

## Testing Distribution

- Unit Testing (50%)
  - Core component functionalities
  - User authentication, content management, accessibility features
- Integration Testing (25%)
  - Front-end and back-end communication
- Usability Testing (25%)
  - End user validation

## Key Metrics

- Task completion rates
- Error rates
- User satisfaction scores
- Accessibility compliance





# Diverse Makers Project Schedule

## Gantt Chart

TASK MILESTONES	FALL 2024 SEMESTER			
	September	October	November	December
User Interface Design Prototypes	█			
Set Up Data Access Component		█		
Frontend Implementation		█		
Set Up Business Logic Component		█		
Unit Testing			█	
Integration Testing			█	
Usability Testing			█	
Feedback Integration			█	
Application Deployment				█

**NOW**



# Future Work



## Project Importance

Breaking barriers in STEM learning opportunities



## Solution

Mobile application enforces usability and accessibility



## Implementation

React Native, Google Firebase, and Google Firestore



## Future Steps

Deployment of our modular application for ease of future development

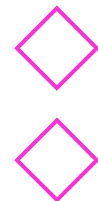


Iteration of new features onto the application to expand social connection



Continue transforming the STEM education landscape





**Thank you!**  
**Any Questions?**

