

# MySTEMGrowth Application

Senior Design II

IRP Presentation

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# Team Introductions

**sdmay26-27**

# Agenda

**Introduction** [04 - 08]

**User Types** [09 - 12]

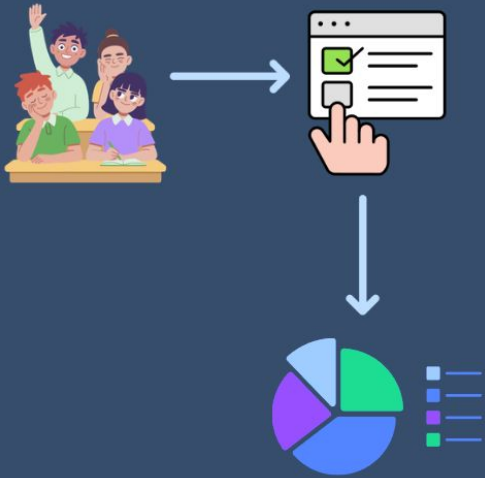
**Design Overview** [13 - 15]

**Implementation** [16 - 21]

**Testing** [22 - 23]

**Production** [24]

# MySTEMGrowth App



**What?**

→ A survey tool

**Who?**

→ Students

**Why?**

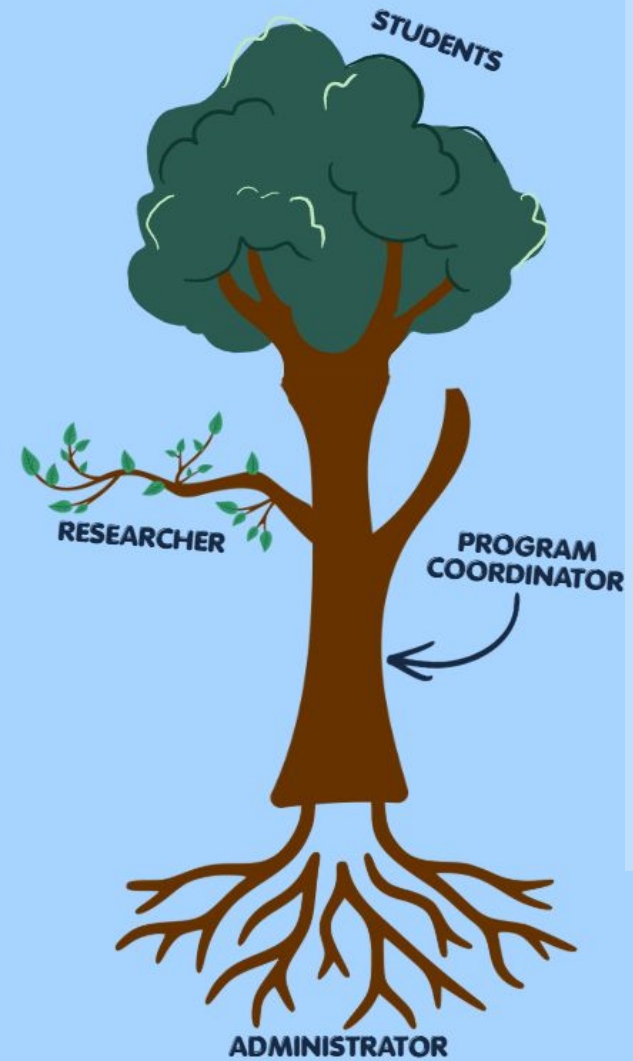
→ Visualize growth



# Our solution

Strengthen all aspects of the application:

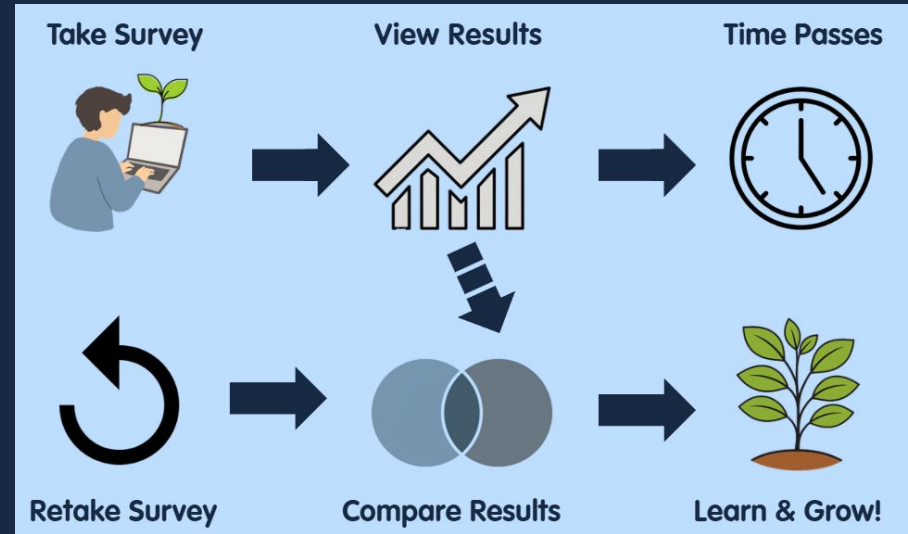
- Enhanced UI for all user types
- Survey upgrades
- Improved overall functionality
- Implemented security measures



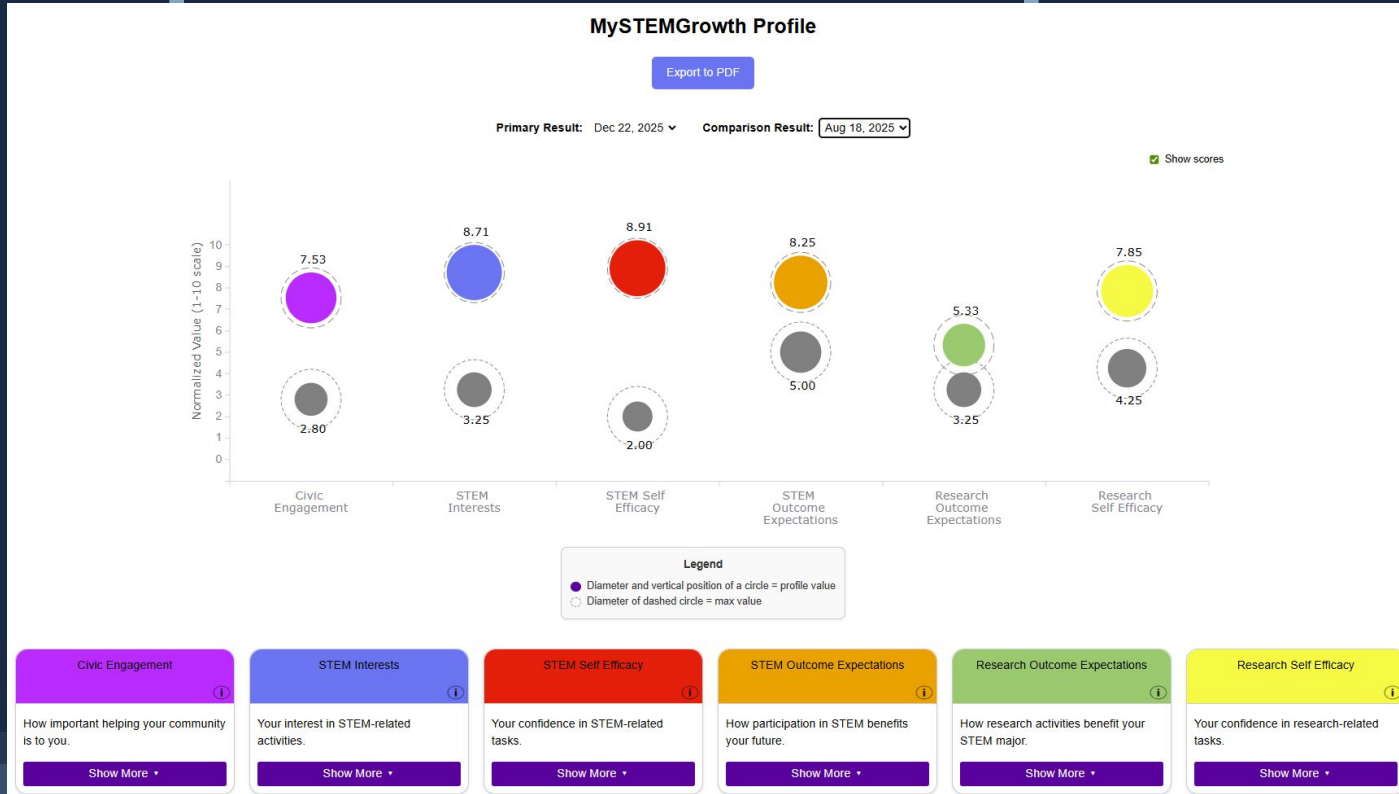
# What is the MySTEMGrowth Application?

An undergraduate research survey tool

- Allows students to visualize their growth overtime
  - Community Engagement
  - STEM Career Expectations
  - STEM Interest
  - STEM Self-Efficacy
  - Research Outcome Expectations
  - Research Self-Efficacy



# Sample Student Comparisons



# User Types



## Students

- Join programs
- Take surveys
- View & compare results
- Access program resources
- Edit account information

The screenshot displays the 'My Programs' section of the MySTEMGrowth website. At the top, there is a navigation bar with links for 'About', 'Dashboard', 'Settings', and 'Help', and a 'Sign Out' button on the right. The main content area is titled 'My Programs' and contains several interactive elements:

- Summer Scholars Program:** A card showing 'Survey Status' as 'Last taken: Never taken' and a 'View Program' button.
- Research Immersion Program:** A card showing 'Survey Status' as 'Last taken: Never taken' and a 'View Program' button.
- Join a New Program:** A card with a text input field containing 'e.g. STEM-2026' and a 'Join' button. The text below the input says 'Enter the program code provided by your teacher or administrator.'
- View All Results:** A card with the text 'View your survey results across all programs in one place.' and a 'View' button.

# User Types

MyS<sup>7</sup>EMGrowth [About](#) [Dashboard](#) [Settings](#) [Help](#) [Sign Out](#)

Hello, Program Coordinator

### Manage Programs +

Active ▾

**Summer Scholars Program** [Archive](#) [Delete](#)

Students  
0 Enrolled  
Latest Survey Status  
0 Surveys Completed • Last Updated N/A  
Program Term  
Summer (05/17/2026 - 08/13/2026)  
Pending Tasks  
0 Pending Tasks  
Resources  
2 Resources

[View Program](#) [Add Resource](#)

**Research Immersion Program** [Archive](#) [Delete](#)

Students  
0 Enrolled  
Latest Survey Status  
0 Surveys Completed • Last Updated N/A  
Program Term  
Fall (08/23/2026 - 12/10/2026)  
Pending Tasks  
0 Pending Tasks  
Resources  
0 Resources

[View Program](#) [Add Resource](#)

**Research Development Program** [Archive](#) [Delete](#)

Students  
0 Enrolled  
Latest Survey Status  
0 Surveys Completed • Last Updated N/A  
Program Term  
Fall (08/23/2026 - 12/10/2026)  
Pending Tasks  
0 Pending Tasks  
Resources  
0 Resources

[View Program](#) [Add Resource](#)

### Manage Resources +

Search Resources

**Accommodations**  
Accommodations at Iowa State University  
<https://iastate.edu>

[View](#) [Edit](#) [Delete](#)

**Student Health**  
Student Health at Iowa State University  
<https://iastate.edu/health>

[View](#) [Edit](#) [Delete](#)

**Mental Health**  
Mental Health at Iowa State University  
<https://www.wellbeing.iastate.edu/care-resources>

[View](#) [Edit](#) [Delete](#)

## Program Coordinators

- Manage programs
  - Add/remove students
  - Share surveys
  - Manage student survey progress
  - Export results
  - Generate program codes
- Add program resources
- Create to-do lists

# User Types

## MySTEMGrowth Admin Dashboard

**Generate Access Code**

Select Role:

Program Name	PC	# Submissions	Download Results	Download Questions	Action
ISU INSPIRE Summer 2025	Yiq Liang	23	<input type="button" value="Download Results"/>	<input type="button" value="Download Questions"/>	<input type="button" value="⋮"/>
Senior Design Team F25-S26	Yiq Liang	6	<input type="button" value="Download Results"/>	<input type="button" value="Download Questions"/>	<input type="button" value="⋮"/>
ISU INSPIRE Spring 26	Yiq Liang	2	<input type="button" value="Download Results"/>	<input type="button" value="Download Questions"/>	<input type="button" value="⋮"/>
Summer Scholars Program	Program Coordinator	1	<input type="button" value="Download Results"/>	<input type="button" value="Download Questions"/>	<input type="button" value="⋮"/>
Research Immersion Program	Program Coordinator	0	<input type="button" value="Download Results"/>	<input type="button" value="Download Questions"/>	<input type="button" value="⋮"/>
Research Development Program	Program Coordinator	0	<input type="button" value="Download Results"/>	<input type="button" value="Download Questions"/>	<input type="button" value="⋮"/>

## Administrators

- Assign Program Coordinators
- Modify survey
- Add/remove students [from any program]
- View results [from any program]
- Export results
- Delete programs

# User Types

The screenshot shows a web interface for 'MyS7EMGrowth'. At the top, there is a dark navigation bar with links for 'About', 'Dashboard', 'Settings', and 'Help', and a 'Sign Out' button on the right. The main content area is white and features a central yellow box. Inside this box, it says 'Welcome!' followed by a paragraph: 'This is your researcher dashboard. Here you can view number of surveys completed, and export anonymized data for your research.' Below this is a grey box titled 'Survey Results' which displays 'Number of surveys completed: 53' and an 'Export' button.

## Researcher

- **Export data**
  - All data exported is anonymous
  - Results used in research

# Design Decisions

## Functional Requirements

- Expanded platform functionality
- Enhanced survey design
- Implemented program-wide process tracking

## Non-Functional Requirements

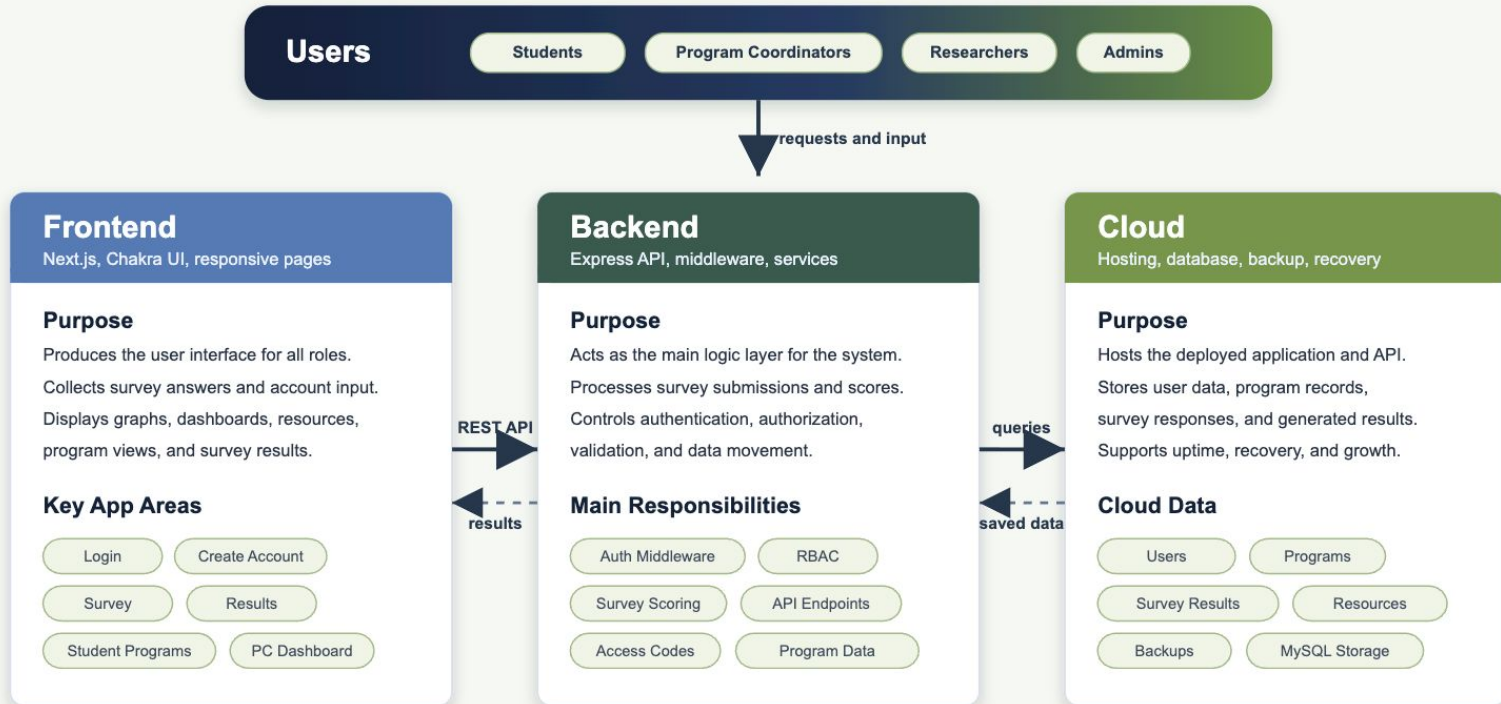
- Mobile responsive design
- Secure data handling
- Robust system security

## Software Approach

- Role-based system architecture
- Cloud-based infrastructure
- Secure authentication & session management

# System Workflow

## MySTEMGrowth Survey Tool Architecture



# Risks



## Cloud Migration

- Maintaining user data
- Ease of scalability



## Security Improvements

- Password changes
- Middleware implementation



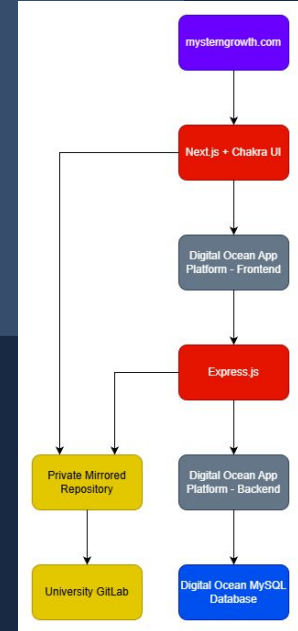
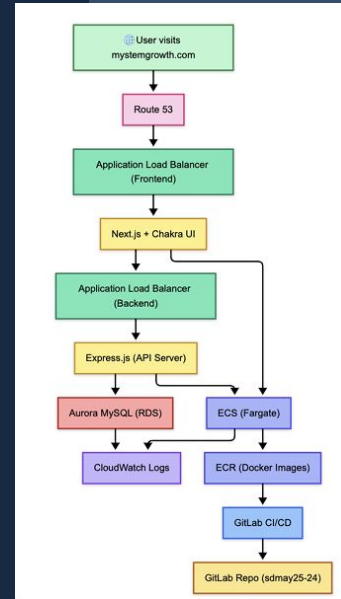
## Result Handling

- Anonymizing results
- Keeping previous data

# Cloud Migration

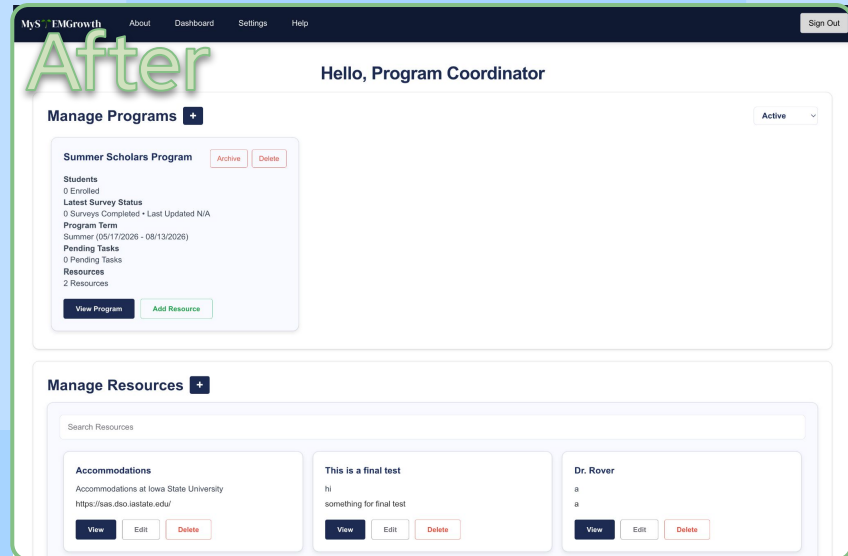
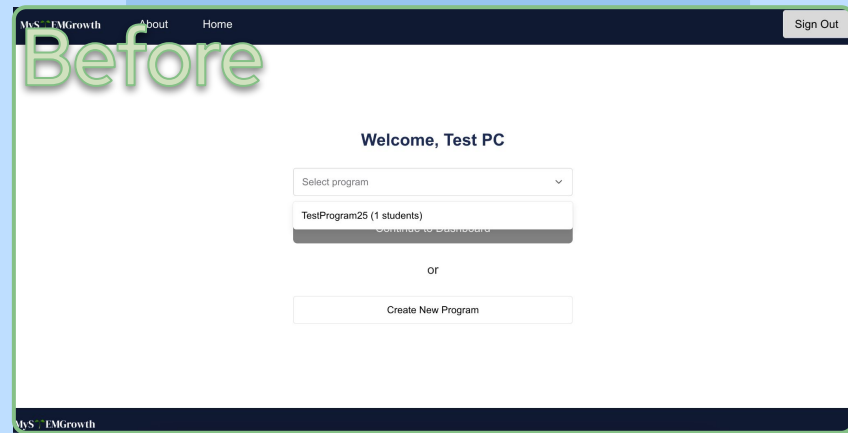
Switching from AWS to Digital Ocean →

- Simple and user friendly interface
- Affordable pricing without sacrificing functionality
- Fast deployment



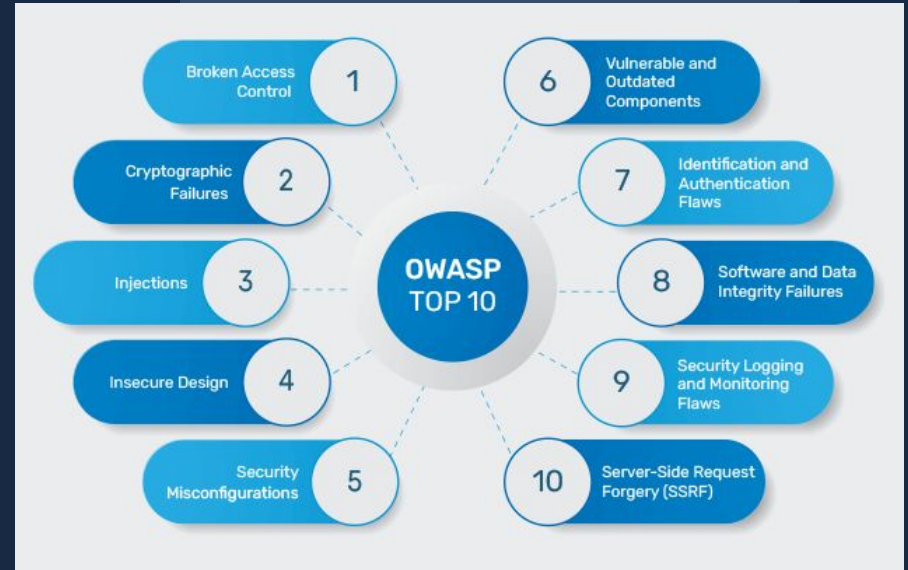
# UI Updates

- Improved all user's dashboards
- Added multiple new features
- Ensured navigation was clear and chronological



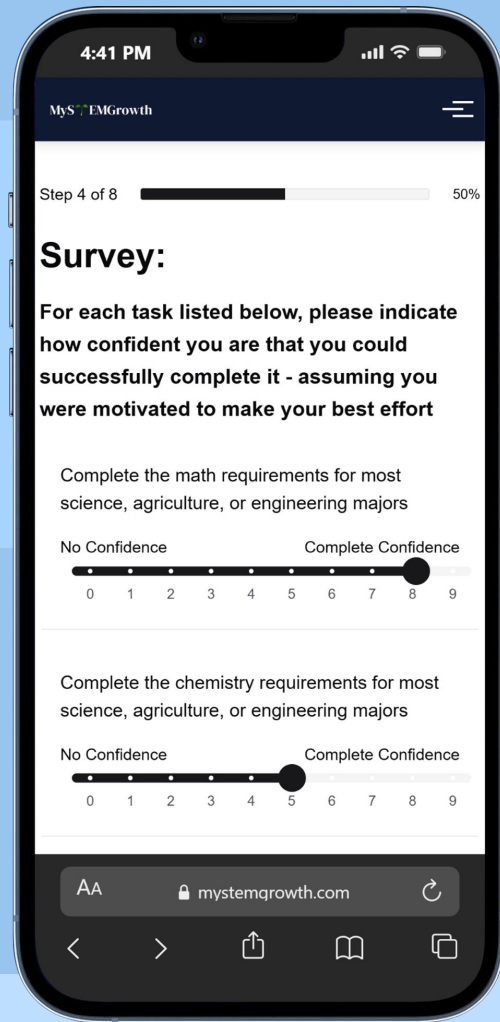
# Security Enhancements

- Implemented middleware
- Added cookies and tokens
- Enabled password hashing
- Enforced stronger password requirements



# Mobile Functionality

- Responsive layouts across screen sizes
- Touch-friendly navigation and controls



# Survey Improvements

- Recalculated data for improved accuracy
- Added numerical result comparisons
- Implemented progress saving

## Survey:

Now, please indicate your degree of interest in doing each of the following activities, Use the scale below to show how interested you are in each activity.

Solving practical math problems  Strongly Dislike  Dislike  Indifferent  Like  Strongly Like

Reading articles or books about engineering issues  Strongly Dislike  Dislike  Indifferent  Like  Strongly Like

Solving computer software problems  Strongly Dislike  Dislike  Indifferent  Like  Strongly Like

**⚠ Please answer this question before submitting.**

Working on a project involving engineering principles  Strongly Dislike  Dislike  Indifferent  Like  Strongly Like

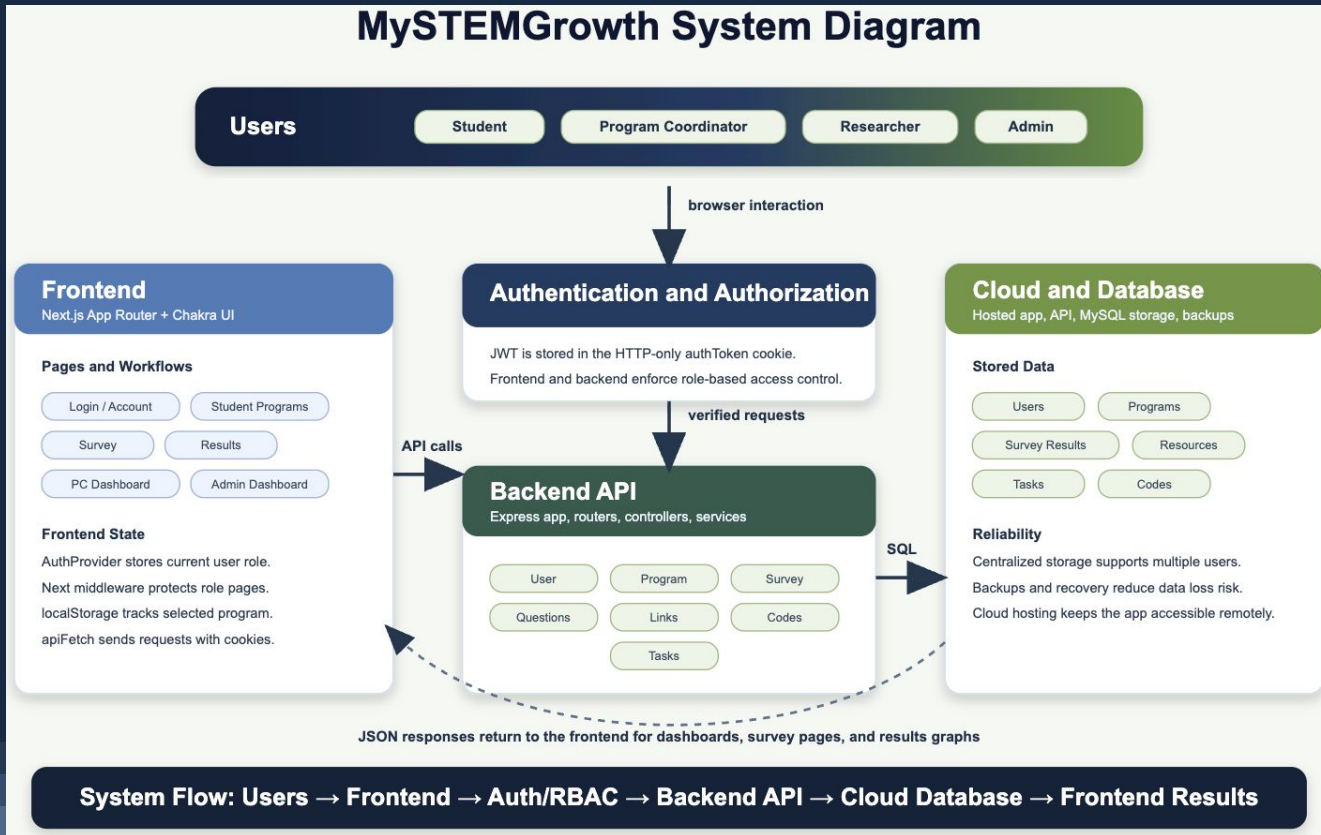
Solving complicated technical problems  Strongly Dislike  Dislike  Indifferent  Like  Strongly Like

Learning new computer applications  Strongly Dislike  Dislike  Indifferent  Like  Strongly Like

Working on a project involving scientific concepts  Strongly Dislike  Dislike  Indifferent  Like  Strongly Like

# System Diagram

## MySTEMGrowth System Diagram



# Incremental Testing

## Define

- Establish client requirements
- Allocate tasks

## Design

- Create system diagrams
- Map component interactions
- Code implementation

## Test

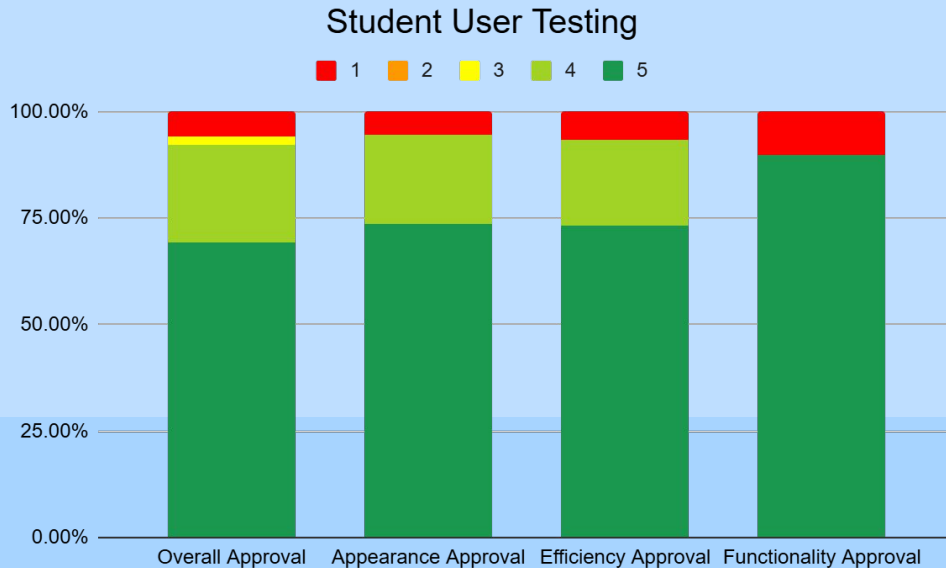
- Identify & resolve issues
- Verify Functionality
- Confirm integration with existing features

## Repeat

- Apply process to next feature
- Continue until all features are complete

# User Testing

- **Constant feedback from clients, administrators, & coordinators**
- **Instructions for students to walk through the application**



## MySTEMGrowth User Testing Survey

### Section 1: Appearance (UI/UX)

The website's overall design is visually appealing.

1 2 3 4 5

Strongly Disagree      Strongly Agree

The page layout is clear and easy to follow.

1 2 3 4 5

Strongly Disagree      Strongly Agree

Text is easy to read.

1 2 3 4 5

Strongly Disagree      Strongly Agree

Buttons are easy to see and understand.

1 2 3 4 5

Strongly Disagree      Strongly Agree

# Future Implications

What's Next?



LSAMP **INSPIRE**  
PROGRAM

1

Summer Programs

2

Multi-Institutional

3

Supports Research

# Thank you

Ask us questions!



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