

MOBILE APPLICATION DEVELOPMENT

Team Members: Charlene Baes (Team Lead), Callie Bockart (Communications Lead), Jason Kraisser, Samantha Neri, Rachel Schnepf, Leah Wamsley

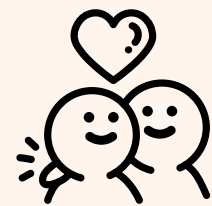
Client: ColorWorks (Rebecca Bockart & Shannon Ward)
Faculty Advisor: Professor Judith Islam



ColorWorks' Mission



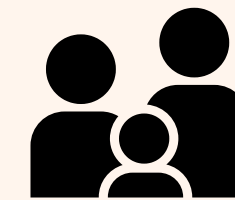
- Personality-based coaching company
- Teach life-long skills to clientele



Strengthen
relationships



Increase
communication
skills



Develop parenting
skills based on trust



Our Mission



What are we creating?

- Create a fully-functioning mobile application for ColorWorks
- User-friendly and informative

Who are our intended users?

- Families, parents, and ColorWorks clientele
- Military personnel during ColorWorks presentations
 - 5,000 - 6,000 ColorWorks users worldwide

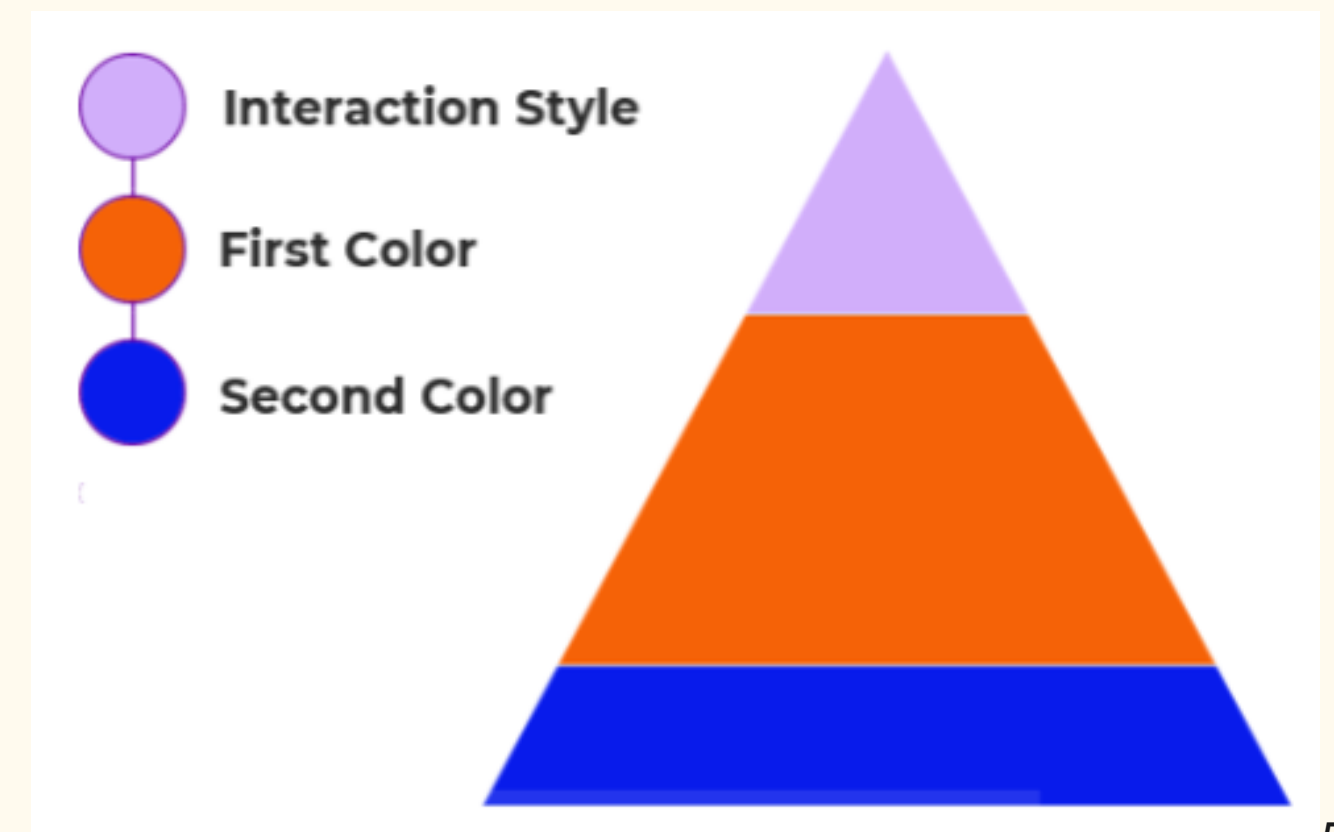




Colors



- 4 Colors
 - Blue, Gold, Orange, and Green
 - Motivators, stressors, perks, pitfalls
- 3 Interaction styles
 - Introvert or Extrovert
 - Process information and battery recharge





Initial Design Sketch



COLORWORKS app
3 LEVELS... 1 free, 2 paid

FREE for individuals

- personality quiz
- create profile
- ability to refine "colors" determination
- gets short but useful "colors" description
- Basic level "Hints & Tips"
 - 3 Stress/Behavior
 - 4 "+" traits
 - 6 life hacks
 - 2 for work
 - 2 for love
 - 2 for recharging


+ MID LEVEL for personal deep dive & couples

- all features of FREE
- Plus one extra profile (partner, parent, boss)
- 3 WORDS ⇒ stress analyzer
- Building Blocks of Δ
- "Hints & Tips" DEEPER DIVE
 - Expanded Life hacks
 - work
 - love
 - parenting
 - recharge
 - leadership

ELITE LEVEL for family or teams (up to 10 profiles)

- all features of Mid
- entire group profiles (family or team up to 10)
- Communication Styles
- Ask, Be, Do (Parents/leaders)
- C.A.L.M. (stress mang)
 - Activities
 - bead boxes
 - conflict □s
 - Building Trust

Legend:
 P = link to Profile(s)
 Lightbulb = link to "Hints & Tips"
 Wrench = link to Action tools
 Envelope = messages from C.W.
 Dice = link to games



- 3 Membership Levels
 - Free (Bronze)
 - Mid-Level (Silver)
 - Elite (Gold)
- Access to additional features as membership increases



Functional Requirements



- **Personality Quiz**

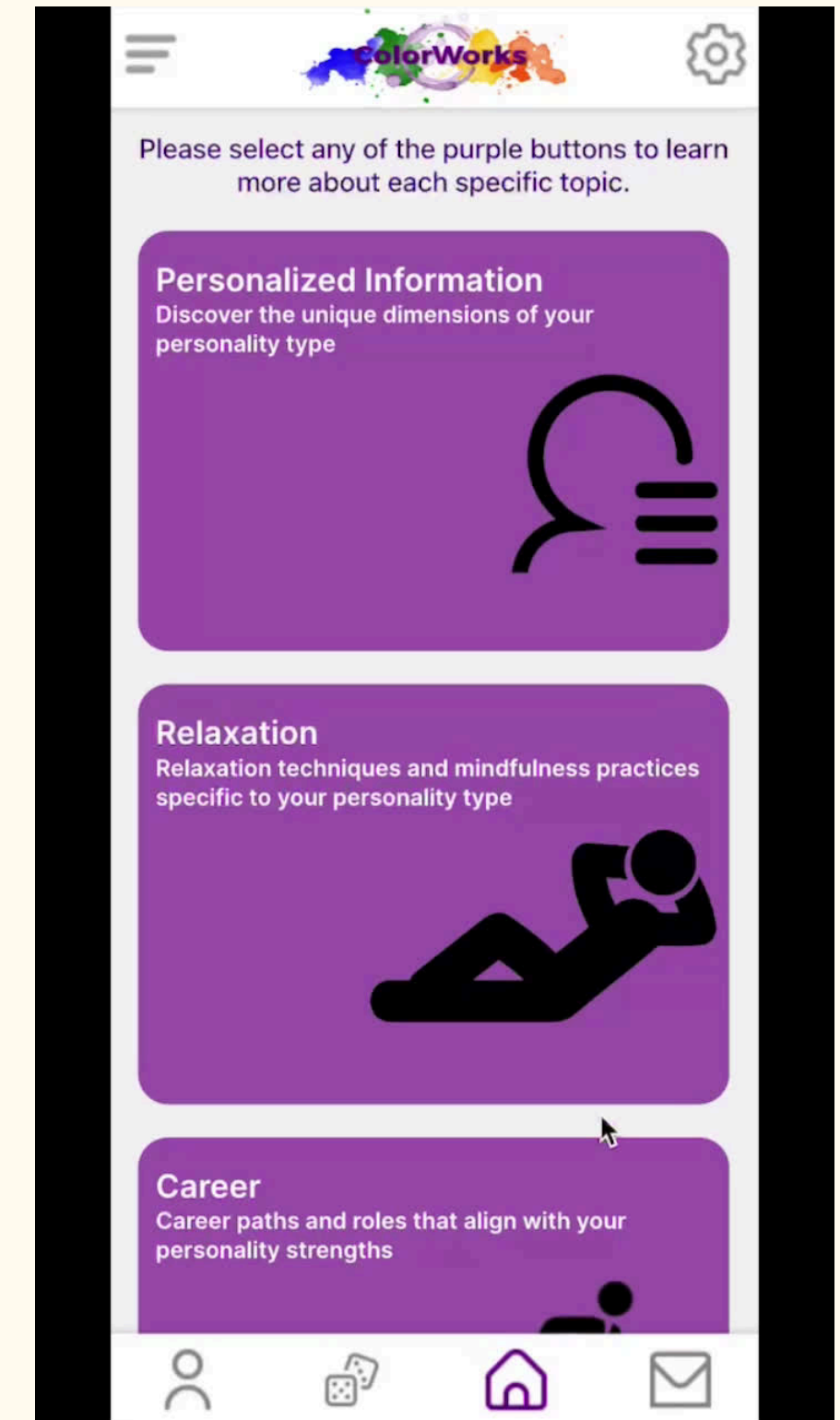
- View personalized information based on quiz results

- **Information Library**

- Multiple categories of information
 - Relationships, Communication, Parenting ...
- Unique situational approach

- **Membership Upgrade**

- Increased access
- Multiple profiles on one account

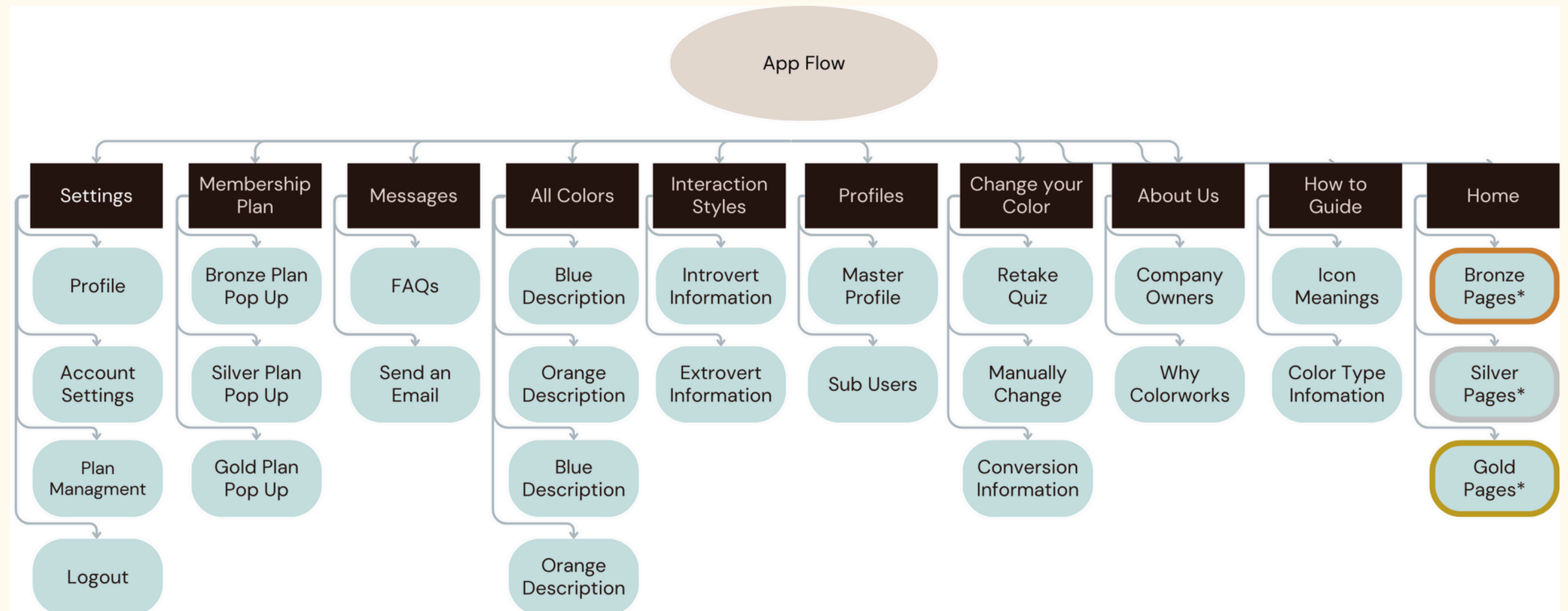
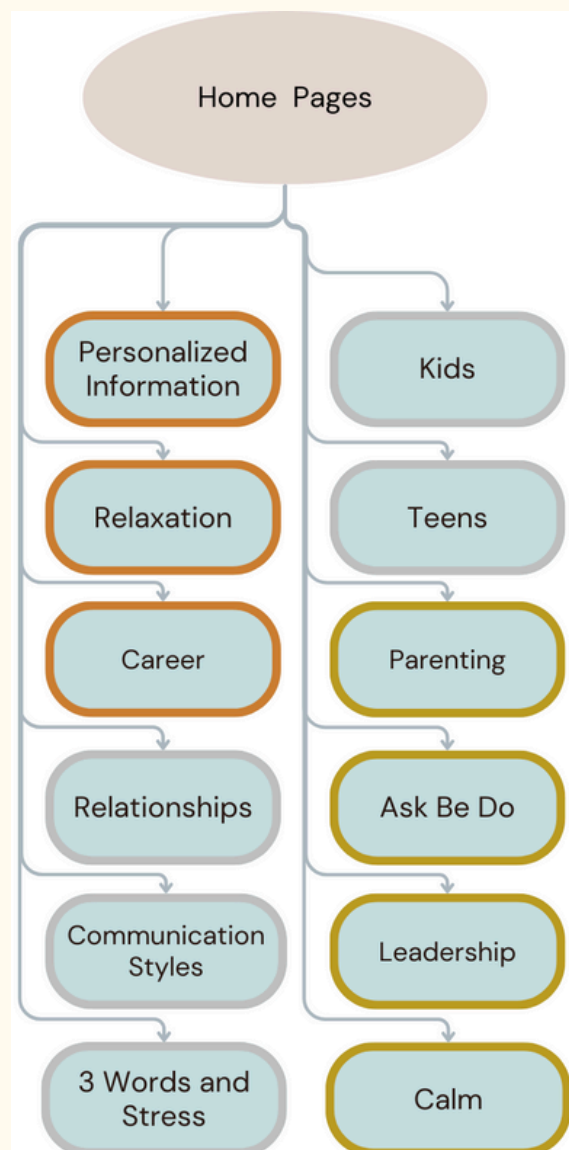




Use-Case Diagrams



- Flow of the app
- Access to certain pages varies on membership plan





Non-Functional Requirements



Usability

- Positive phrasing and imagery for mental health
- Easy navigation, designed to minimize any user errors

Performance

- Information re-render should not take more than 5 seconds

Maintainability

- Application shall support change of database updates and addition of new users
- Application can be managed without any app development knowledge

Operational

- Compatible with Android and iOS phone devices



Security Concerns and Countermeasures



Sensitive Data Encryption

- Sensitive data not stored as plaintext
- SHA one-way hash function used for email storage.

Payment Through App:

- Third-party payment system implemented using Stripe.
- Secure payment links embedded into application buttons using webhooks.

Parent Account Management:

- Parent account can adjust children accounts.
- Passcode or face identification required for certain changes.

Password Complexity Rules:

- Enforced password complexity rules for user accounts.



Constraints



Budget

- No budget = no icon library, pro canva tools, and Callie paying for server

Resources

- No Color Works accounts = images manually developed

Limited Development Knowledge

- No backend
- 1 Cyber Security

Client Requirements

- Impeccable UX/UI design
- Creating entire design from scratch
- Use of ONLY client approved material on app (acceptance testing)

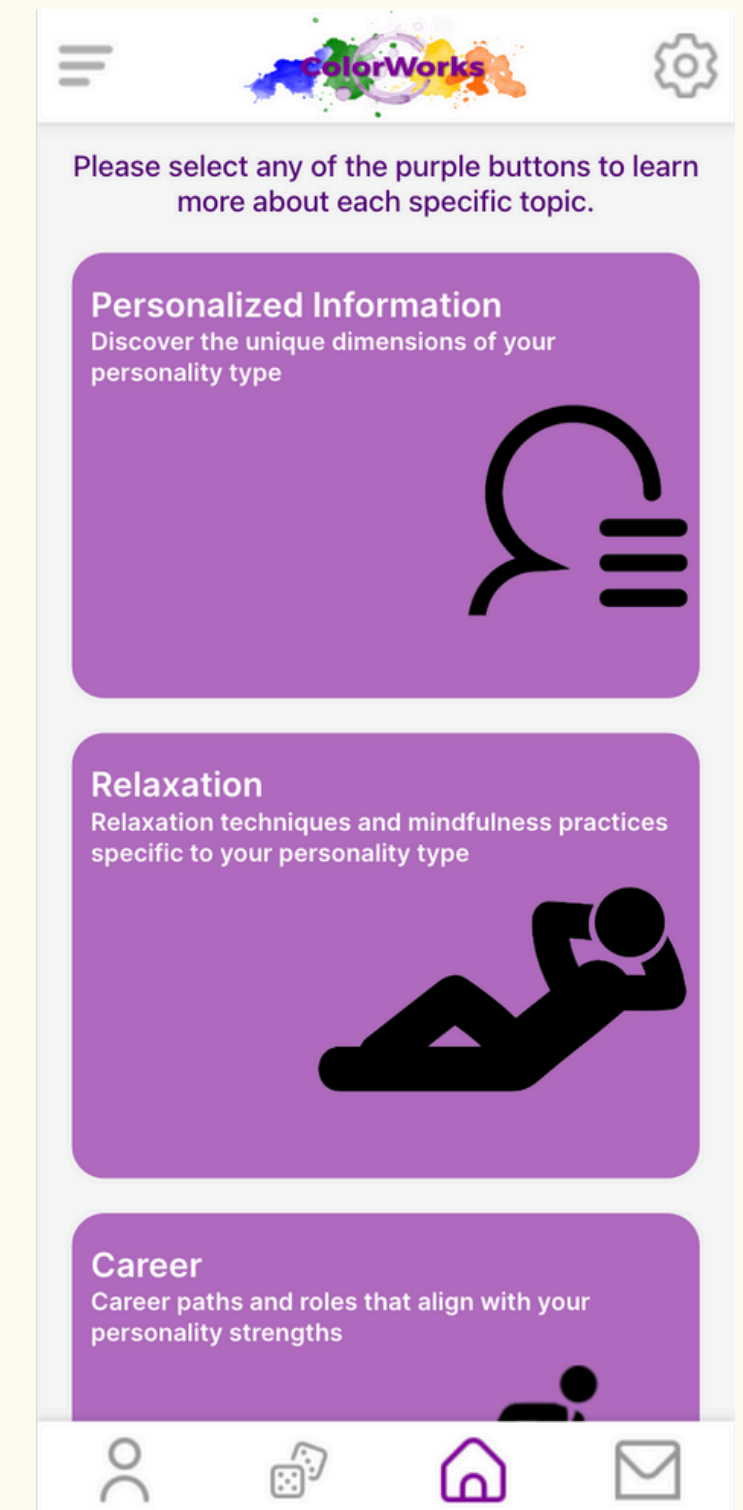
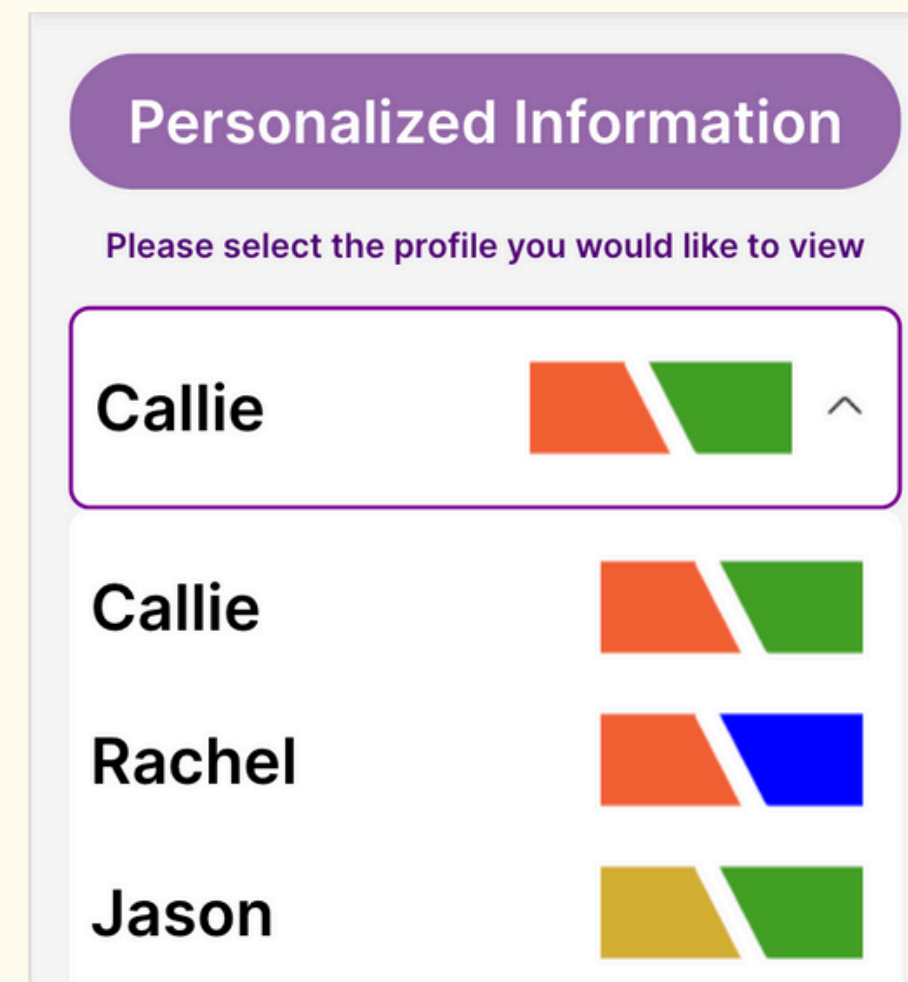


Frontend



Frontend

- React Native Framework, Javascript, Node.js Runtime Environment
- Component-based development
 - Headers and menus
 - Account profile dropdown
 - Home page tiles
 - Quiz question pages
 - Text styling





Backend



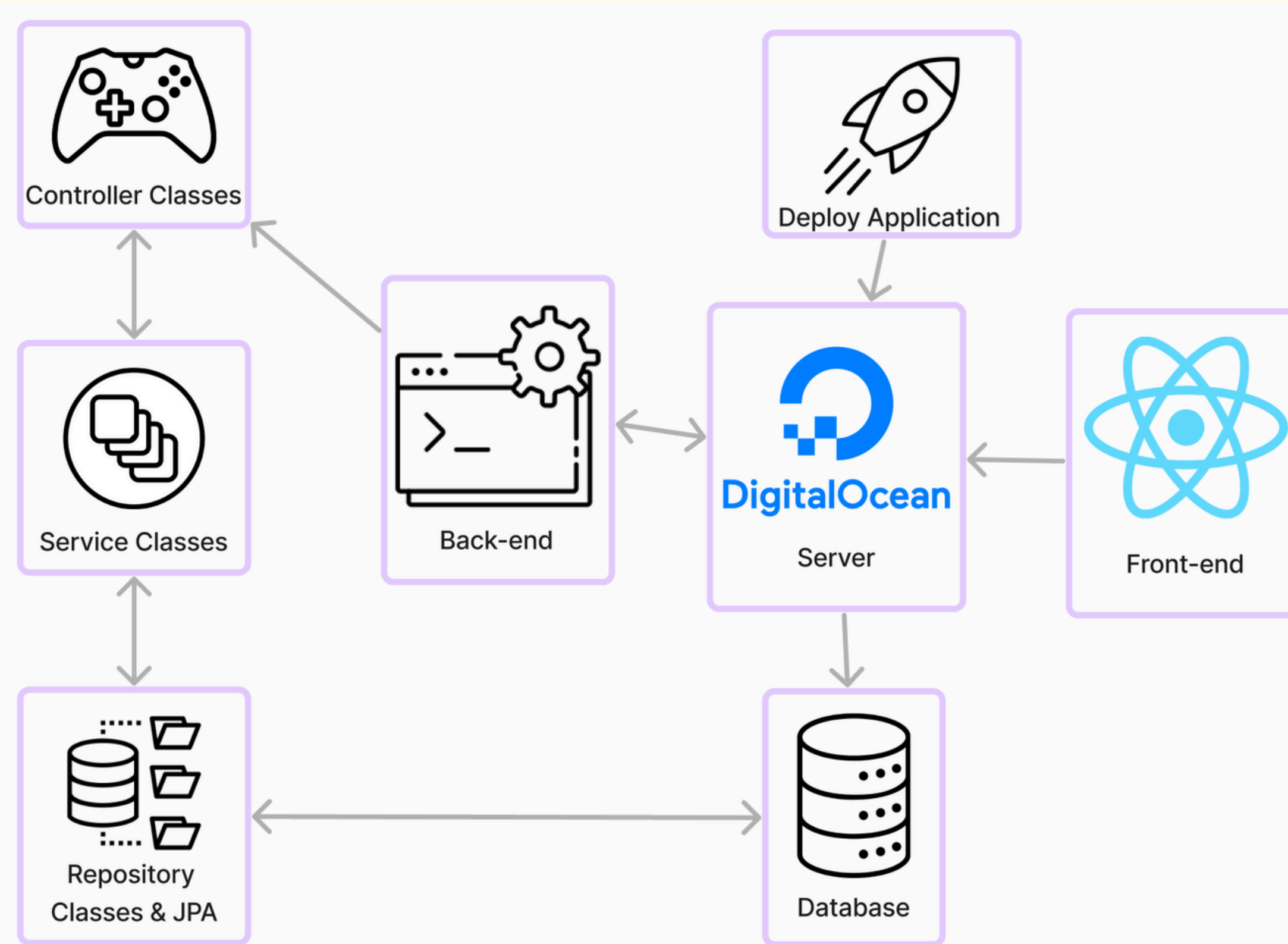
- Backend written in Java
- Utilize Java Persistence API (JPA)
 - Map database tables to Java objects
 - Performs basic queries
 - Focus on business logic over SQL complexities

```
@Entity
@Table(name = "communication_styles")
public class CommunicationStyles_Entity {
    @Id
    @Column(name = "color")
    private int colorId;
```

```
@Repository
public interface CommunicationStyles_Repository extends JpaRepository<CommunicationStyles_Entity, Integer> {
    1 usage  👤 Charlene Baes
    CommunicationStyles_Entity findById(int colorId);
}
```




Architecture



Frontend React Testing

- **Motivation**

- Ensure that all main elements of a page are present
- Certain buttons or links are correctly taking the user to the appropriate page

- **Results**

- All tests for their associated page are passing

```
PASS src/tests/Relationships.test.js
```

```
RelationshipsHome
```

```
✓ renders correctly with all sections (334 ms)
```

```
One of your dependencies, babel-preset-react-app, is importing the "@babel/plugin-proposal-private-property-in-object" package without declaring it in its dependencies. This is currently working because "@babel/plugin-proposal-private-property-in-object" is already in your node_modules folder for unrelated reasons, but it may break at any time.
```

```
babel-preset-react-app is part of the create-react-app project, which is not maintained anymore. It is thus unlikely that this bug will ever be fixed. Add "@babel/plugin-proposal-private-property-in-object" to your devDependencies to work around this error. This will make this message go away.
```

```
Test Suites: 1 passed, 1 total
```

```
Tests: 1 passed, 1 total
```

```
Snapshots: 0 total
```

```
Time: 7.714 s
```

```
Ran all test suites matching /Relationships/i.
```



Frontend React Testing



- **Process**

- Used testing library from React. Mock elements made for navigation strings to each page and each image.
 - **Test ID:** Created for each testable feature. Test expects the specific test ID to be in the page. Test passes if all elements are shown.
 - **Navigation:** Used mock navigation string. Test renders the icon or button to be pressed, simulates clicking the icon, then waits for the expected mock navigation page to be called.

Usability Testing

- **Structure**

- Insight to how the user interacts with certain elements.
- Survey consists of 3 parts:
 - Demographics
 - Age, profession, family status, previous experience
 - Actual Test
 - Opinions on formatting & design, or ease of use
 - Final Overview
 - Overall impression and how to improve

-

Usability Testing

- **Process**

- 39 responses from a wide variety of users.
- Survey done either virtually or in-person, with the user getting access to all functionalities of the app.
- User starts by creating an account or logging into an existing account.
 - Navigates through the app as they like.
- When finished browsing the app or while navigating, the user will take the usability survey.



Usability Survey Results



- **Demographics**

- **Age**

- Variety of users from under 18 to above 60 years old. Majority in the 18-29 age range.

- **Profession**

- Majority of users are students from various majors, including design majors who provided constructive feedback

- **Family Status**

- Single, married, with / without dependents.

- **Previous experience with ColorWorks**

- Majority of users have no experience with ColorWorks and its website.

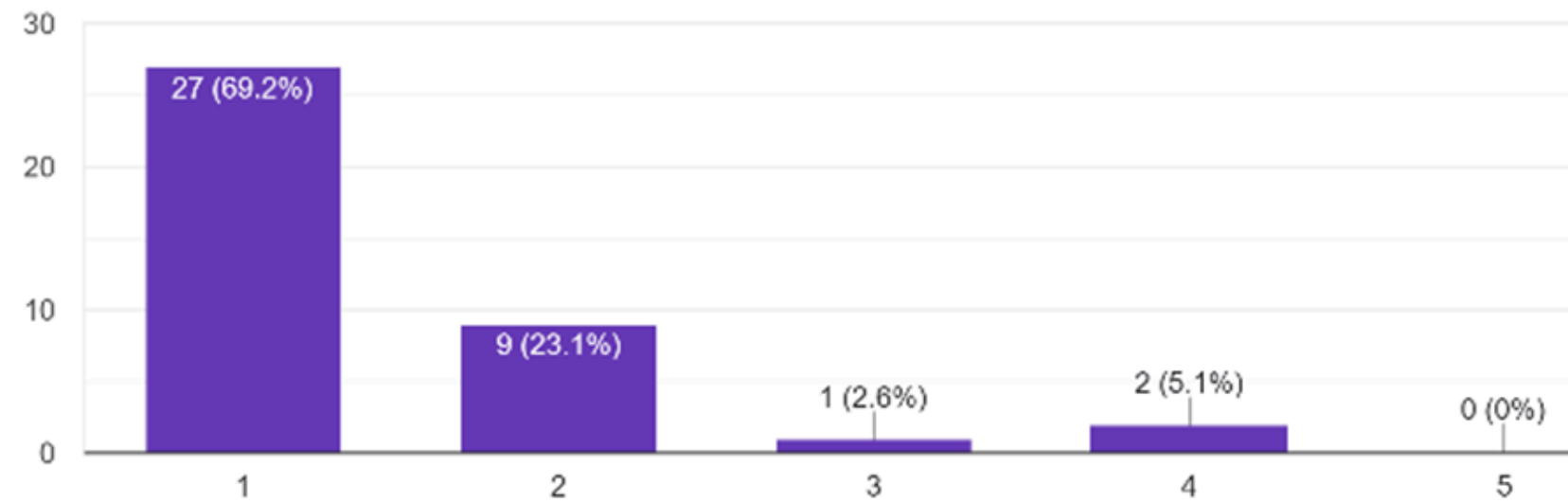


Usability Survey Results



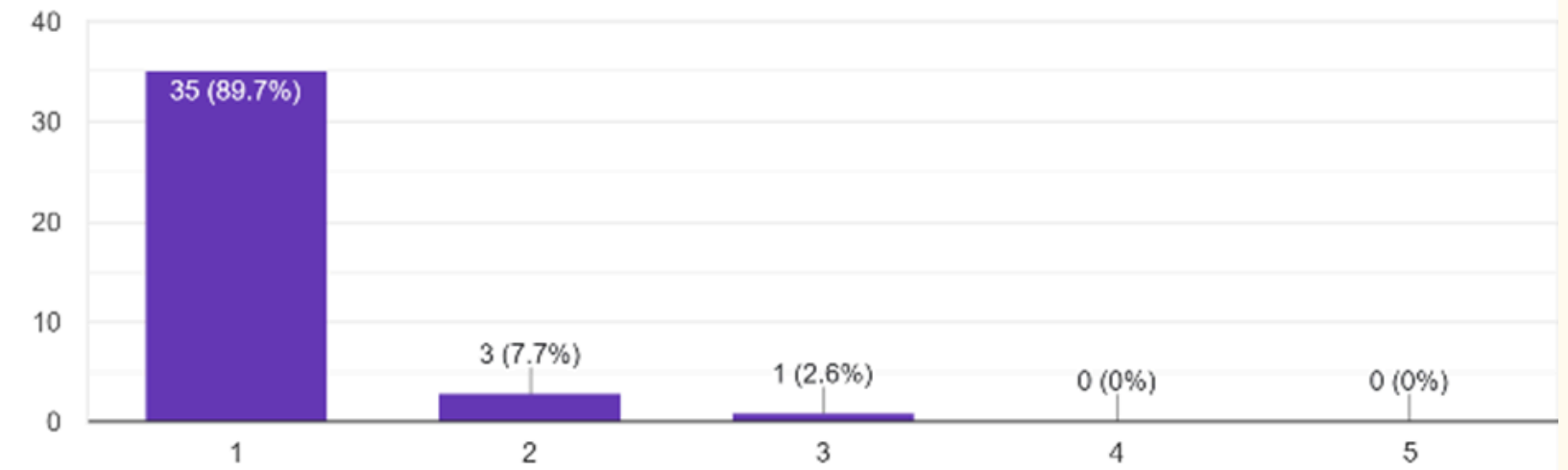
What was the difficulty to create a new account or to login?

39 responses



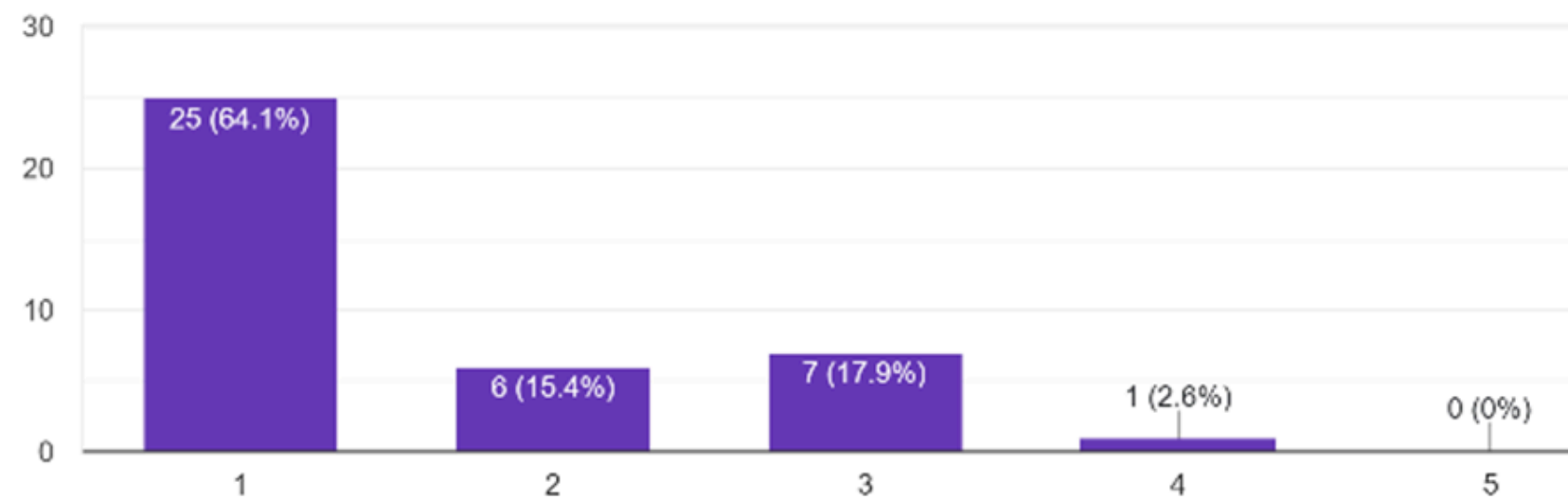
How would you rate the difficulty of finding the settings page?

39 responses



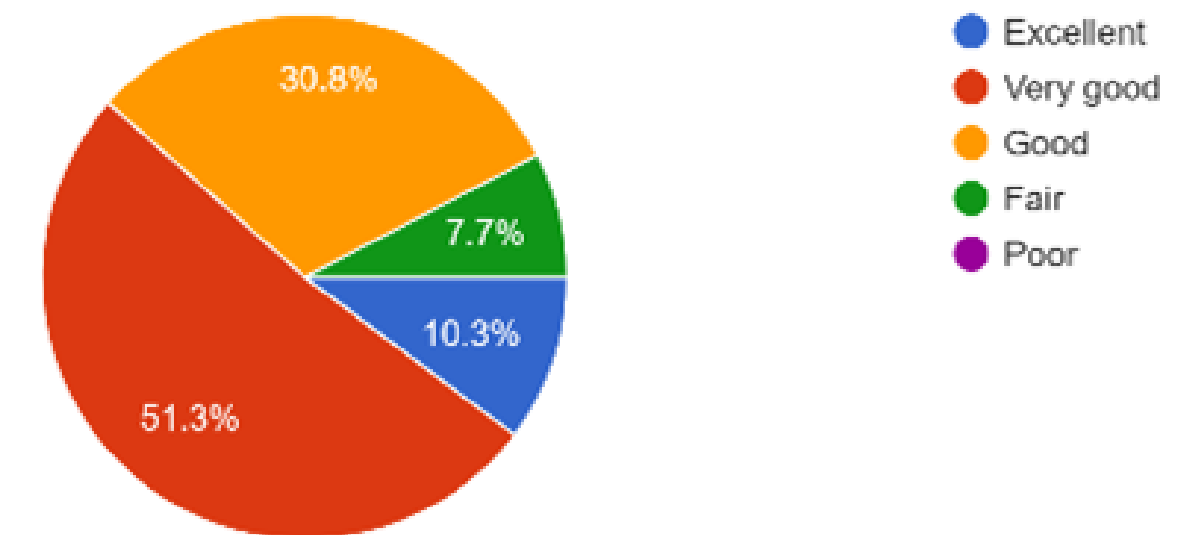
How would you rate the difficulty of finding the profile page?

39 responses



What was your overall impression of the ColorWorks app?

39 responses



Usability Test Fixes

- **Text Size, Color, or Alignment:**
 - Need to promote uniformity
 - More professional that way
 - Terms + Quiz instruction text too small
- **User Information Text:**
 - What does the puzzle piece mean?
 - What does the pyramid is and how it will be used?
 - Warning that intro level you can only take this quiz once so take it seriously so app is more tailored to you as well



Design Evolution since 491

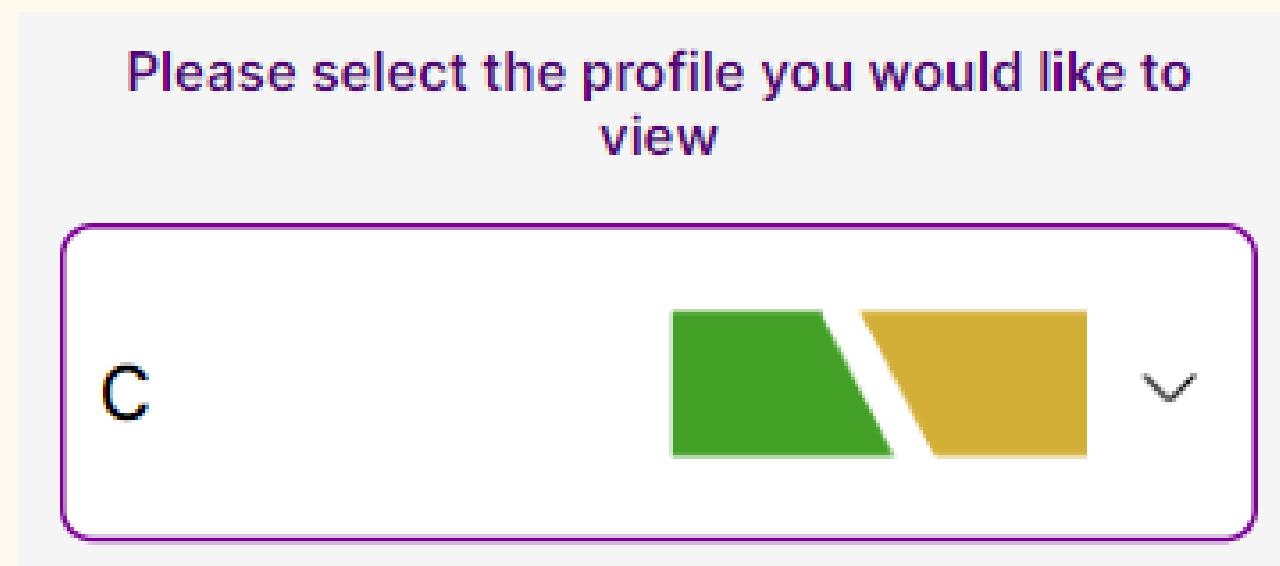
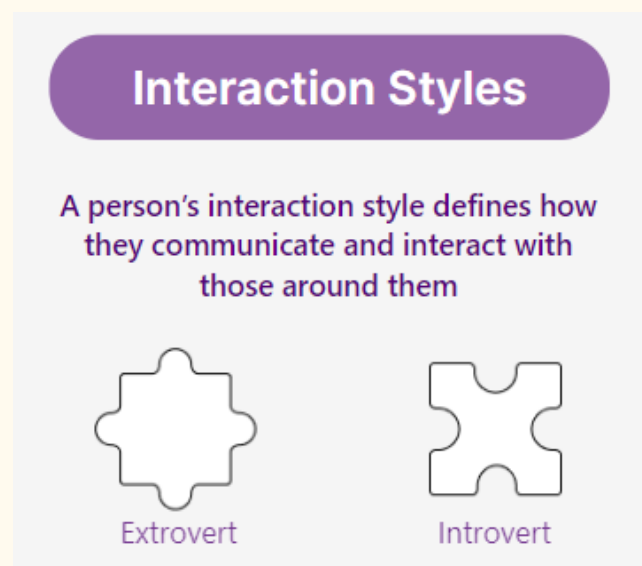


All design changes were based off client feedback or usability survey results

Four major component changes:

- DropDown: Change organization of entire app
- ColorWorksText: Component for all text (uniform CSS)
- Paragraph splitter: Makes information more readable
- Local Async Storage Component: Pull information from local storage

```
<ColorWorksText type={'header'} inputText={headerText} style={style}/>
```



Mindfulness

Practice mindfulness or meditation techniques to help quiet your mind and focus on the present moment, reducing stress and promoting relaxation.

Creative Endeavors

Engage in creative activities like writing, drawing, coding, or experimenting with new ideas.

Expressing creativity can be both relaxing and intellectually stimulating for an Introvert Green-Gold.

Spend time engaging in hobbies that allow for quiet, independent activities, such as gardening, stargazing, or playing musical instruments.

Self Care

Retreat to a quiet and comfortable space where you can be alone with your

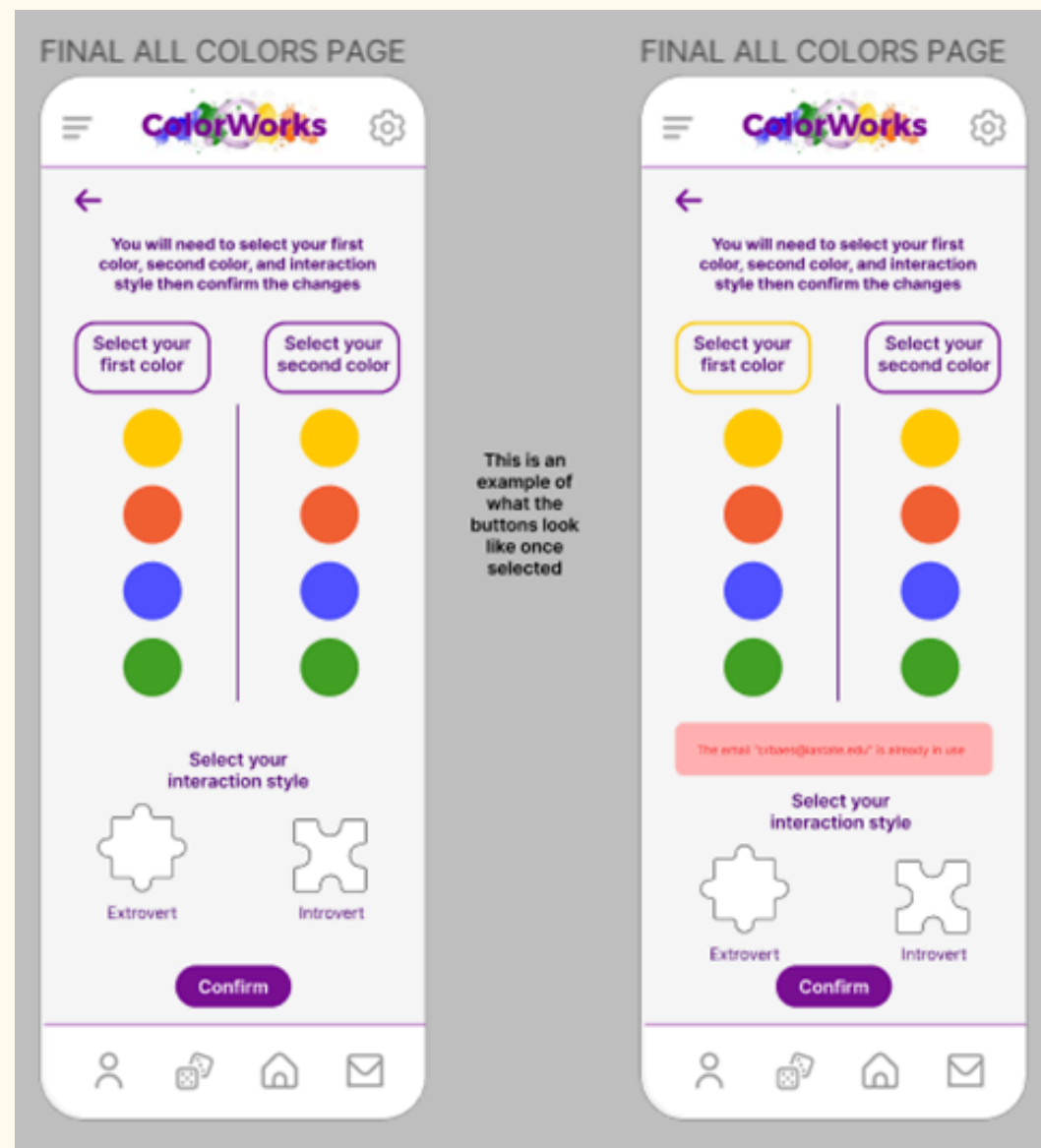


Design Evolution since 491

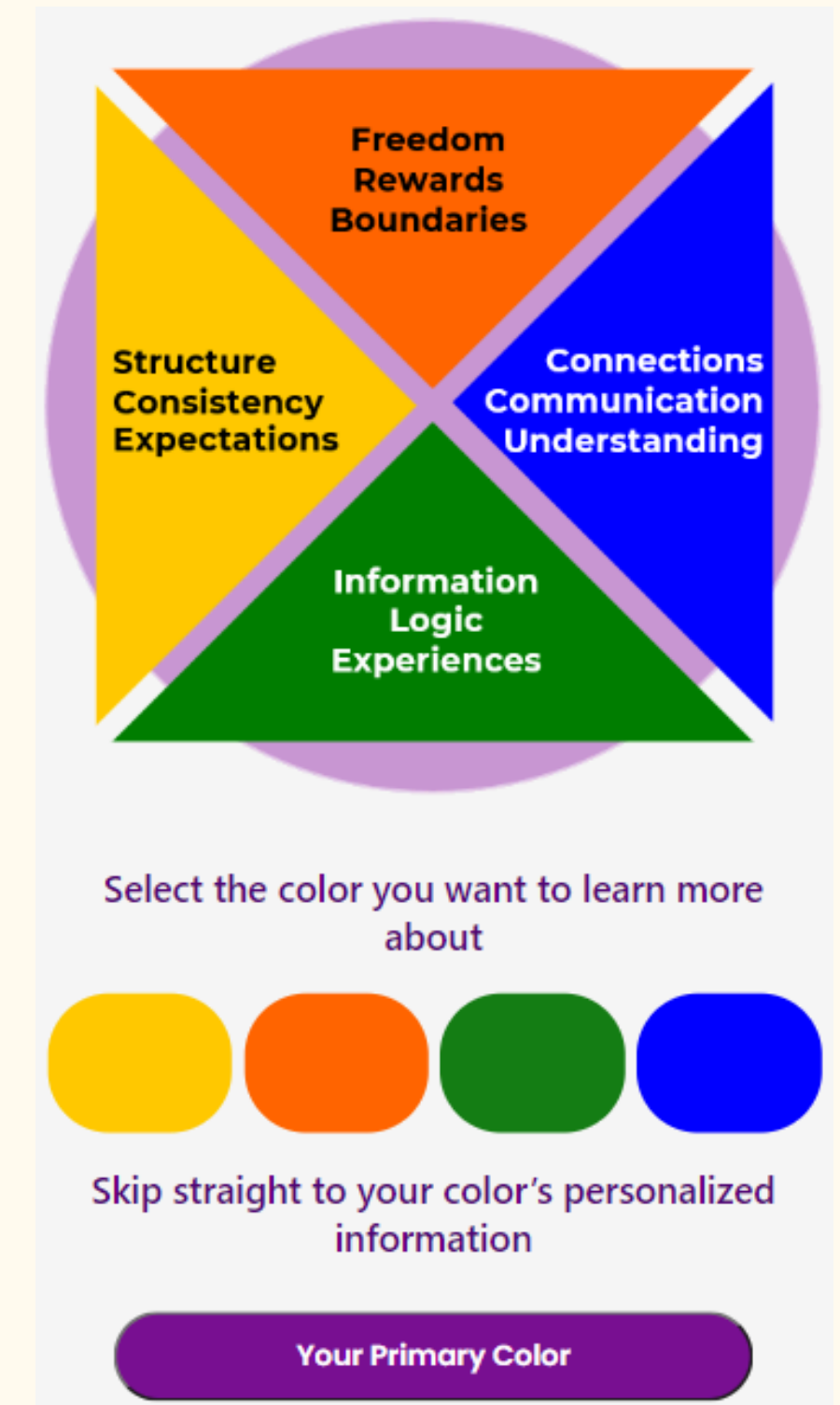
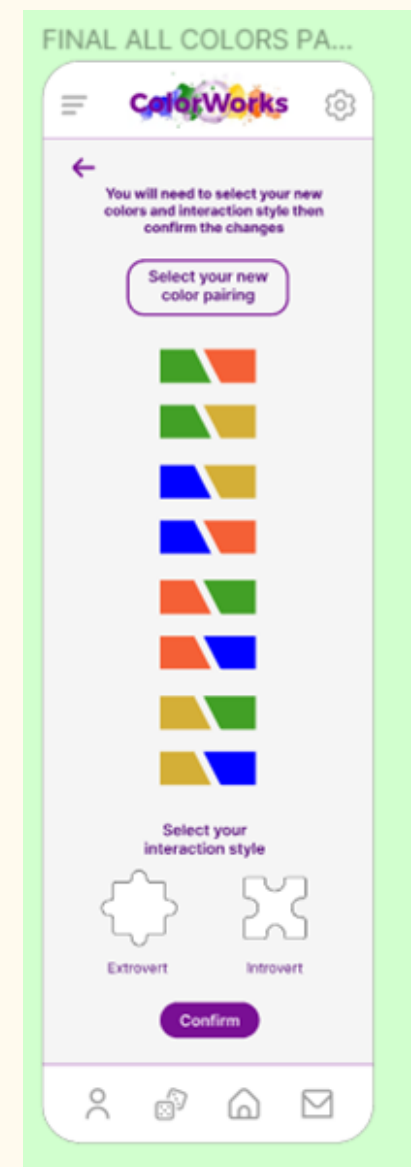


Major page changes:

- ChangeYourColor: Increase ease of use
- AllColors: More intuitive design



This is an example of what the buttons look like once selected





Design Evolution since 491




Major page changes:

- Home Pages: Creation and development (2 options)
- Addition of FAQ to messaging


Relaxation

Please select the profile you would like to view

C 

Introverted Green Gold

Interaction Style
First Color
Second Color



Relaxation

Introvert Green-Golds often relax best when they engage in activities that

Communication Styles




Please select a color you would like to learn the 3 words for



Why should I upgrade my payment plan?

If you wish to access unlimited quiz retakes, increase the amount of profiles your account may have, or want to expand the knowledge provided by color works. Please click on the link below to learn more about the different membership plans available.

[Plan Managemnet](#)



Messaging

Pre-Screening Questions

Before you reach out, we would like to get to know you!

What are you primarily using the ColorWorks application for?

- Building stronger relationships
- Working with my kids
- Improving communication skills
- Other

Leave your message / question here:

Enter your message for ColorWorks here

Submit Inquiry



Future Improvements to Development



- Integrate CI/CD into our project
 - Manually re-deploying application through command line
- Reduce re-rendering of components
 - Components re-render with changes in props / state
 - `useMemo()` / `useCallback()`
- Analyze and shorten component render times
- Add a larger test suite and more comprehensive frontend and backend tests



Future Improvements to Application



- **Game Features**

- The Gold membership plan of our app would have included a variety of educational games for users to play. Format of the games would have been required by the client.
- Due to preparing content focused on the main features of the app, the client was unable to give us the games we would create this semester.

- **Uniformity and readability of the app**

- uniformity of pages throughout the entire application, payment plan page did not match the theme of the application
- Make font and buttons scalable

- **Encryption of user data**

- Make all of our sensitive data fully encrypted within the database and throughout all POST/GET https connections



Conclusions



- 95% completion of application with requirements and information we were given
 - FAQs, Games & Activities, and a couple of home page tiles not provided to us by client
- Client is satisfied and very impressed with our work throughout the semester



Any Questions?