QRCS Accessible Donation Prototype – Testing Report

Client: Qatar Red Crescent Society (QRCS)
Team: Al Anoud Al Khulaifi, Fatima Al-Haddad, Deema Al-Mohanadi
Course: Information Systems Consulting Project (Spring 2025)
Date: April 5, 2025

Overview

As part of our commitment to improving accessibility for visually impaired users, we developed a Flutter-based proof-of-concept interface redesign for our client's donation application. Our goal was to ensure all users, regardless of visual ability, could independently access and use the donation features.

Peer Review Testing Results

Observation: Button Alignment Issues

Issue: During development, our team encountered alignment challenges due to simultaneous work on UI elements—specifically donation buttons and navigation components.

Feedback:

- The donation amount buttons were slightly misaligned when rendered on smaller screen sizes.
- We noticed overlapping padding on the 'Add to cart' and 'Donate' buttons which caused tap-target issues.
- Some of the icons were missing semantic labels.
- One team member implemented buttons using a Row, while another used Wrap, leading to inconsistencies.

Resolution: We standardized all button layouts using Column with consistent padding and spacing, ensuring compatibility across devices.

Screen Reader Testing Results (VoiceOver on iOS)

We conducted VoiceOver screen reader testing on both the **original** and **redesigned** donation screens. Below are comparative results, including screenshots and actual VoiceOver outputs. Videos of the before and after of the screenreader outputs are here.

Before Redesign

VoiceOver Output Observations:

- **Issue:** "Swipe up for more details" not recognized.

    - VoiceOver could not interpret the swipe gesture, leaving users unaware of more options.
- *"1 QAR. You can type the donation amount from here." (what does it usually say)*
- The entire project description text was **not read aloud**, making the purpose of the campaign inaccessible. This is because the swipe-up feature blocks the project information behind it, therefore, not enabling the screenreader to access it.

UI Element	**Results/ScreenReader Transcript:**

After Redesign

VoiceOver Output Observations:

- *"Project Description. Image: Stacked coins with green plants."*
- *"General Sadaqa. Sadaqa is a great form of goodness... will be used for 5 purposes: relief of refugees..."*
- *"Expiring in 786 days. Beneficiaries: 72,000. Goal: 7 million QAR. Raised: 6.1 million QAR."*
- *"Donation amount. Default: 50 QAR. Input desired amount: 0 QAR."*
- *"Button: Add to cart."*

Test Case	**Result/Screen Reader Transcript:**
Test case 1: VoiceOver reads all semantic labels for the icons (back button, shopping cart icon, menu button, share button)	
Test case 2: VoiceOver reads all text displayed in the page (e.g., General Sadaqa title, description,	

beneficiaries, expiry info, goal raised, progress percentages, donation instructions)	
Test case 3: VoiceOver correctly identifies the "Donation Amount" input field and announces the default value "50 QAR"	
Test case 4: VoiceOver properly reads and focuses on the input field when custom value "100" is entered	
Test case 5: VoiceOver announces error message or invalid entry prompt when typing alphabetic input like "abc"	
Test case 6: VoiceOver announces error or helper text when input is left empty ""	
Test case 7: VoiceOver handles "0" entry and announces any constraints or warnings (e.g., "Minimum donation is 1 QAR")	
Test case 8: VoiceOver announces "Add to Cart" button clearly, including its purpose and label	
Test case 9: VoiceOver reads the progress ring percentage correctly (87.33% reached, 12.67% remaining), including the circular graphic if semantically labeled	
Test case 10: VoiceOver reads the expiry date ("Expiring in 784 days") and associates it properly with the label	
Test case 11: VoiceOver reads the total number of beneficiaries ("70,000 beneficiaries")	
Test case 12: VoiceOver successfully navigates the entire page using swipe gestures, ensuring logical focus order from top to bottom	

Improvements Noted:

- All key information is now **readable** via screen reader.
- No swipe gestures required to access donation amounts.
- Improved logical reading order and field descriptions.
- Clear labeling of interactive elements (e.g., buttons, input fields).

Automated Accessibility Testing Using Flutter's accessibility_tools (v2.4.1)

To complement our manual and peer review testing, we conducted **automated accessibility testing** using the Flutter package accessibility_tools, version 2.4.1. This package provides real-time analysis of widget trees during development to ensure compliance with accessibility standards.

How Automated Testing Was Conducted

Integration into the App:

We added accessibility_tools to our Flutter project as a development-only dependency in the pubspec.yaml file.

```
dev_dependencies:
        accessibility_tools: ^2.4.1
```

1. **Running the Tools in Dev Mode:**

We activated the accessibility overlay and ran the app in development mode using:

```
flutter run --debug
```

The accessibility overlay visually marked widgets that failed accessibility checks, such as:

- Inadequate touch target sizes
- Checking for semantic labels
- Checking for font over flows
- Checking for image labels

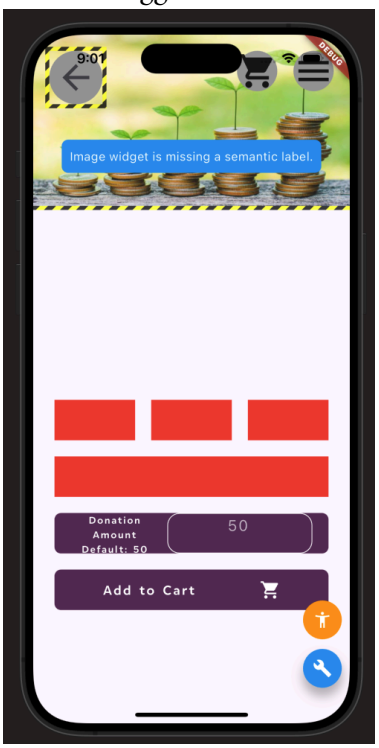
2. **Using AccessibilityChecker:**

We wrapped our widget tree with the AccessibilityTools widget provided by the package to enable real-time analysis during UI rendering.

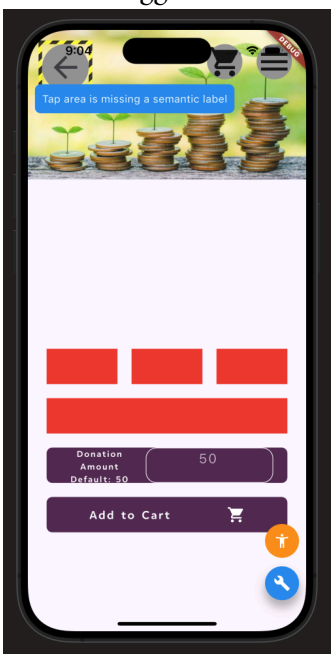
```
return AccessibilityTools(
  child: MyApp(),
);
```

3. **Issue Identification and Resolution:**

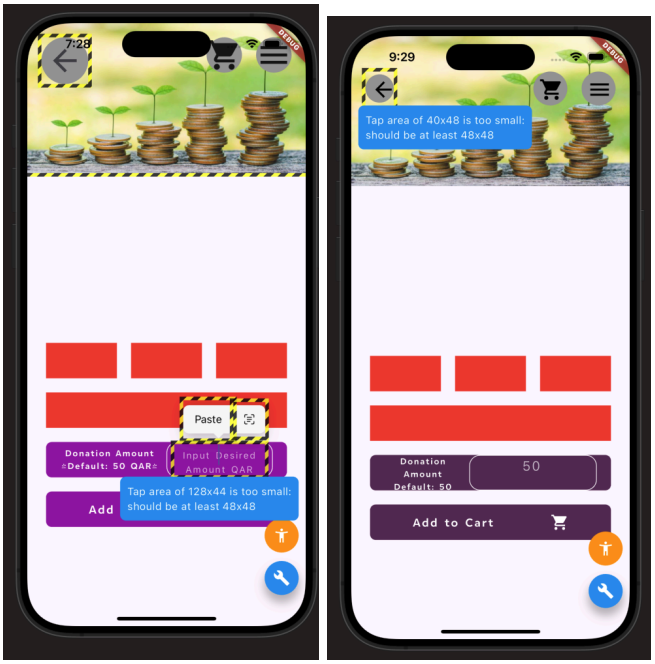
- The tool flagged one unlabeled image, which we corrected by adding a semanticLabel.



- The tool flagged one unlabeled icon, which we corrected by adding a semanticLabel.



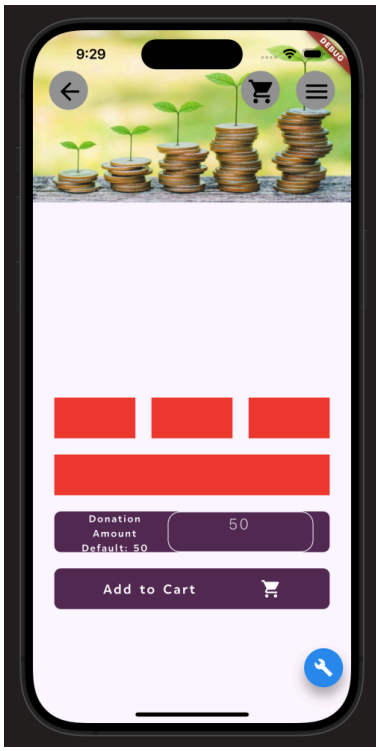
- Numerous tap area warnings helped us increase button padding to meet minimum tap target guidelines.



- All remaining UI elements were confirmed to have appropriate labels and structure.

4. **Re-Verification:**

After resolving all flagged issues, we re-ran the accessibility tools and confirmed **zero remaining errors or warnings**, ensuring compliance with WCAG accessibility principles.



Conclusion

Our peer review and accessibility testing demonstrated significant improvements in the new donation page's usability for visually impaired users. The redesign eliminates gesture barriers, provides full VoiceOver compatibility, and improves layout consistency. Future enhancements will include haptic feedback for button presses and audio confirmations of donation submission.