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An Investigation of the Accessibility and Usability Testing of Progressive Web Application

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Introduction

This project involved investigation approaches to usability and accessibility implementation, principles and concepts while also researching the testing on a manual and automated front, by creating two Progressive Web Applications.

Aim

The aim of this project is to analyse the accessibility and usability techniques for Progressive Web Applications (PWA).

Objectives

- Evaluate accessibility and usability principles, concepts and techniques applied to Progressive web application.
- Investigate good approaches to applying accessibility and usability techniques in web applications by developing and testing a PWA.
- Analyse the benefits and drawbacks of different accessibility and usability approaches applied to the development of a PWA.

Research

Progressive Web Apps
Essentially a website, that is developed like a native app and through the use of service workers and can be downloaded, provide notification services and function offline.

Accessibility
Accessibility is a development principle and method to allow a website or web application to be accessed and used by all users irrespective of their abilities or disability

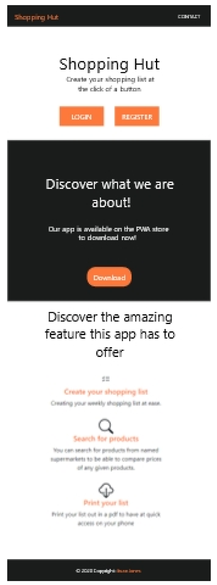
Usability
Usability refers to the ease of use of an application, specifically, Learnability, Efficiency, Memorability, Error tolerance and prevention and finally, Satisfaction.

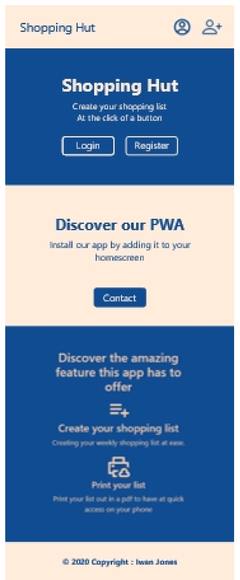
Implementation & Testing

Implementation
Creating two PWA's one with poor accessibility and usability leading to another more refined app with the solutions to these problems.

Testing
Manual user testing :
- Completion of tests set up
- Questionnaire feedback

Automated testing :
Lighthouse - (Accessibility and PWA)
WAVE - Accessibility
Access Tool Assistant - Accessibility





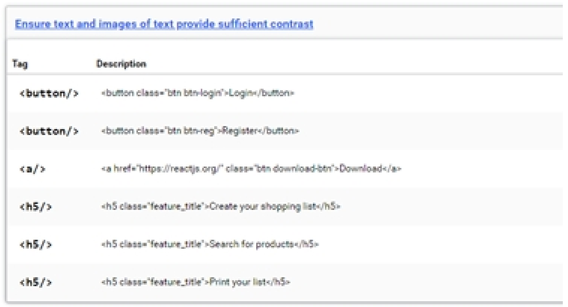
Results

PWA 1

This first app produced many errors from learnability, colour contrast issues to the lack of alternative tags on buttons, images and links

Provide alternative text for images

Tag	Description
<svg/>	<svg xmlns="http://www.w3.org/2000/svg" fill="currentColor" viewbox="0 0 16 16" height="2.5em" width="2.5em"
<svg/>	<svg xmlns="http://www.w3.org/2000/svg" fill="currentColor" class="bi bi-search" viewbox="0 0 16 16" height="2.
<svg/>	<svg xmlns="http://www.w3.org/2000/svg" fill="currentColor" class="bi bi-cloud-download" viewbox="0 0 16 16" h

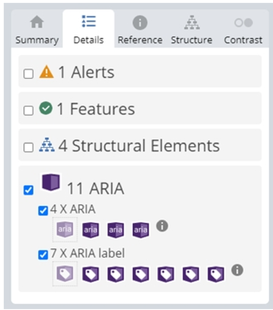

Ensure text and images of text provide sufficient contrast

Tag	Description
<button/>	<button class="btn btn-login">Login</button>
<button/>	<button class="btn btn-reg">Register</button>
<a/>	Download
<h5/>	<h5 class="feature_title">Create your shopping list</h5>
<h5/>	<h5 class="feature_title">Search for products</h5>
<h5/>	<h5 class="feature_title">Print your list</h5>

PWA 2

```
><RiAccountCircleLine aria-label="Login" />
```

The second app was much more successful with the testing, both with users and on the automated tests



node JS

React JS

Conclusion

The aim and objectives that were set were met during the project, initially with the research conducted during the literature review, evaluating the principles, concepts and techniques.

The second objective we met by investing these good approaches and applying them to the implementation of the second Progressive Web app..

Finally, meeting the last objective in the analysis of the testing between both of the PWA's developed in both the automated testing and the manual user tests.

The important of both Accessibility and usability has been proven here, as well as the need to use multiple pieces of software in the automated testing to verify each software's results.

Overall the project was very successful.