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Superieur

Universite de Buea

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER ENGINEERING

MOBILE APPLICATION DEVELOPMENT

CEF 440

TASK 5 REPORT:
ROAD SIGN AND ROAD STATE NOTIFICATION MOBILE
APP
UI DESIGN AND IMPLEMENTATION

Presented by:

GROUP 8

N°	NAMES	MATRICULES
1	FOWEDLUNG ATSAFAC AGAFINA	FE21A196
2	KAMDEM KAMGAING GILLES CHRISTIAN	FE21A209
3	NEGUE KWAHAM MAEL GRACE	FE21A252
4	NGUEPI GNETEDDEM PATERSON	FE21A264
5	NOUPOUWO DONGMO STEPHANE MERCI	FE21A283

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I- INTRODUCTION

User Interface (UI) design is a crucial aspect of mobile application development, aiming to create interfaces that are both visually appealing and easy to use. Following the previous task on system modelling and design which provided a blueprint of the app, it is necessary to create a comprehensive user interface that will provide stakeholders with an intuitive user experience.

UI design also helps in providing stakeholders with a more specific view of the app such that possible issues can be assessed early enough before implementation.

This report provides a comprehensive overview of the UI design process for this mobile application, detailing the steps throughout the design process. The primary focus is on enhancing user experience through intuitive design, consistency, and accessibility.

II- APP IDENTITY AND DESIGN ELEMENTS

Before diving into the design process, elaboration on a few app identity elements is essential for communicating the app's values, mission, and personality to the user. This section will delve into the key components that form the identity of our app, including its name, logo, and color scheme. Also, the tool utilized in the design process will be discussed here.

II.1 App Name

The app name is the first point of interaction between the user and the app. It sets the tone for what users can expect. The name chosen for this app is **"Zaapa"**.

This name originates from a Cameroonian Western cultural expression *"Za'a pa'a"* which means *"Take this route"* in English Language. This expression represents the process of directing someone to a specific destination which reflects the purpose and vision of the app, hence the name **"Zaapa"**.

II.2 Color Scheme

The color scheme is a critical aspect of the app's design, influencing user perception and usability. Zaapa employs a palette dominated by shades of Blue, specifically the Jelly Bean color(#227b98).

The blue color here represents

- *Safety* of users during their journey while using the app
- *Secureness* of user's data (personal and location information)
- *Trust* in information coming from the app

Following figure shows the color palette employed by Zaapa



Figure 1: Jelly Bean Color Palette

II.3 App Logo

The logo is a visual representation of the app's identity. It should be unique, easily recognizable, and evoke the right emotions. The logo for Zaapa represents a location icon with a traced route following the “Z” form the app’s name first letter. The color used for the logo is #41B5CF from the specified color palette.



Figure 2: Zaapa App Logo

II.4 Design Tool

The design of Zaapa was primarily accomplished using **Figma**, a powerful web-based design tool that is highly regarded for its collaborative features and versatility. Figma was chosen for several reasons:

- **Collaborative Design:** Figma's real-time collaboration capabilities allowed team members to work together simultaneously, providing immediate feedback and making adjustments on the fly. This feature was particularly beneficial in ensuring a cohesive design vision and accelerating the design process.
- **Prototyping:** Figma's prototyping features enabled the creation of interactive and high-fidelity prototypes. This was crucial for testing user flows and interactions before development, ensuring a smooth and intuitive user experience.
- **Vector Graphics:** Figma's robust vector graphic tools were used to design the app’s logo and custom icons, ensuring scalability and crisp visuals on all devices.
- **Design Systems:** The creation of a comprehensive design system in Figma helped maintain consistency across various UI elements. This included defining color palettes, typography, and reusable components, which streamlined the design and development process.
- **User Testing:** Figma’s integration with user testing tools allowed for easy sharing of prototypes with testers, gathering valuable feedback to refine and improve the design.

III- WIREFRAMING

Wireframing is a crucial step in UI/UX design process, serving as the blueprint for an app's structure and functionality. It provides a skeletal framework of the app, focusing on layout and content placement without the distraction of visual design elements. The wireframe provides basis for some design principles including harmony, gestalt, rhythm and alignment of the different design elements. This section will explore the specific wireframes created for Zaapa. Following are the wireframes that were created for this design;

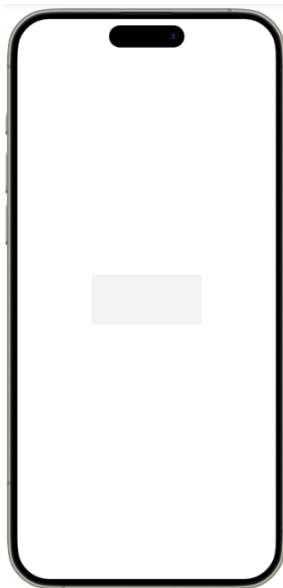


Figure 3 : Logo Page

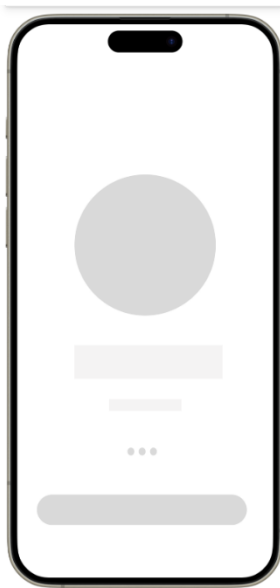


Figure 4 : App guide

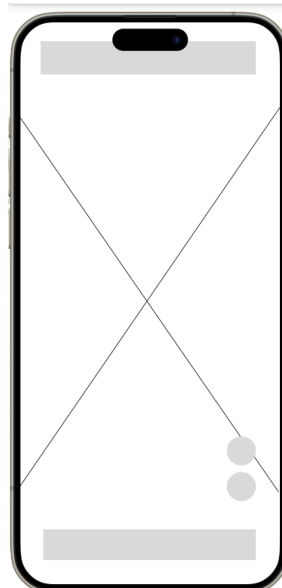


Figure 5 : Home page

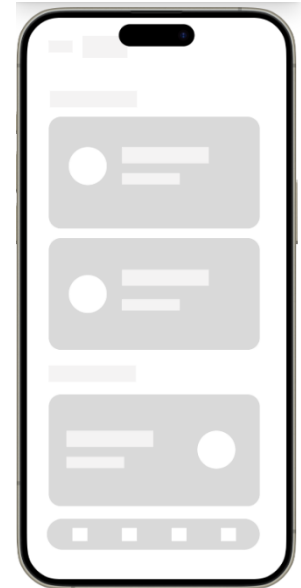
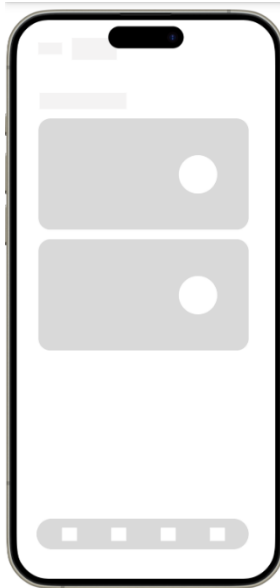


Figure 6 : Learning page



Figure 7 : Login Page



*Figure 8 : Notification
préférences*

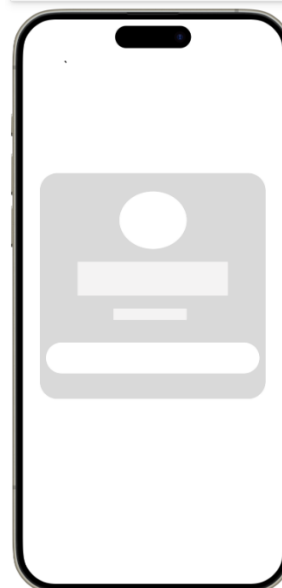


Figure 9: Pop-up



Figure 10 : Saved locations



Figure 11 : Setting page



Figure 12 : Sign Up Page

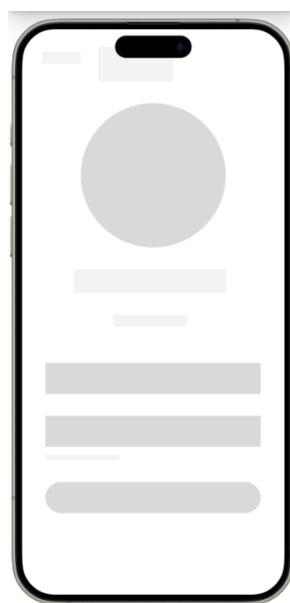


Figure 13 : Profile page



Figure 14 : Itinerary page

After coming out with the wireframes above, we can clearly identify harmony, gestalt, rhythm and alignment in the different design elements. Next, it is left to add colors, text, images and interactions to come out with a final design. This is discussed in the following topic.

IV- VISUAL DESIGN

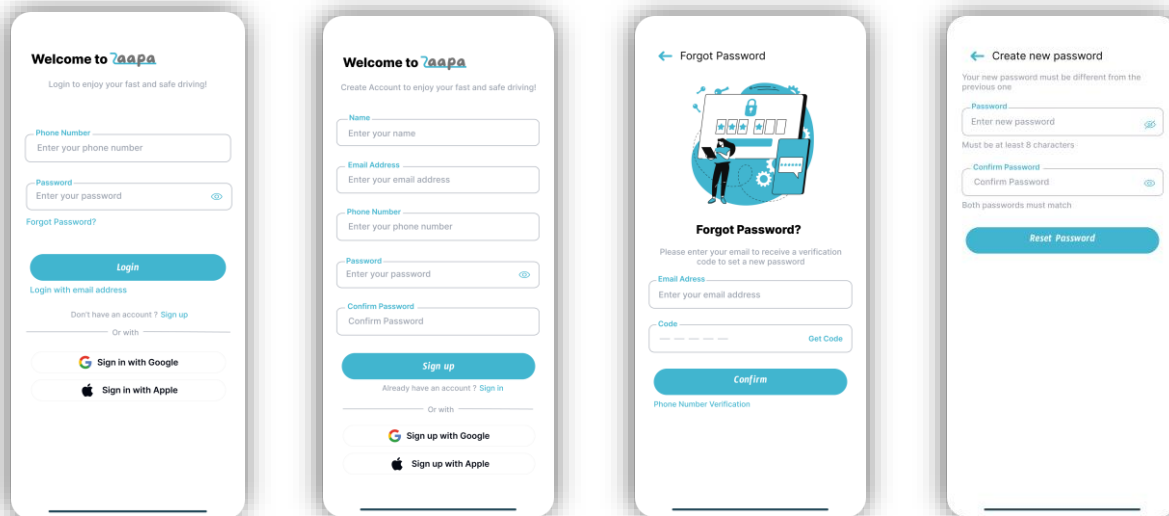
Visual design is the process of creating the graphical elements and overall visual aesthetics of the app. The goal of visual design is not only to make the product look appealing but also to enhance usability and create a cohesive and intuitive user experience, following the wireframes.

This section will elaborate on the different screens of the Zaapa app UI, clearly following the user flow during the use of the app.

[Click here](#) to access the Zaapa UI design.

IV.1 User Authentication

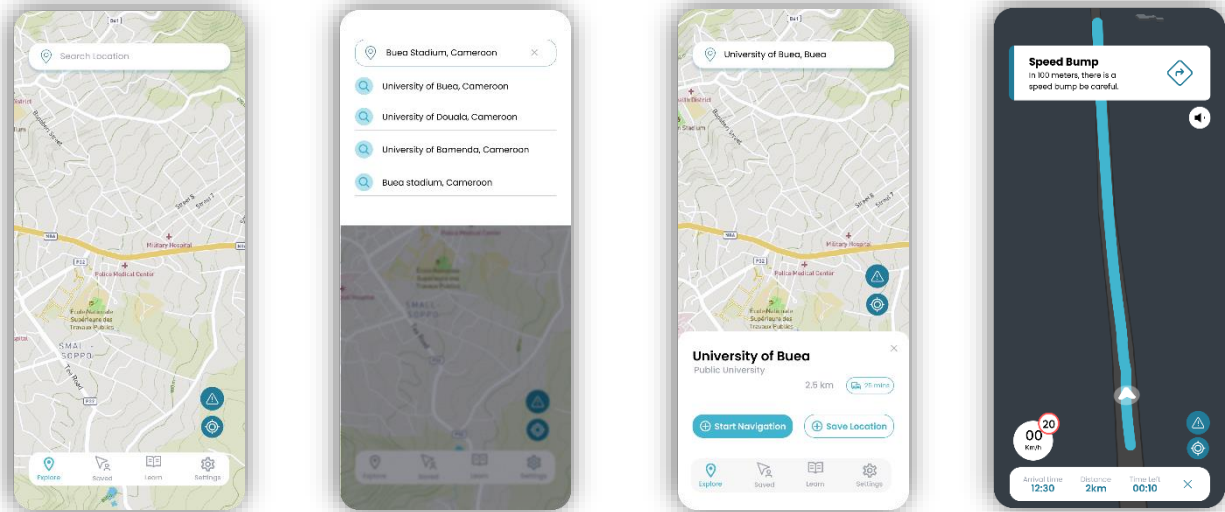
- Once the user opens the app, he is prompted to login with his email. He can also decide to login with his phone number.
- If he doesn't have an account, he can signup for an account.
- In case the user has forgotten his password, he can recover his password either using his email or phone number.
- Once the user has successfully logged in, he is directed to the home page.



IV.2 Navigation

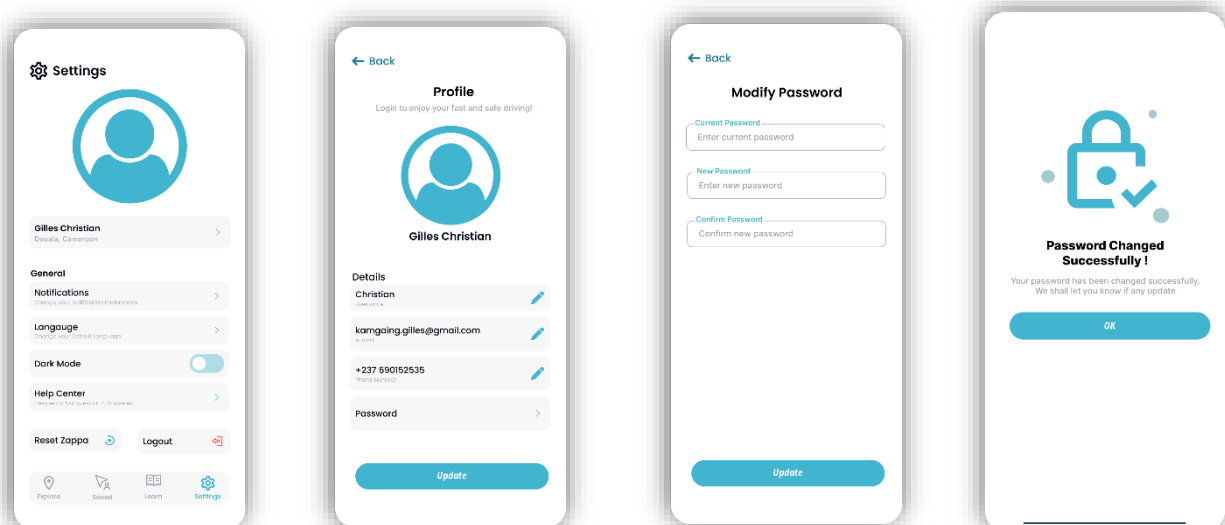
- Once the user is on the home page, he can enter his destination.
- He will be shown the itinerary and some information about the itinerary such as arrival time, and the possibility to save the itinerary as frequently accessed location.
- When he starts the itinerary, he is notified about road signs and road states upfront throughout his journey.
- When the user is stuck in traffic and has been on the spot for 5 minutes, the system automatically prompts a message to ask why he has stopped. He can select between

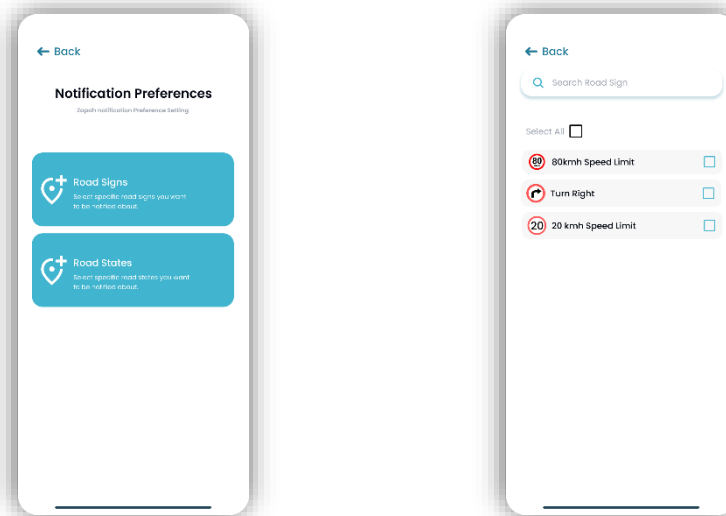
possible road states such as accidents, blocked roads and others before continuing his navigation.



IV.3 Settings

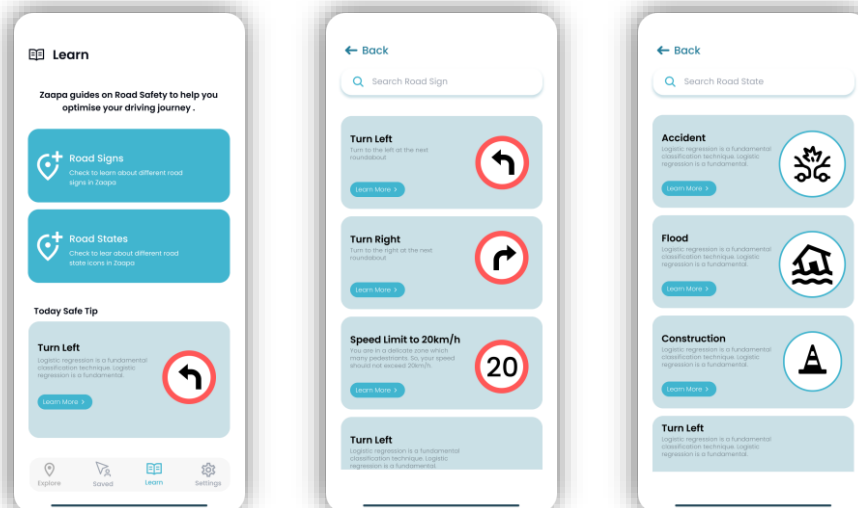
- The user can click on the settings button from the navigation bar to access the settings page.
- In the settings, the user can view his profile, modify notification preferences, change language, logout and others.
- When viewing his profile, he can modify his username, email, phone number and password.
- While changing his password, he is asked to enter the current password and the new password.





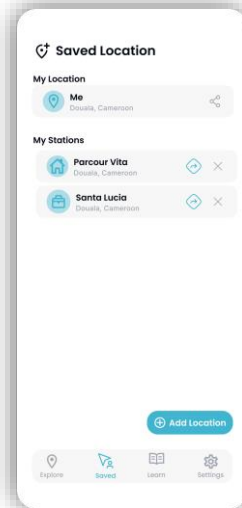
IV.4 Learn

- The user can click on the learn button from the navigation bar to access the learning center.
- In the learning center, he can choose the to learn about road states or road signs.
- If he chooses road signs, he is directed to a page containing road signs and their descriptions. He can also search for a specific road sign to learn about.
- If he chooses road state, he is directed to a page containing road states and their descriptions. He can also search for a specific road state to learn about.



IV.5 Saved Locations

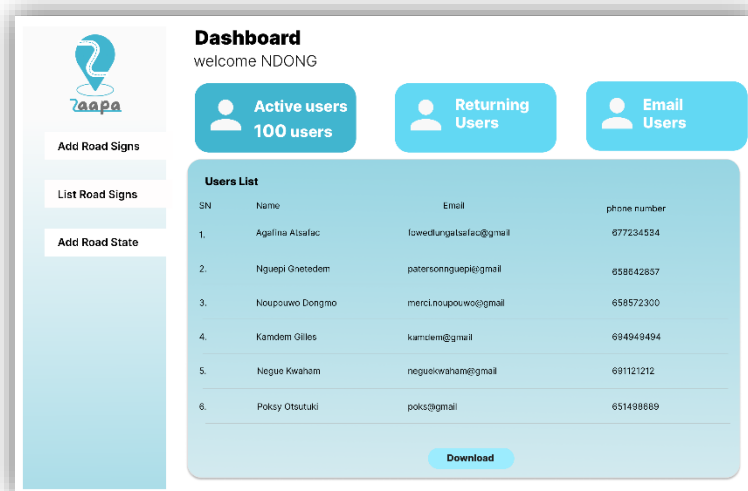
- The user can click on the saved button from the navigation bar to access the saved locations.
- In the saved locations, he can view or delete the locations he has saved.
- He can also add a new location in the saved locations.
- From these saved locations, he can directly have the itinerary to get there.
- Finally, he can share his location.




IV.6 Admin Dashboard

From the dashboard, the admin can;

- View active users
- Send broadcast emails to users
- Add a new road state or sign to the app






Add Road Signs

List Road Signs

Add Road State

Add Road Signs


Upload Road Sign Image


Upload

Road Sign Name

Description

ADD




Add Road Signs

List Road Signs

Add Road State

Add Road State

Upload Road State Image


Upload

Road State Name

Description

ADD

V- HANDLING EXCEPTIONS

Exceptions are unexpected events or errors that occur during the execution of a program, and managing them effectively is essential to prevent crashes, maintain functionality, and provide a smooth user experience. This section explores the common types of exceptions that could arise in Zaapa, and strategies for managing them.

Following are different exception instances in Zaapa and how to manage them

- **Incorrect Password**

During login, a user might unconsciously enter a wrong e-mail, phone number or password. In this situation, there is need for to system to notify the user with a reason and guide message relative to inability to login. Figure 15 below shows the “incorrect password” error message displayed to the user when he enters a wrong password. This message is displayed in red color representing error and warning.

- **Incorrect verification code**

When a user has forgotten his account password, he can reset the password which requires to enter the phone number to receive a verification code. In case the user enters an inexistent phone number or a wrong verification code, he needs to be notified. Figure 16 below shows how the “Invalid code” message is displayed when the user enters an invalid verification code.

- **Internet instability**

When internet connection is instable, it is possible that some requests might not be processed. In such situation, the user should be notified. Figure 17 below shows how an error popup is displayed to the user when he tries making a road state update when internet is unstable.

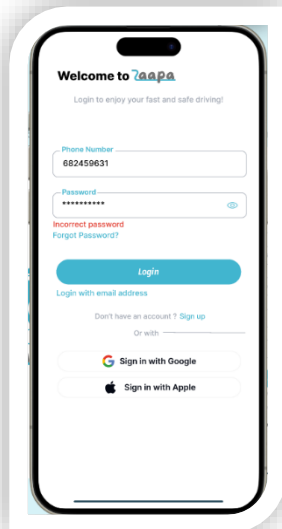


Figure 15 : Incorrect Password

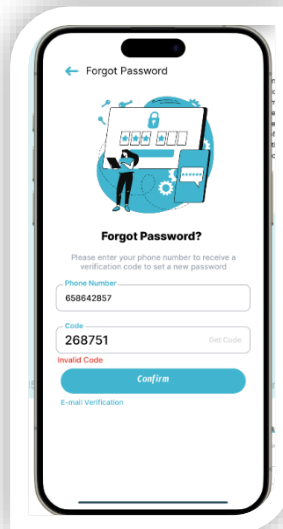


Figure 16 : Invalid code

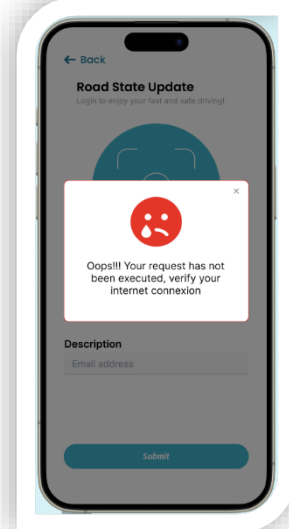


Figure 17 : Internet Instability

VI- EVALUATION AND VALIDATION

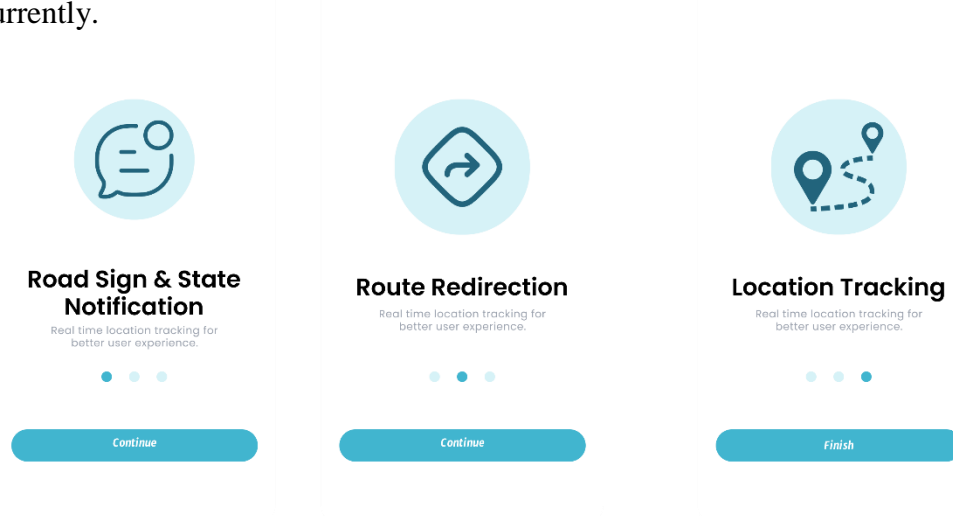
Evaluation and validation ensure that the final product meets the intended design principles and usability criteria. This section describes how the design of Zaapa was rigorously assessed (evaluated) to ensure that it aligns with the design best practices, usability criteria and design principles and validated to ensure it provides an optimal user experience, aligns with best practices in design, and meets the needs of its users.

VI.1 Evaluation

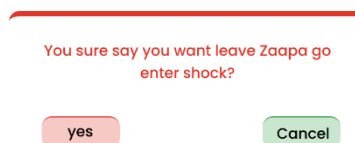
The system was evaluated based on:

VI.1.1 Usability Criteria by Nielson

- **Visibility of system status:** The progression of the system should be visible. It was done on the app guide pages, and through the navbar highlighting the section where the user is currently.



- **Match the system with the real world:** For example, don't put a green cross to signal an error. This was done on the logout warning frame and every exception.



- **Error prevention:** This involve providing the user with enough guides such that errors are minimized. This was done when the user is changing his password, by providing him with the number of characters his password should have.

- **Aesthetic and minimalist design:** It involves providing the user with the simplest possible design without crowded interfaces. This was implemented throughout the system design.

VI.1.2 Visual design principles

The system was also evaluated based on the principles of design including:

- **Unity:** This involves creating a sense of harmony between all elements in a page. This was implemented by applying a single color palette over every page of the design.
- **Hierarchy:** This is the perceived order in which elements on a design are viewed. This was implemented in the design by putting emphasis on important text or graphics when required.
- **Rhythm:** It involves all elements of the UI being consistent in shape and size. This was implemented with the consistent shape and size of text, text areas, shapes and graphics in the system.
- **Alignment:** It is demonstrated across the design with elements being perfectly aligned with one another.

VI.2 Validation

The system was tested and validated with some sample users and the design was iterated over and over until the final design was obtained, satisfying the user's need.

CONCLUSION

In conclusion, the design and development of Zaapa involved a meticulous and iterative process that focused on creating a cohesive, user-centric app. Starting with a strong app identity, including a cultural-inspired logo and blue color palette, we used Figma to develop wireframes, establish a consistent visual design, and create interactive prototypes. Robust exception handling ensured app reliability, while thorough evaluation and validation processes confirmed that Zaapa met key design principles and usability criteria. This comprehensive approach resulted in a visually appealing, user-friendly, and reliable app that effectively promotes eco-friendly habits and sustainability.

REFERENCES

- [1] <https://www.figma.com/>
- [2] <https://uicolors.app/create>
- [3] <https://www.usabilis.com/ui-design/>