University Bus

By

Feras Sameer Ramadan Saleem (AD0039)

Mohammed Ghassan Mohammed AlQunbar (AD0068)

Hamza Khaled Ahmed Msallam(AB1199)

Supervisor Dr.....

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Contents

1. Introduction and abstraction

1.1. Introduction

The project is a smartphone app running on Android operating system and Ios operating system. The app serves three main types of users: student, driver, and motion officer. This project aims at facilitating the use of university buses for students and informing movement officials about the movement of buses. Complete the required work, facilitate other users to perform their tasks, and reduce their effort.

All the goals we are pursuing will be set out in the following sections of this document, and we will explain the conditions and steps we have followed to get there.

In the end we aim to use transportation easily in the least possible time, and the best service.

1.2. System Purpose

In this part, we talk about the purpose of implementing this system and beyond. Through research and investigation, we found that many students suffer from using buses at the university and are unable to know the location of the bus or inform them of its location.

These services must be facilitated for students so that they can reach the university with ease.

1.3. Proposed problem solution

To solve the problem, we have developed a specialized application in transportation at the university that enables the student to share his location and know the location of the bus near him as quickly and with minimal effort.

This helps to avoid a student's contact with the Movement Department to find out where the bus is.

In addition, the movement manager can monitor the bus route and find out about their cargo.

1.4. Swot analysis

SWOT analysis is a framework for identifying and analyzing an organization's strengths, weaknesses, opportunities, and threats. These words make up the SWOT acronym.

The primary goal of SWOT analysis is to increase awareness of the factors that go into making a business decision or establishing a business strategy. To do this, SWOT analyzes the internal and external environment and the factors that can impact the viability of a decision.

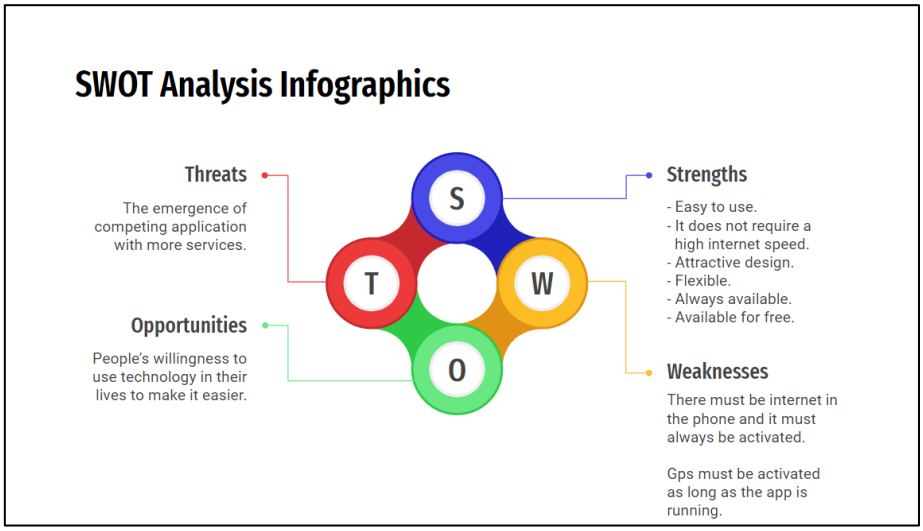


Figure (1-1) Swot analysis

1.5. Research scope

- Android applications.
- Android apps are legally allowed.
- Buses:
    1. Bus load.
    2. Bus driver information.

2. System Requirement analysis

2.1. Overview

- The main objective of the analysis phase is to analyze the system that is sufficient to identify all the functions and services expected from the system.
- The most important result that we obtain in the analysis phase is coming up with document requirements which will be designed in the next stage is the stage of the design, which relies heavily on the result of this stage, and help us in achieving the goals of the project hoped for.
- It is the analysis phase of the most important stages throughout the system, because of its significant role in shaping the path that will take after a system designer, which depends on what has been reached at this stage.

2.2. Data collection

In this system, we collect data by conducting a questionnaire and presenting the idea to different groups of people.

In addition to collecting data from drivers and traffic officials, knowing the most common problems and working to avoid them.

In addition, data was collected from a diverse number of students.

Data collection methods used in the system include:

1. Personal interviews
2. Questionnaires
3. Observations

2.3. Stakeholders

While investigating the "Bus University" app, we kept a list of potential stakeholders:

1. Students
2. Drivers
3. Traffic official (Admin)

2.4. Stakeholder in the Project

1. Student: His main role is to watch the buses on the map and share their location.
2. Traffic official (admin):
    a. His role is to monitor buses on the map and watch the students on the road.
    b. Add drivers and determine the bus load
3. Driver:
    a. View the students' location
    b. Download students
    c. Receiving notification of the presence of a nearby student

2.5. System Requirements

System requirements are the configuration that a system must have in order for a hardware or software application to run smoothly and efficiently. Failure to meet these requirements can result in installation problems or performance issues.

Hardware resources:

1. The speed of the application is linked to the speed of the phone and the Internet.
2. Internet connection
3. Memory is required by the device if the phone has a minimum of 170 MB.

2.6. Functional Requirements

In this phase of the software development process, our focus is on requirements elicitation techniques. This phase is a crucial component of the broader requirements engineering discipline, which encompasses activities such as requirements elicitation, analysis, specification, verification, and management.

Requirements elicitation is the process of gathering information about the needs and desires of users or stakeholders for a software system. It's aimed at understanding what the system should do and how it should behave to meet those needs effectively.

Typically, the selection of requirements elicitation techniques depends on company practices, or the personal experience of the team involved. However, there's often a lack of guidance on how to choose the most appropriate techniques for a specific software project.

Functional requirements are a key aspect of requirements elicitation. They define specific functions

or behaviors of the system or its components. These functions describe the relationship between inputs to the system and the corresponding outputs.

Overall, effective requirements elicitation is essential for the success of the software system, as it lays the foundation for the subsequent phases of development, ensuring that the final product meets the needs and expectations of its users and stakeholders.

❖ Students Requirement

1. The system must be able to allow students to create a new account in the application.
2. The system must be able to allow students to log in to their accounts.
3. The system must be able to allow students to reset their password.
4. The system must be able to allow students to navigate through the application screen.
5. The system should be able to allow students to view bus locations on a map.
6. The system should be able to allow students to share their locations on the map.
7. The system must be able to allow students to delete their locations from the map.
8. The system must be able to allow students to log out of their accounts.
9. The system must be able to allow students to change the language of the application.

❖ Driver Requirement

1. The system must be able to allow drivers to log into the account.

2. The system should be able to allow drivers to reset its password.

3. The system must be able to allow drivers to navigate through the app screen.

4. The system must be able to allow drivers to view student locations on a map.

5. The system must be able to allow drivers to receive notification that a student is nearby.

6. The system must be able to allow drivers to load students.

7. The system must be able to allow drivers to store the number of students on the bus.

8. The system must be able to allow drivers to unload the number of students on the bus.

9. The system must be able to allow drivers to log out of their accounts.

10. The system must be able to allow drivers to change the language of the application.

❖ Admin Requirement

1. The system must be able to allow the admin to log in to the account.

2. The system must be able to allow the admin to reset his password.

3. The system must be able to allow the admin to navigate through the application screen.

4. The system must be able to allow the admin to view bus locations on a map.

5. The system must be able to allow the admin to view the load of buses.

6. The system must be able to allow the admin to view student websites.

7. The system must be able to allow the admin to add a driver.

8. The system must be able to allow the admin to log out of their accounts.

9. The system must be able to allow the admin to change the application language.

2.7. Nonfunctional Requirement

Nonfunctional Requirements (NFRs) encompass system attributes that dictate its behavior and characteristics beyond specific functions. They include aspects such as security, reliability, performance, maintainability, scalability, and usability, among others. These requirements serve as constraints or guidelines for the design and implementation of the system across various backlogs and development phases.

❖ Availability:

1. The system must be accessible to students, drivers, and administrators 24/7, facilitated by a multi-server infrastructure to ensure continuous availability.

❖ Performance:

1. The system's response time should fall within the range of 1 to 6 seconds to provide a satisfactory user experience and efficient interaction.

❖ Security:

1. User passwords should be securely hashed, and a user token generation mechanism should be implemented to enhance security.
2. All transactions performed on the website must undergo authentication and authorization processes, verifying the role of the current user to ensure data integrity and prevent unauthorized access.

❖ **Usability:**

1. Both the widget system and the interface screens should be designed intuitively, presenting all available options to the user in a clear and accessible manner.
2. The application's design should utilize harmonious color schemes to enhance usability and visual appeal.

3. Design

3.1. Introduction TO design

3.1.1. Inputs to System Design

System design takes the following inputs:

- Statement of work
- Requirement determination plan
- Current situation analysis
- Proposed system requirements including a conceptual data model, modified DFDs, and Metadata (data about data).

3.1.2. Outputs for System Design

System design gives the following outputs:

- Infrastructure and organizational changes for the proposed system.
- A data schema, often a relational schema.
- Metadata to define the tables/files and columns/data-items.
- A function hierarchy diagram or web page map that graphically describes the program structure.
- Actual or pseudocode for each module in the program.
- A prototype for the proposed system.

3.2. Interface Design

The graphical user interface is a form of user interface that allows users to interact with electronic devices through graphical icons and audio indicators such as primary notation, instead of text-based UIs, typed command labels or text navigation.

1) Splash Screen

Through this screen we initialize the application to start immediately call the associated API and make the application ready to start

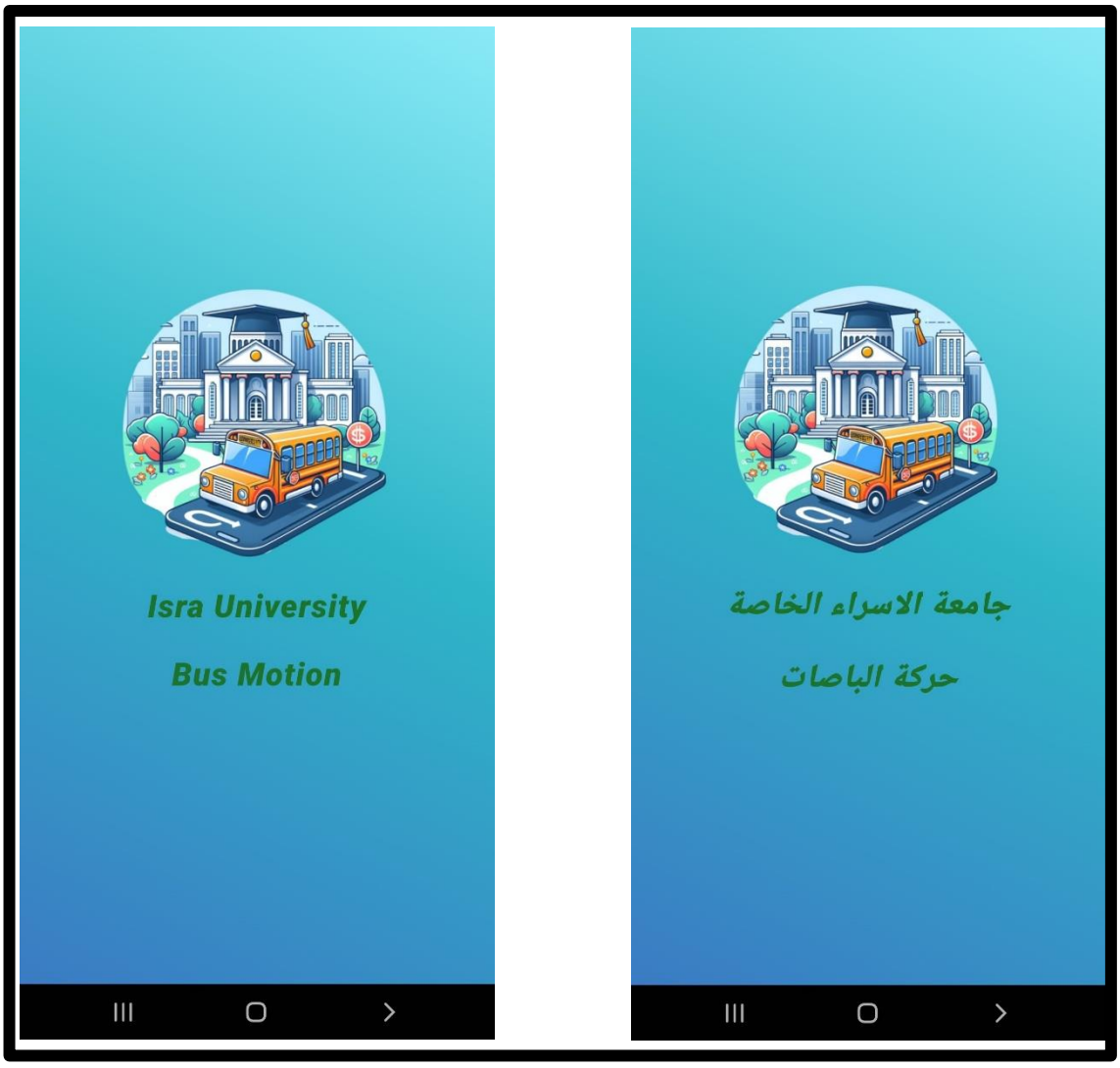


Figure (3-5) Splash Screen

2) Login

This screen asks the user to enter his email and password to log into his account.

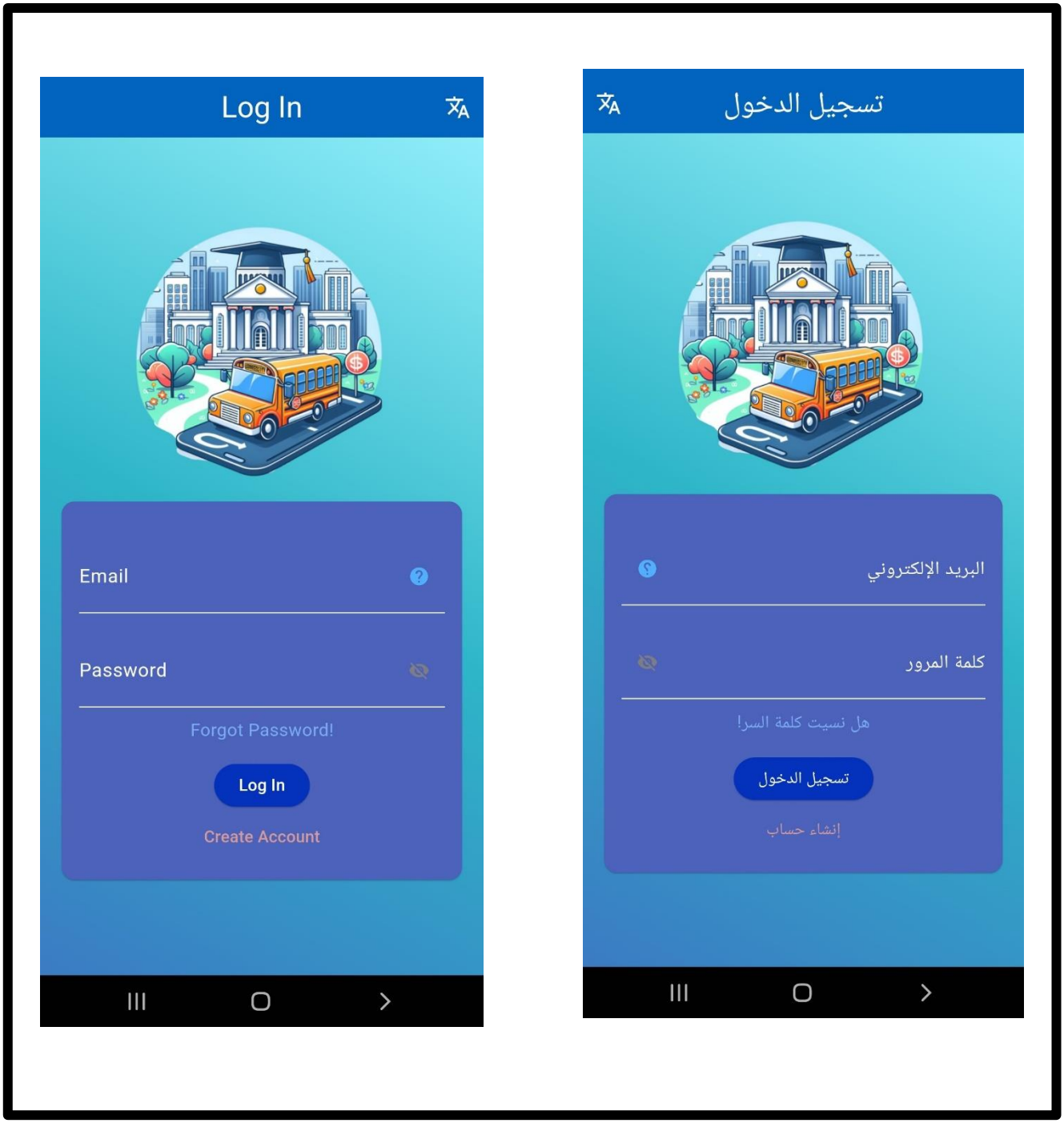


Figure (3-6) Login

3) Registration

This Screen issued to create a user Account.

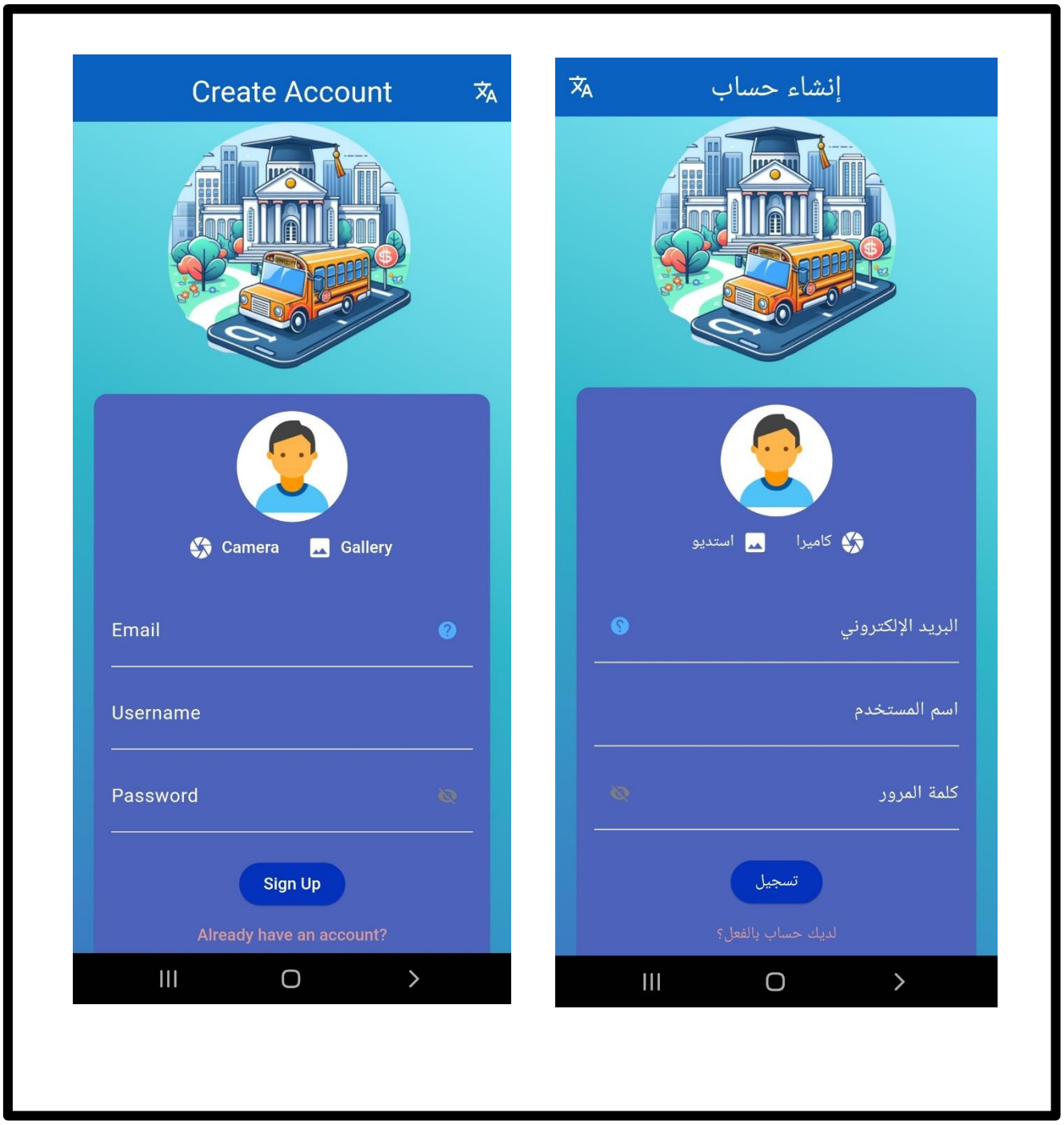


Figure (3-7) Registration

4) Wait Screen

This screen appears when the application is loading data from the database

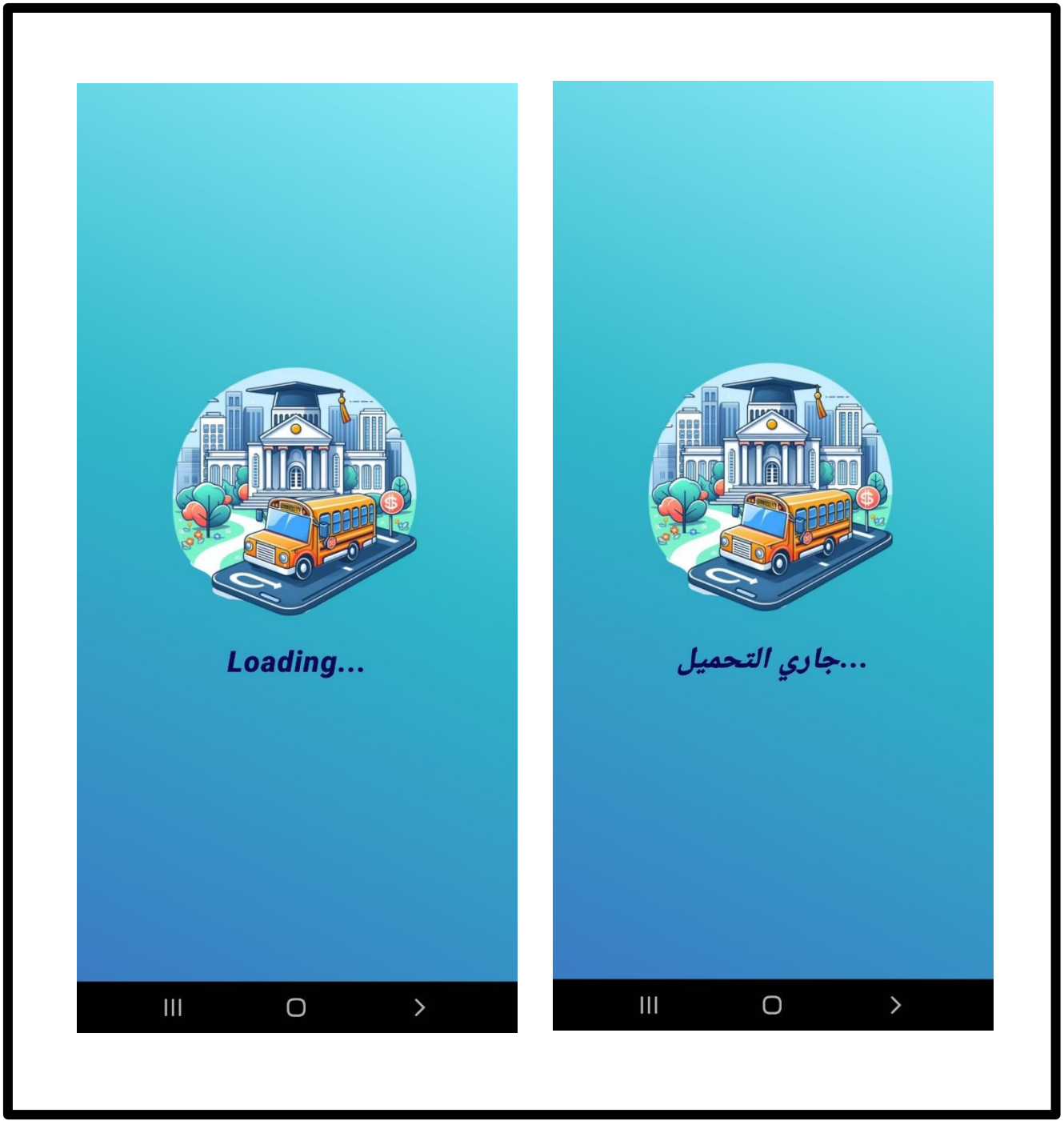


Figure (3-8) Wait Screen

5) Email Help Message

Instructions appear in a message that helps the student know the email with which to log in to the application

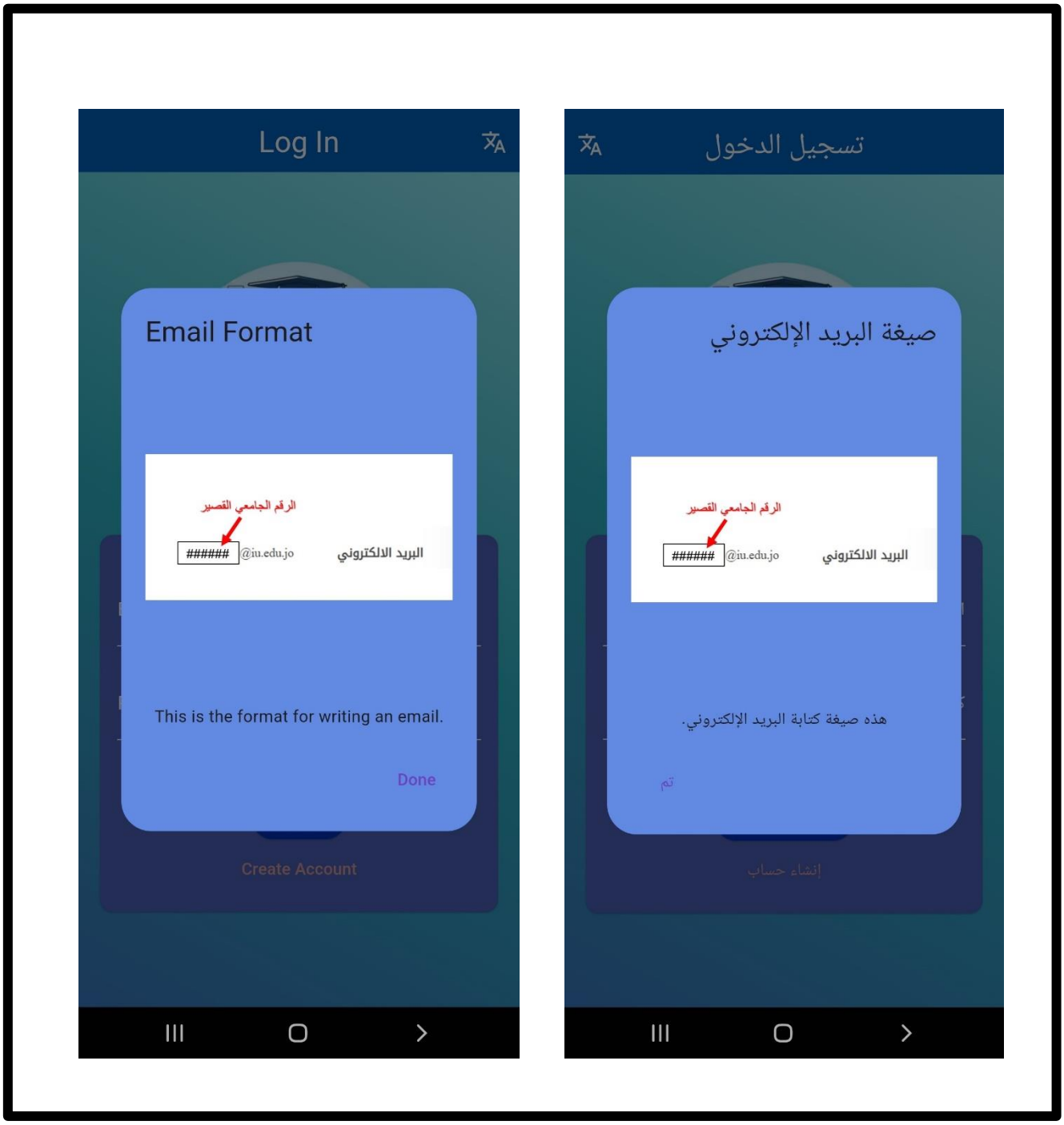


Figure (3-9) Email Help Message

6) Password Recovery

On this screen, the password can be recovered when entering the email. A link to change the password is sent to the email entered

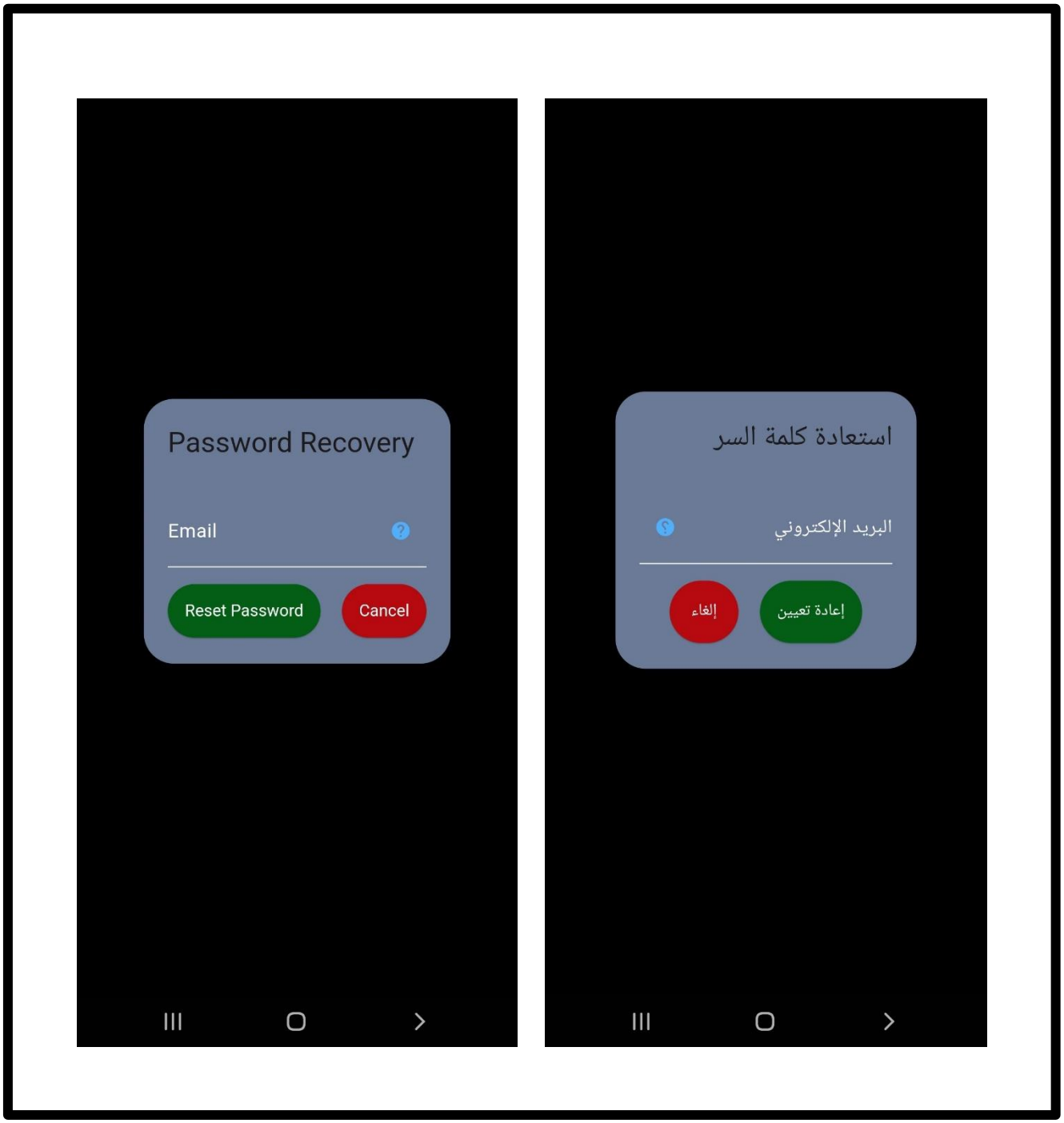


Figure (3-10) Password Recovery

7) Admin Main Screen

This screen shows the bus numbers in the database and the add driver button

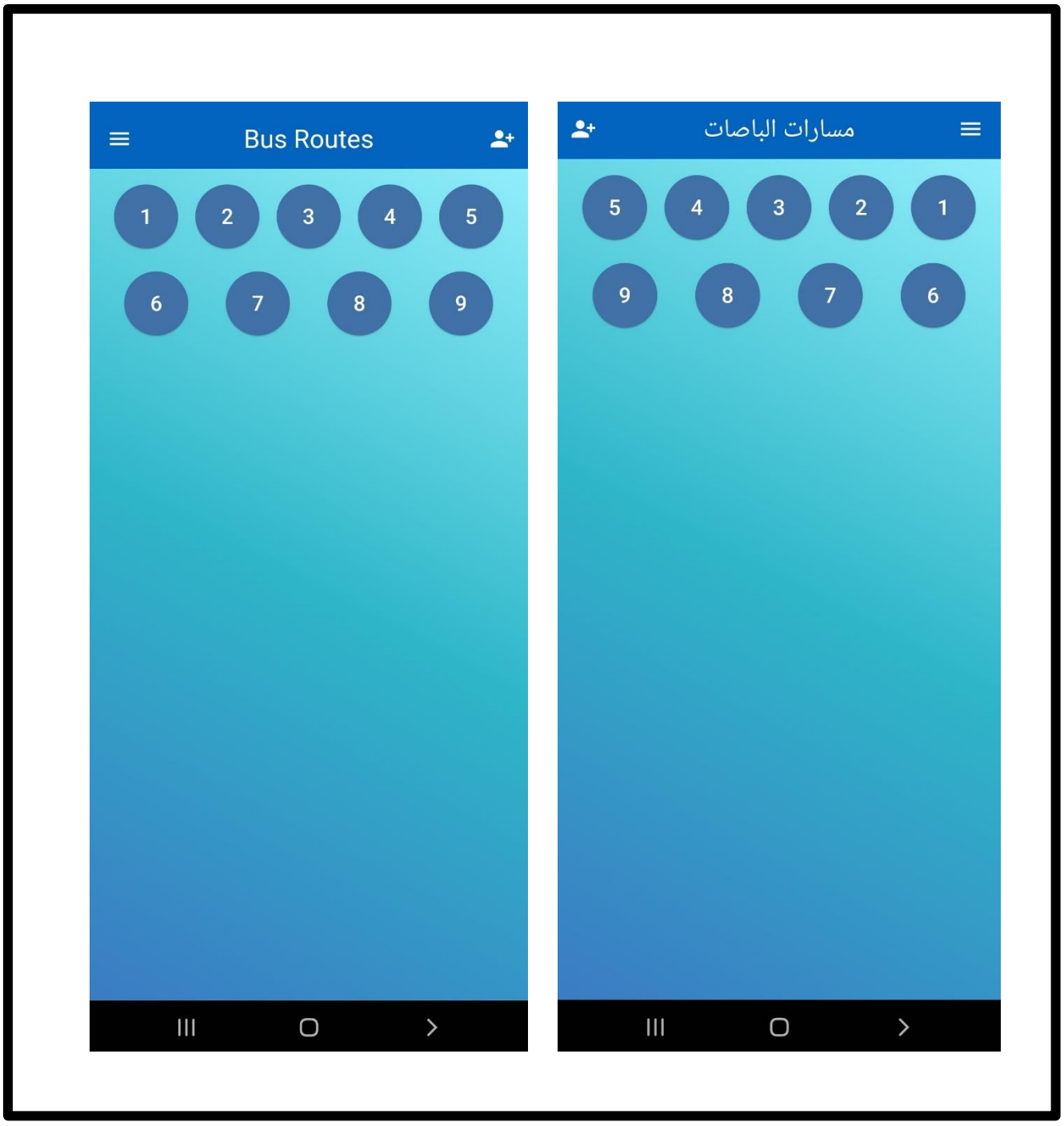


Figure (3-11) Admin Main Screen

8) Add Driver

Add driver to database screen

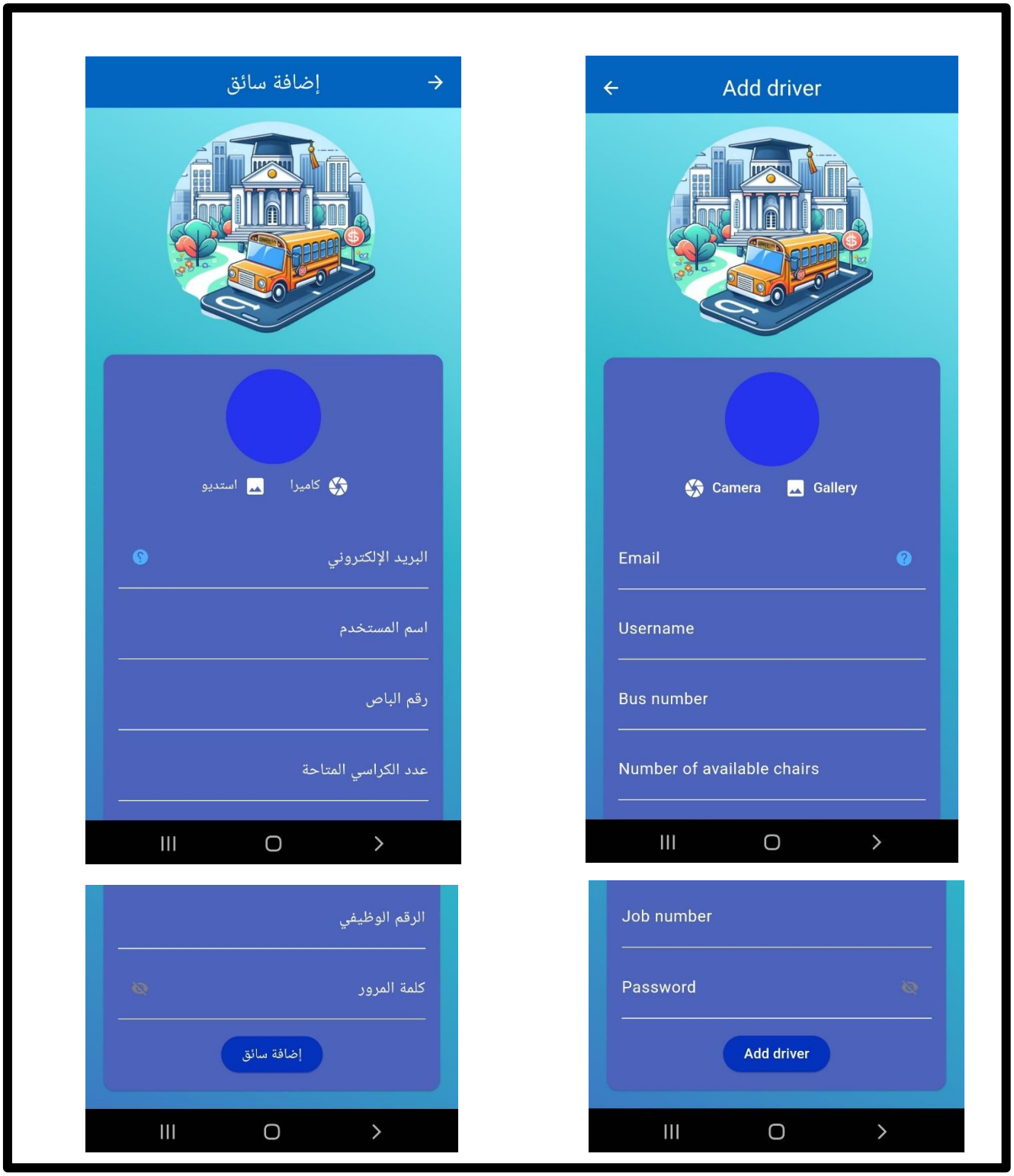


Figure (3-12) Add Driver

9) Driver Details

A screen showing the driver's data in the database and his direct location

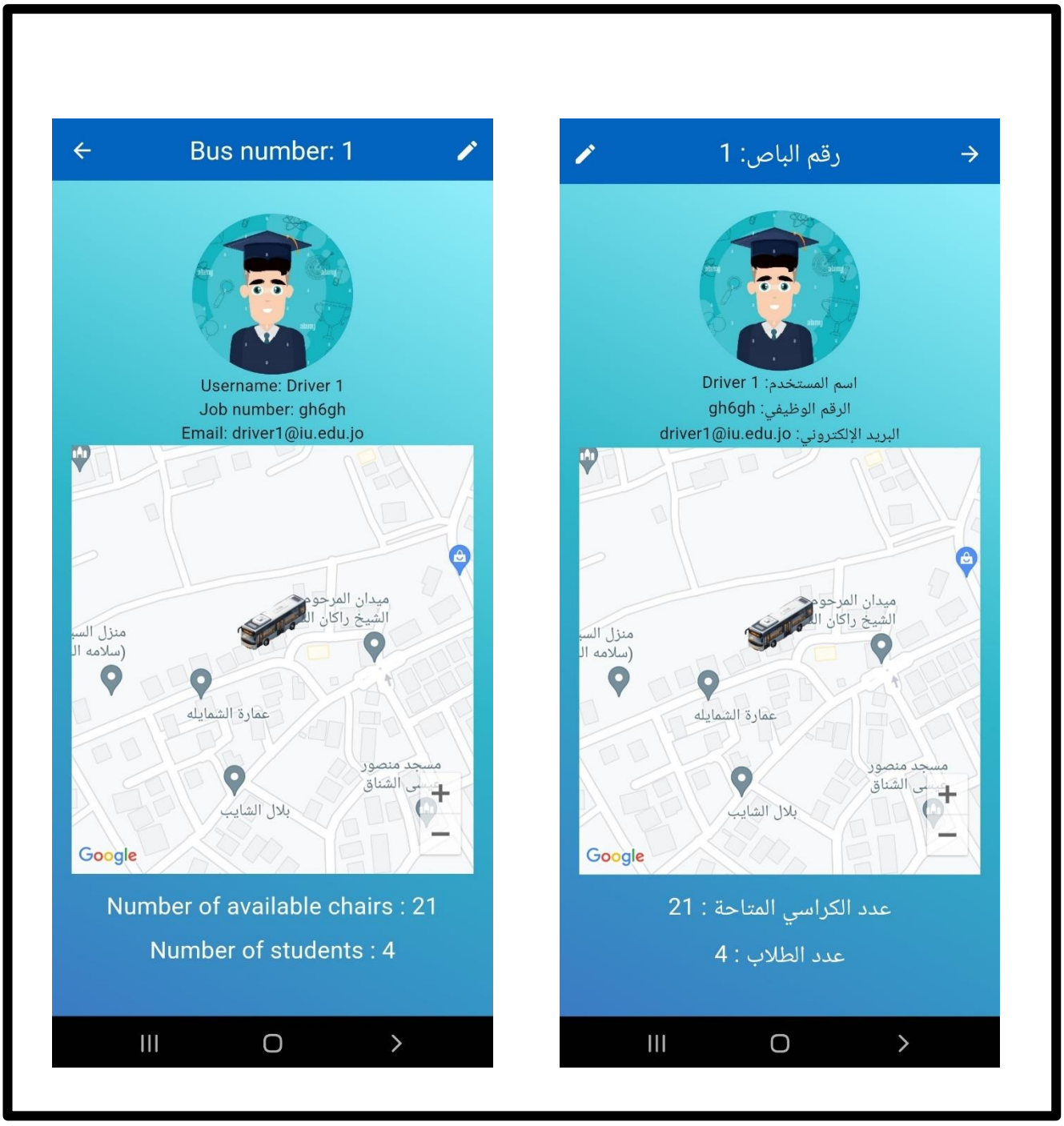


Figure (3-13) Driver Details

10) Update Driver Information

On this screen, the driver's data is updated in the database

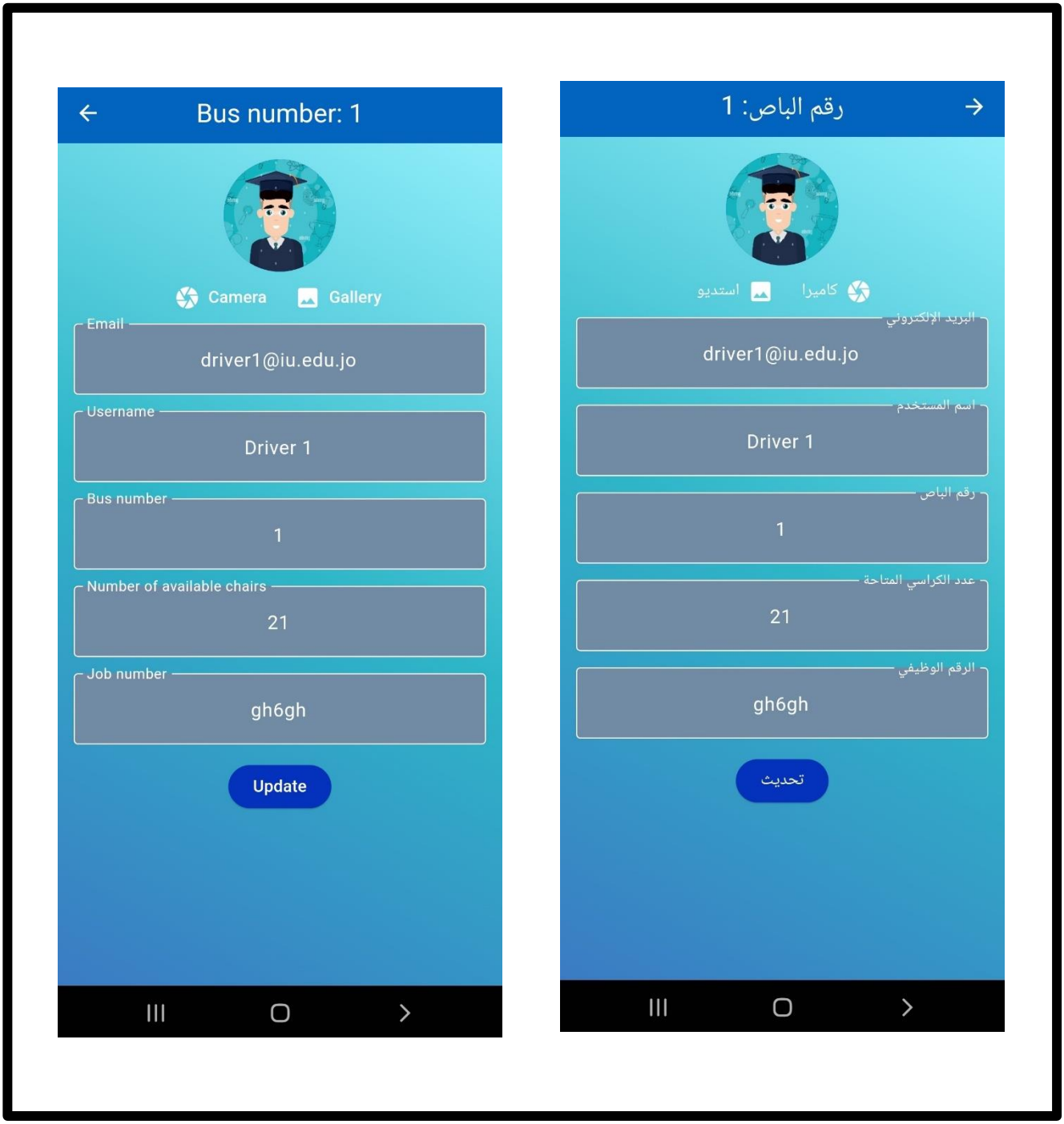


Figure (3-14)Update Driver Information

11) Side Menu

The User side menu shows his picture, email, username, the language change button, and the log out button

Figure (3-15) Side Menu

12) Setting Screen

On this screen, you can change the language settings for the application and log out of the account

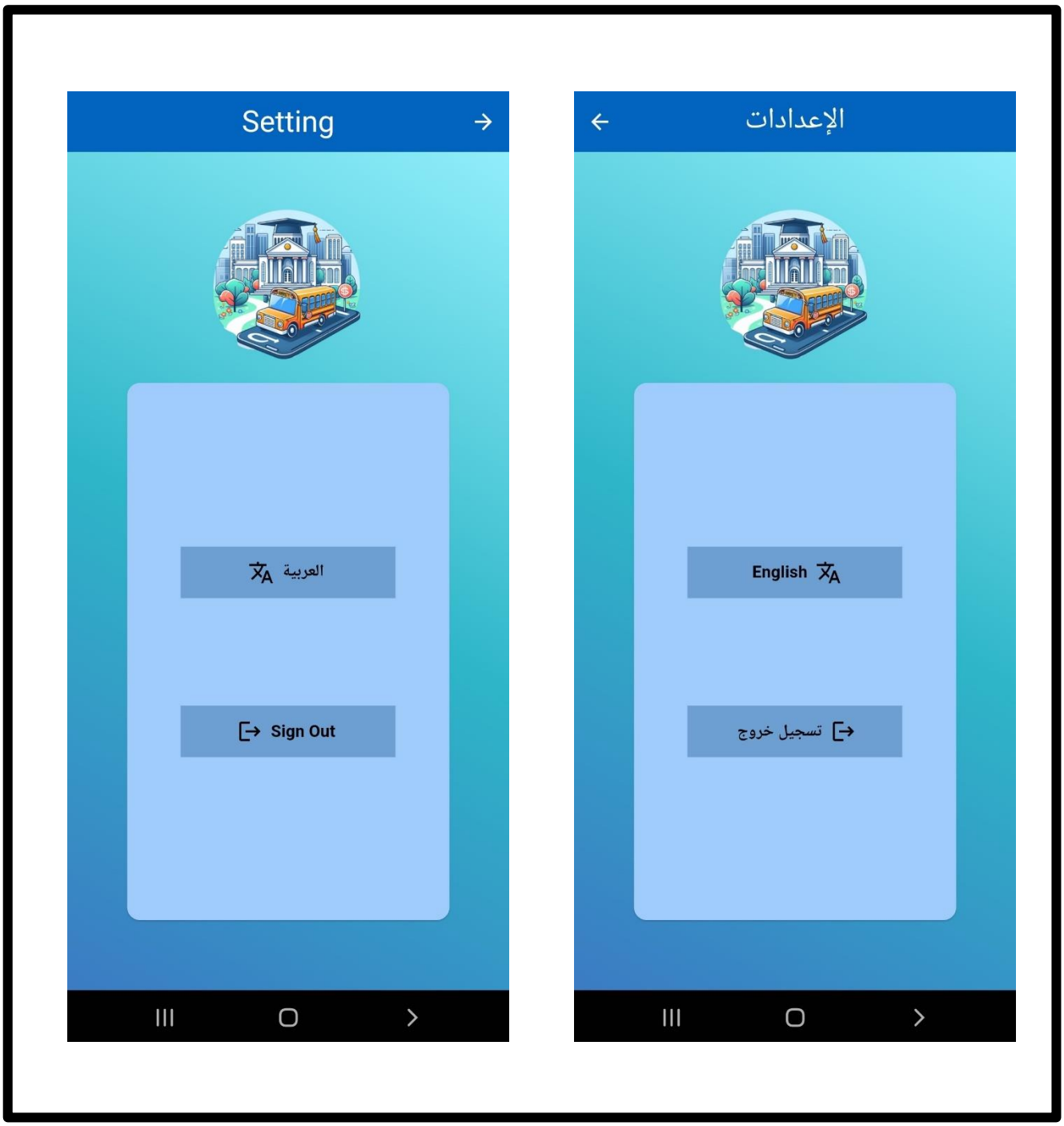


Figure (3-16) Setting Screen

13) Update Admin Data

On this screen, the admin can update his data

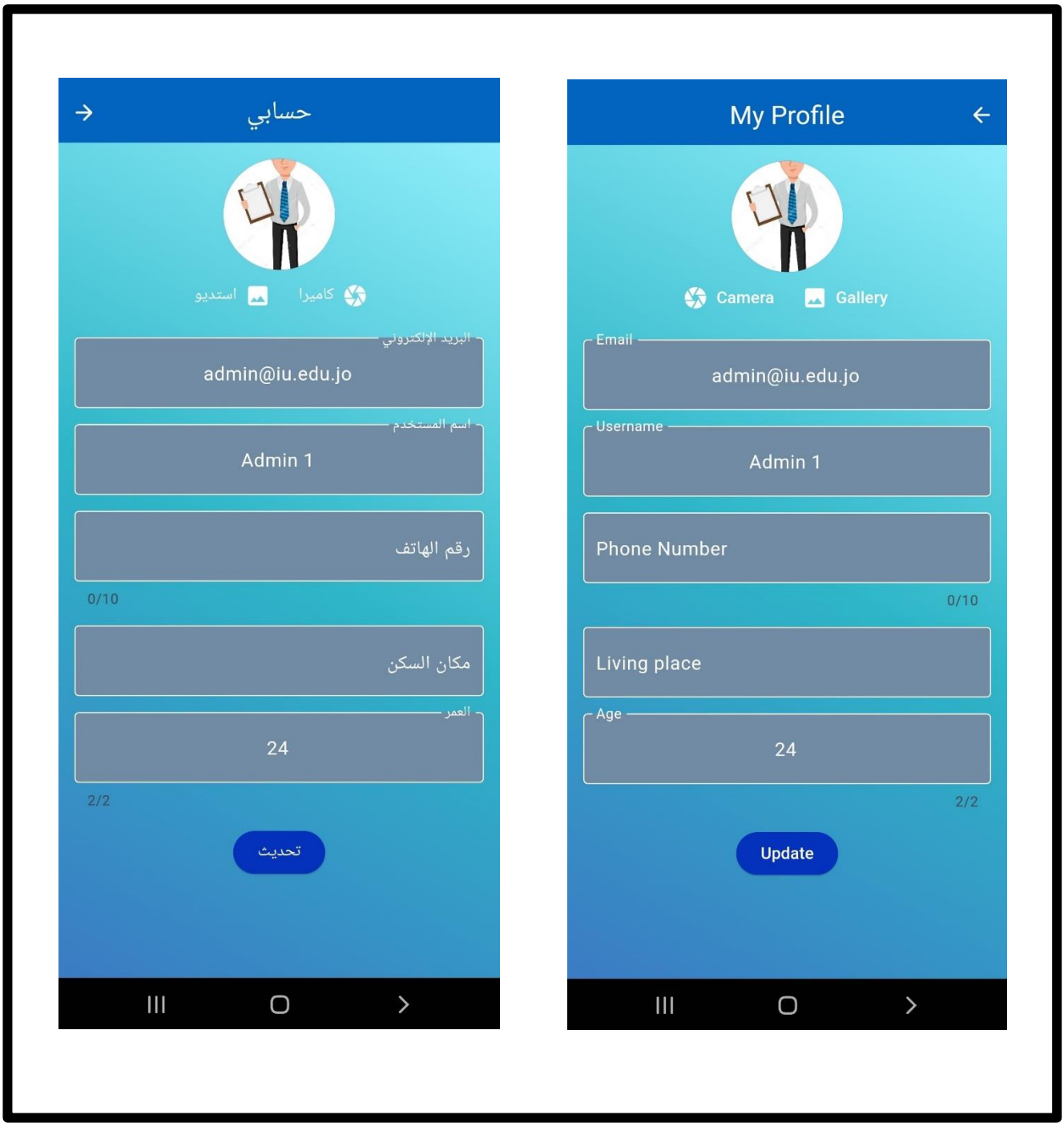


Figure (3-17) Update Admin Data

14) Driver Main Screen

This page shows the driver's location, the number of seats on the bus, and the number of students on the bus

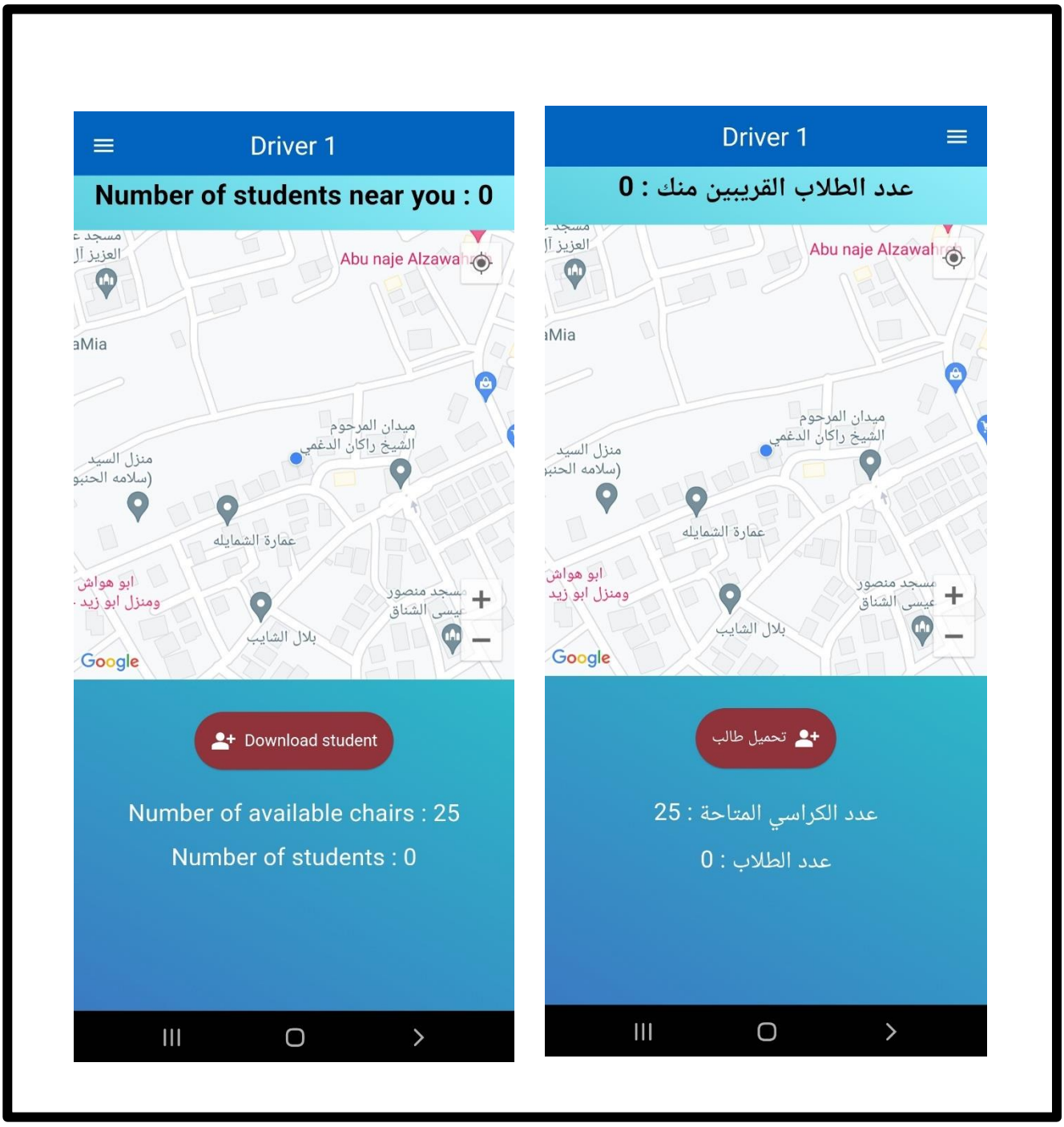


Figure (3-18) Driver Main Screen

15) Message of Chairs is Not Empty

On this page, a message appears: The number of chairs has expired

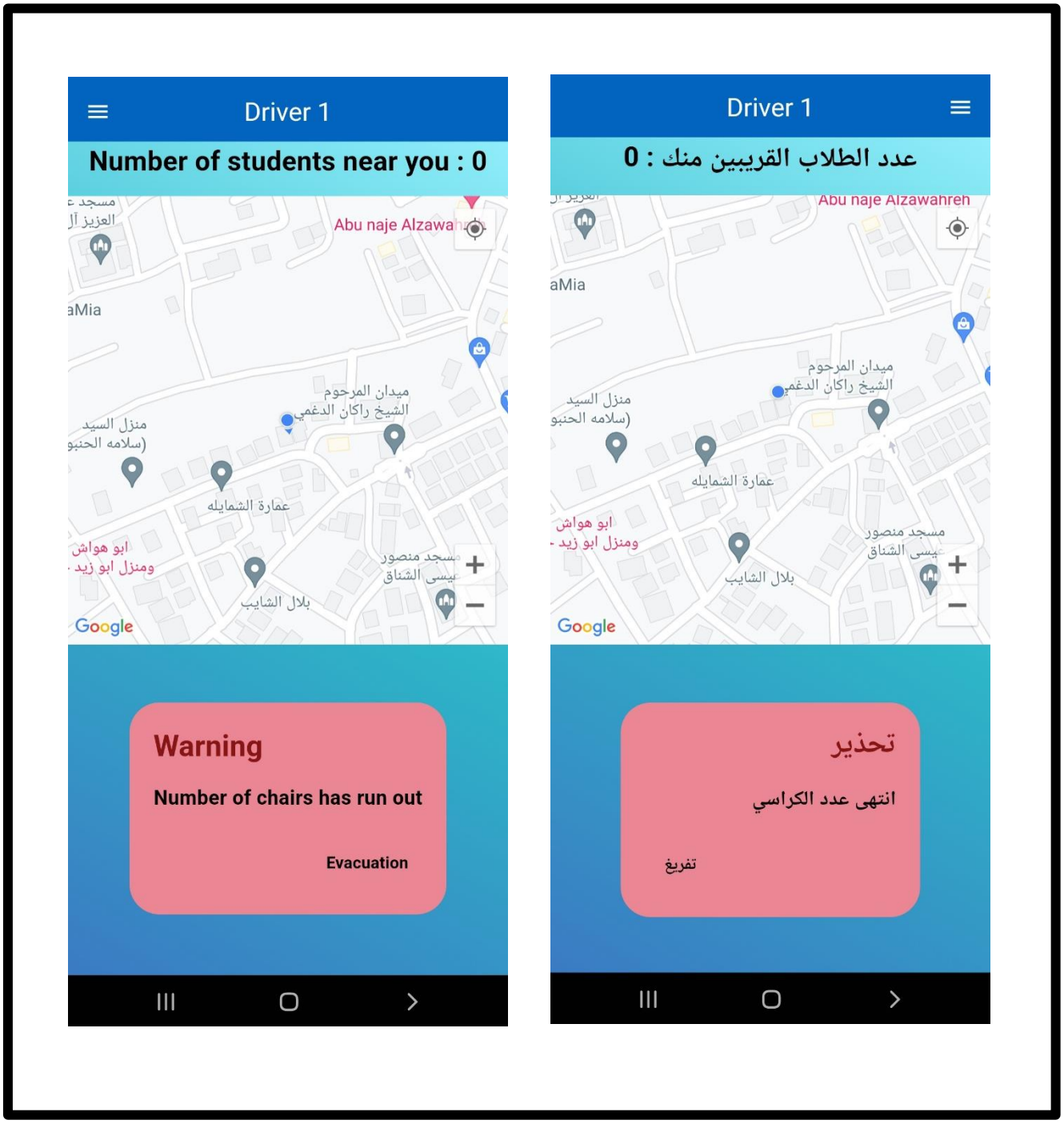
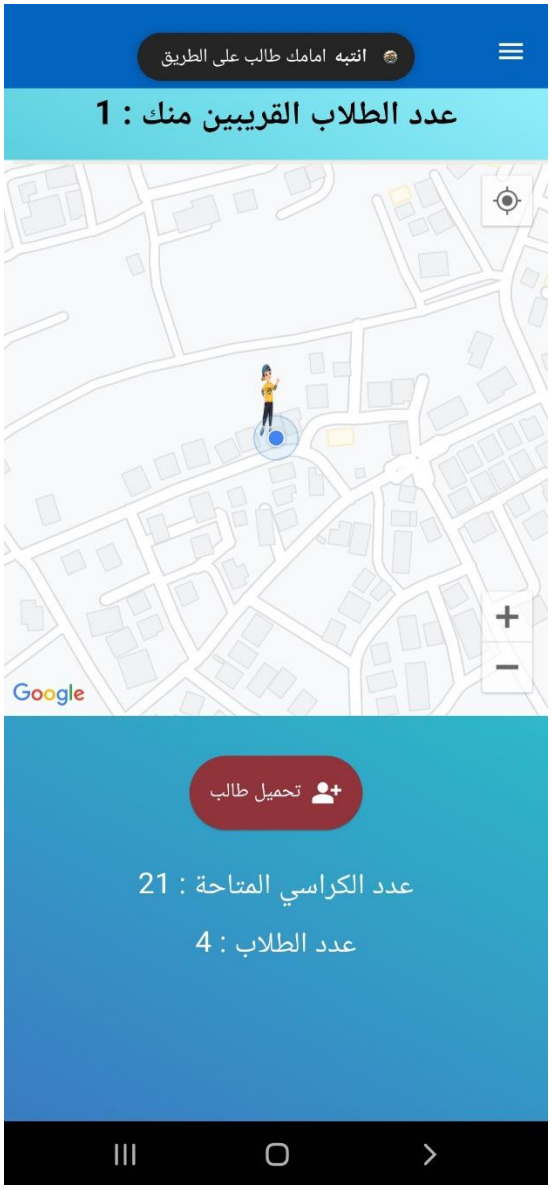


Figure (3-19) Message of Chairs is Not Empty

16) Receive Notification

On this page, the driver receives a notification that a student is nearby



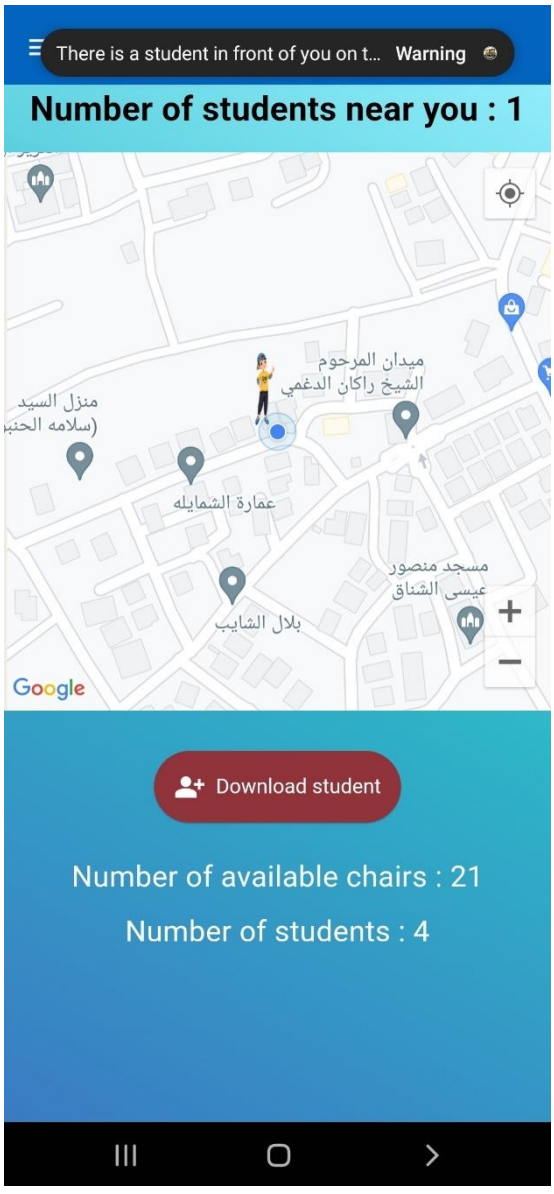


Figure (3-20) Receive Notification

17) Update Driver Data

On this screen, the driver can update his data

Figure (3-21) Update Driver Data

18) Student Main Screen

On this screen, the location of the buses appears on the map and press share or delete the student's location

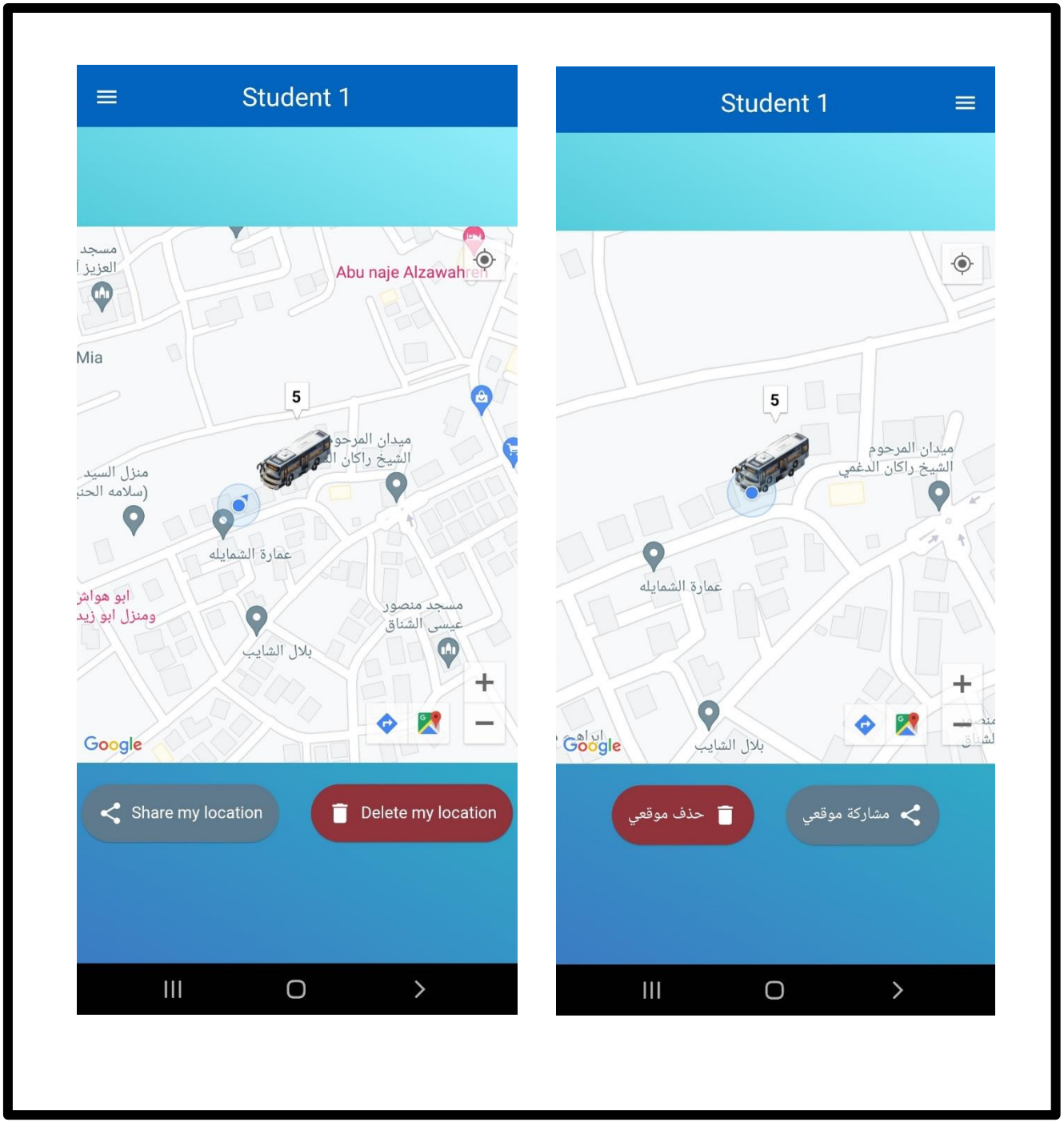


Figure (3-22) Student Main Screen

19) Message Share Location

A message appears when a student successfully shares his or her location

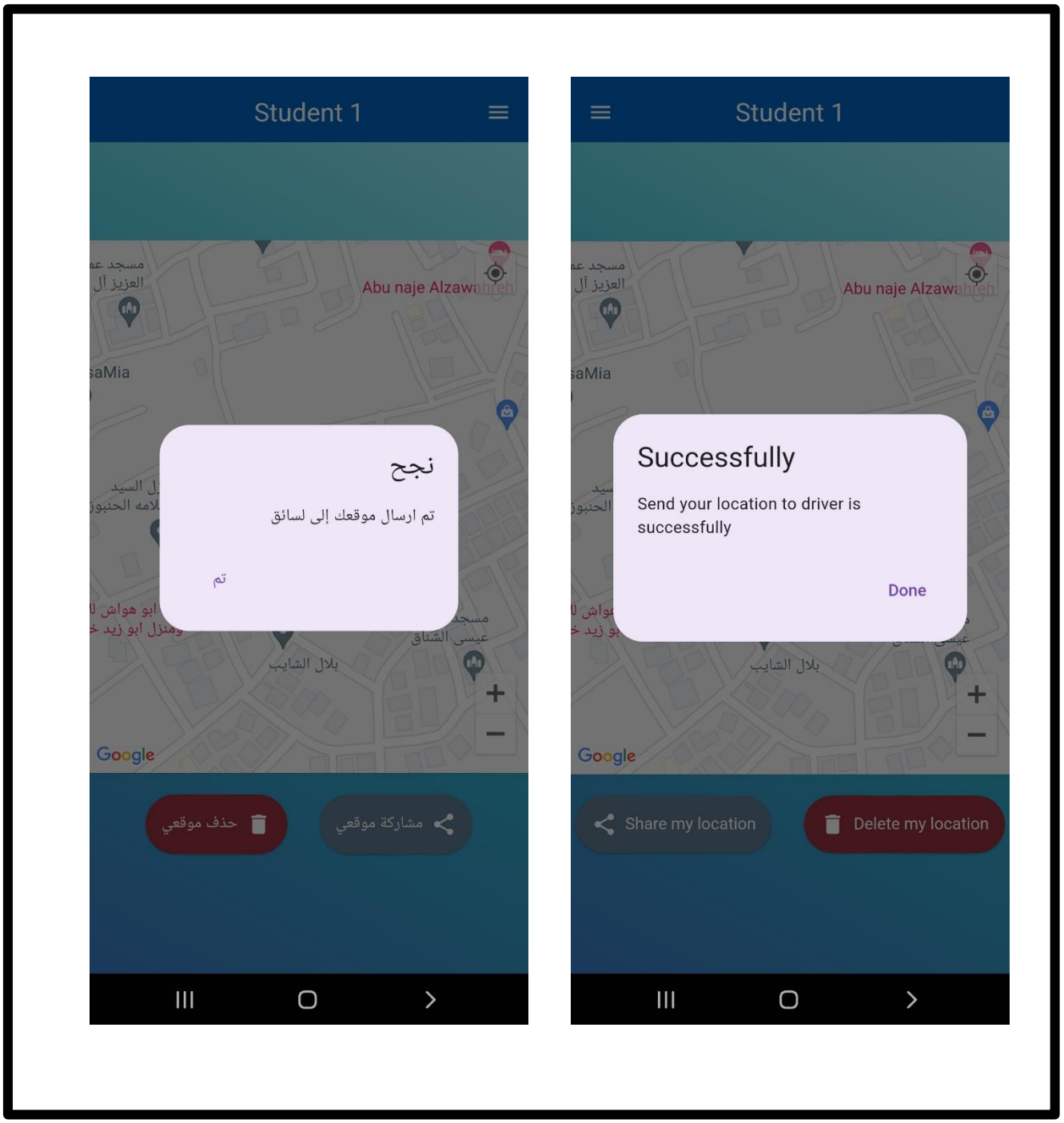


Figure (3-23) Message Share Location

20) Message Delete Location

A message appears when a student successfully deletes his or her location

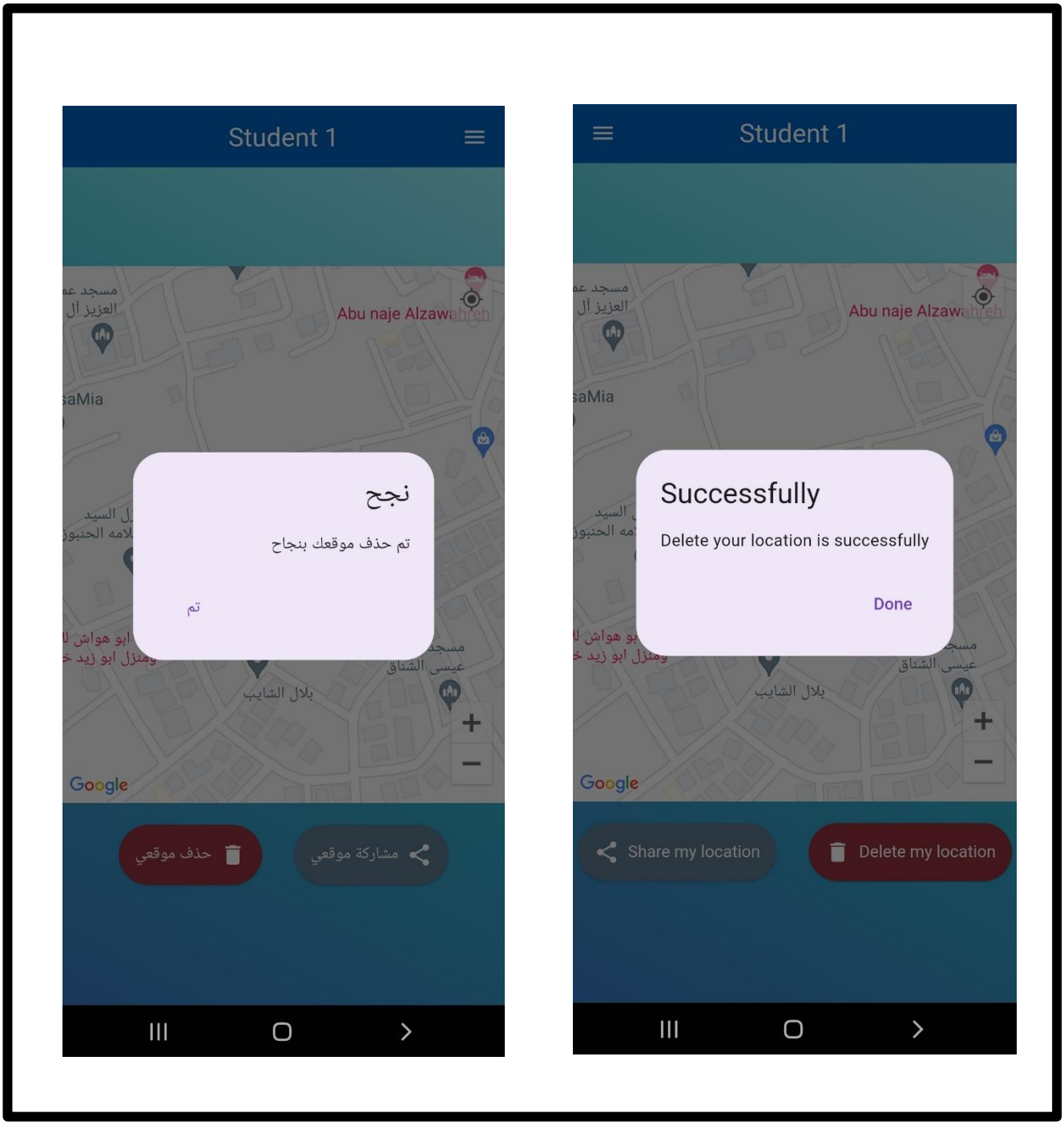


Figure (3-24) Message **Delete** Location

21) Student Account Update Screen

On this screen, the student can update his data

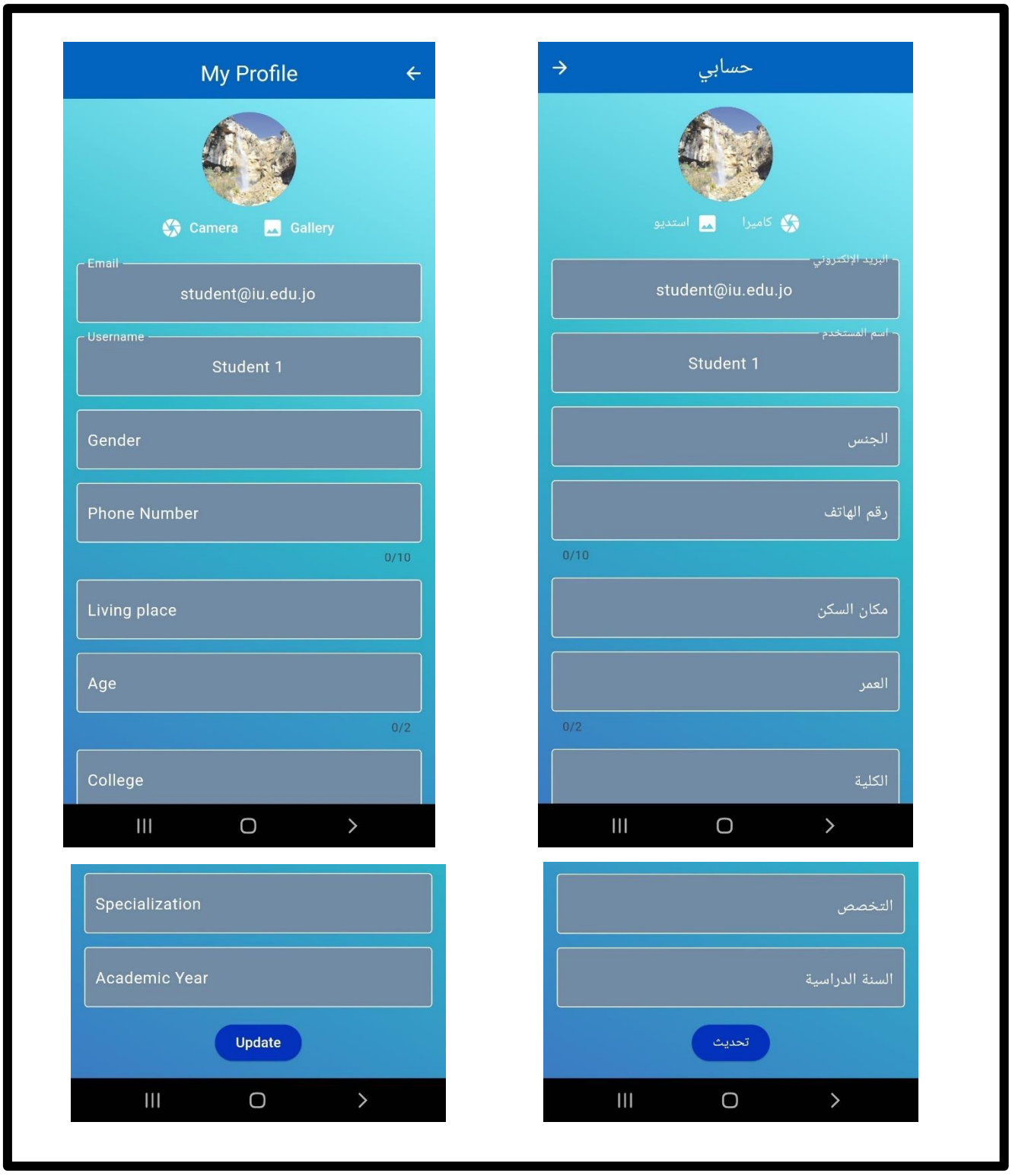


Figure (3-25) Student Account Update Screen

4. Software Testing

is a group of techniques to determine the correctness of the application under the predefined script.

The process of validating a system to ensure that it meets business requirements.

Testing includes an examination of code and the execution of code in various environments.

- ❖ Black Box Testing:
  Black box testing involves evaluating the functionality of an application without delving into its internal workings. This method provides a comprehensive examination of the system's behavior from start to finish, simulating end-user interactions. Unlike other forms of testing, black box testing doesn't necessitate knowledge of programming.

Input	Expected output	Actual output
Fill in all required fields when sign-up	Successful sign-up	User sign-up was successful
Leave a blank field when sign-up	No sign-up with error message	Page Reload and no user created
Login: Existing username, Valid password	Successful login	User login was successful
Login: Existing username, Invalid password	No login with error message	User can't login and Reload Page
Student shares his location	Send the location to the database	Succeed
Student delete his location	Delete the location from the database	Succeed
The admin adds a driver	Sending driver data to the database	succeed
The admin views the driver's details	Bring driver data to the database	succeed
Driver shares his location	Send the location to the database	Succeed
The driver views the location student	Bring student location to the database	succeed

Table (4-1) Black Box

The table (4-1) shows black box testing results after test system functionality to ensure the functions work successfully and match the expected result.