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Bachelor degree in Computer Engineering

## Software Graduation Project



## Little Hands

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## **Disclaimer**

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## Abstract

This project “Little Hands” presents a digital child care platform designed to connect parents with trusted caregivers, child support specialists, and experts through a single, easy-to-use app. It helps parents find and book the most suitable support based on their specific needs, offering access to essential services such as babysitting, special needs care, and expert consultations—whether at home, school, or online.

The application was developed using Flutter for the frontend (user interface) and Node.js for the backend (server side). It features dedicated user interfaces for both families and caregivers, with a secure login and registration system. Caregivers can register, subscribe to the platform, and choose a specific role (e.g., babysitter, expert, or special needs supporter). Parents in turn, can search for matching caregivers, browse detailed profiles, check availability, read reviews, exchange messages, and book sessions for the desired service directly through the app.

Main features include guided booking flows, personalized caregiver matching, integrated feedback and rating systems, real-time messaging, notifications, and calendar-based scheduling. In addition to live services, the platform also offers access to valuable children-related educational content shared by expert caregivers, helping parents stay informed and supported beyond the sessions.

By incorporating essential child care services in one platform, Little Hands offers parents a reliable, easy, and convenient way to find professional support for their children’s health, development, and well-being.

# Chapter 1

## Introduction

### 1.1 Background

Childcare is essential for the development of both children and society. As financial, social, and time pressures increase, families face new challenges in managing their responsibilities while ensuring their children receive proper care and support. In a dynamically changing society like Palestine—where education and health are foundational pillars for progress and generational change—access to trusted child care is more important than ever.

Traditional methods of finding childcare, such as relying on personal recommendations, connections, or visiting local centers, are often inefficient and stressful, and with the presence and the endless evolution of technology, they are becoming more obsolete.

Although technology has simplified many areas of daily life, there remains a significant gap when it comes to accessible, all-in-one digital solutions that support parents in managing their children’s care. This challenge is especially present in Palestinian society, where education and health are key pillars for achieving long-term community development and generational progress. The lack of a unified, trustworthy platform for childcare services limits families’ access to much-needed support, especially for those who require specialized services. Thus, there is a growing demand to bridge the gap of a one-package digital solution that offer reliable, safe, easy and convenient access to babysitters, specialists, and child development experts. Therefore, this project aims to address that gap by building a user-friendly mobile application that offers a centralized platform for essential childcare services.

### 1.2 Objectives

The main objective of this project is to design and develop a digital mobile platform—Little Hands—that connects families seeking child care services with qualified local caregivers, and simplifies the access to trusted child care services. The application is intended to help families in the following:

- Searching and booking reliable caregivers such as babysitters, shadow teachers, and child development experts based on location and preferences.
- Allow them to view caregiver profiles, check schedules, read service offerings, and communicate directly through messaging.
- Provide instant booking and secure access to trusted babysitting and expert services.
- Use a location-based matching algorithm to ensure families are connected with suitable and available caregivers nearby.
- Support caregivers in presenting their services, managing bookings, and engaging with families in need.
- Access personalized support based on their child’s specific needs.
- Communicate professionally with caregivers and experts.
- Keep track and organize through scheduling, notifications, and feedback tools.
- Benefit from shared educational content and expert advice.

On the other hand, Caregivers are given a platform to register, showcase their expertise, manage their schedule, and connect with families in need of their services. Once the goals of the project are achieved, the project guarantees to ease the stress and complexity involved in arranging childcare, while empowering families and professionals alike.

### 1.3 Significance

This project holds both social and practical importance, and the long-term impact of it lies in its potential to fulfill a real-life and growing need in today’s society. With more dual-working parents, limited time, and a growing demand for specialized child services, the need for safe, reliable, easy to use and accessible platforms is increasing. The traditional process—relying on acquaintances, scattered online searches, or visiting physical centers—is often unreliable and time-consuming. By offering an all-in-one digital product that brings together babysitting, special needs care, expert consultations, and educational resources, Little Hands saves time, builds trust, and supports parents in making informed decisions.

In addition to supporting families, the platform also creates meaningful job opportunities and income streams. Many individuals are eager to work but lack access to structured channels for offering their services. Little Hands empowers these individuals by providing a professional space where they can register, showcase their qualifications, manage appointments, and earn income through flexible, on-demand bookings.

By connecting supply and demand in an organized, secure, and transparent way, the platform supports both community well-being and local economic participation, especially in a society where digital employment opportunities are increasingly vital.

## 1.4 Organization of the Report

This report is structured to clearly present the design, development, and evaluation of the Little Hands childcare platform. It consists of the following sections:

- **Introduction** – Provides an overview of the project, explaining the motivation behind building a digital platform to connect parents with trusted caregivers, and the gap in such services in the local context.
- **Literature Review** – Reviews existing childcare and caregiver-matching platforms globally, identifying the lack of integrated and culturally adapted solutions in Palestine and similar regions.
- **Methodology** – Details the development process including:
  - Tools and technologies used (Flutter, Node.js, MongoDB, etc.)
  - System architecture and database design
  - Implementation details for both client and server sides
  - **System Features and Implementation** – Describes major platform functionalities such as user registration and authentication, caregiver onboarding, booking logic, notification system, expert content sharing, feedback and ratings, and admin dashboard.
- **Results and Discussion** – Presents the outcomes of development and system testing. It also discusses the challenges faced during implementation and how they were handled.
- **Conclusion and Recommendations** – Summarizes the project's key achievements and offers suggestions for future improvements.

## Chapter 2

# Literature Review

The advancement of mobile technology has significantly transformed how families access childcare services, shifting from traditional informal networks to digital, on-demand platforms. This change aligns with broader trends in the platform and sharing economy, where services are intermediated through mobile apps and websites that enable real-time matching, geolocation, and peer-based reviews. Applications such as Care.com [2] and Sittercity [6] have served as dominant providers in this field, providing structured environments for families to connect with caregivers. These digital platforms operate by offering features such as user profiles, background checks, secure payment systems, and review mechanisms—yet concerns remain regarding the security and accountability of their processes.

Research shows that trust and reputation are crucial for childcare apps because parents need to feel confident when choosing caregivers. Trust in childcare apps comes from both technical features, like secure payments and data protection, and social features, like caregiver reviews and parent feedback. As these apps use algorithms to suggest matches or spot risks, concerns arise about fairness, transparency, and how data is handled. Good app design is also important—it should be simple and quick to use for busy parents and work well for people from all income levels. However, not everyone can access these services, especially lower-income families who may not have smartphones or reliable internet.

While Care.com [2] and Sittercity [6] have established key foundations in digital childcare services, there remain visible gaps and opportunities for future innovation. These include implementing real-time safety features, offering multilingual support, integrating verifiable credentials (e.g., for special needs care), and enhancing parental controls and transparency. Emerging technologies such as AI-driven matching and blockchain-based verification could enhance trust and accountability. Ultimately, the future of mobile childcare applications lies in developing ethically grounded, user-centric platforms that address the limitations of current models while ensuring safety, accessibility, and policy compliance.

# Chapter 3

## Methodology

### 3.1 Overview of the Methodology

This chapter outlines the methods and technologies used in the design, development, and implementation of the “Little Hands” application. It covers system architecture, database structure, client and server implementation techniques, tool selection, and the project’s features and implementation.

### 3.2 Tools and Technologies

The development of the “Little Hands” digital platform relied on a set of modern tools and technologies to ensure cross-platform compatibility, real-time performance, and scalability. The mobile application was built using Flutter, enabling a single codebase for both Android and iOS. The backend was developed with Node.js and Express.js, providing a lightweight and modular framework for building RESTful APIs. MongoDB, a NoSQL database, was chosen for its flexibility in handling dynamic and unstructured data such as user profiles, bookings, and messages.

For real-time communication features, Socket.IO was integrated into the backend to enable instant updates for booking status changes and live messaging between users. In addition, Firebase Firestore [3] was used to manage real-time chat data and push notifications through Firebase Cloud Messaging (FCM) [3]. The web-based admin interface was developed using React.js, offering a responsive and interactive environment for administrators to manage the platform.

Additionally, Google Gemini was utilized to automatically summarize PDF articles published by expert caregivers, generating simplified and AI-enhanced educational card-shaped visualizations for parents.

The development was carried out using Visual Studio Code as the primary IDE. Git and GitHub were used for version control and collaboration, while Postman was employed for testing and verifying backend API endpoints.

These technologies were selected to ensure a seamless, secure, and intelligent user experience while allowing for future feature expansion.

## 3.3 System Architecture and Design

The “Little Hands” system was built using the Model-View-Controller (MVC) architecture to ensure clean structure and maintainability. In this design, the application is divided into three main components:

- **Models**, which define the structure and format of data stored in the database, such as users, bookings, notifications, feedbacks and weeklyPreferences for caregiver availability.
- **Views** are the user interfaces in the mobile app (built with Flutter) and the web admin panel (built with React), which display the information and allow users to interact with the system.
- **Controllers**, which handle incoming requests from the client and coordinate appropriate responses.

To support this structure, the app also includes two important components:

- **Services**, which contain the main business logic of the app — such as finding matching caregivers, calculating feedback scores, or managing booking status changes.
- **Routes**, which define the available API endpoints and connect them to the appropriate controller functions.

Communication between the mobile or web client and the backend was managed through RESTful APIs, ensuring a consistent and organized flow of data. In addition, Socket.IO was implemented to enable real-time features such as instant booking status updates and immediate responses in special cases, for example, notifying parents with alternatives when a caregiver cancels a confirmed booking.

This architecture also supports role-based access, allowing different users (parents, caregivers, and admins) to access only the features relevant to their roles. The use of MVC helped make the system easier to develop, test, and expand in the future.

## 3.4 Implementation Details

### 3.4.1 Client Side (Flutter App)

The client side was developed using Flutter to support both Android and iOS. The app includes full Arabic language using Right-to-Left (RTL) support. A responsive layout and reusable components were used to ensure a consistent and accessible user experience. The Android emulator was used to preview and check the interface during development.

### 3.4.2 Server Side (Node.js API)

The server side was developed using Node.js with the Express.js framework. A clear structure was followed by separating routes, logic, and data handling. Middleware was used to handle authentication and authorization, ensuring secure access based on user roles. Token-based login was implemented using JWT.

Core functionalities such as user registration, caregiver matching, booking management, messaging, feedback handling, and expert post management were organized into dedicated service layers to keep the code modular and easy to maintain.

### 3.4.3 Database Design

MongoDB was used as a flexible, document-based NoSQL database. Mongoose was used as an Object Data Modeling (ODM) library to define schemas, add validation, and manage relationships between collections.

## 3.5 System Features and Implementation

### 3.5.1 User Registration and Authentication Flow

#### 3.5.1.1 Welcome Screen

The welcome screen appears when the user first opens the application. It contains a brief carousel that introduces the platform's purpose and features, along with two main buttons: "إنشاء حساب" for registration and "تسجيل الدخول" for login, allowing users to proceed based on their role. 3.1.



(a) Welcome Page 1



(b) Welcome Page 2

Figure 3.1: Welcome Page

#### 3.5.1.2 Registration Process

Parents and caregivers can register by entering their full name, email, password, and other required information. After submitting the form, a verification email is sent to confirm the user's identity as shown in 3.5. The account becomes active only after successful email verification.

(a)

(b)

Figure 3.2: Parent Reregistration

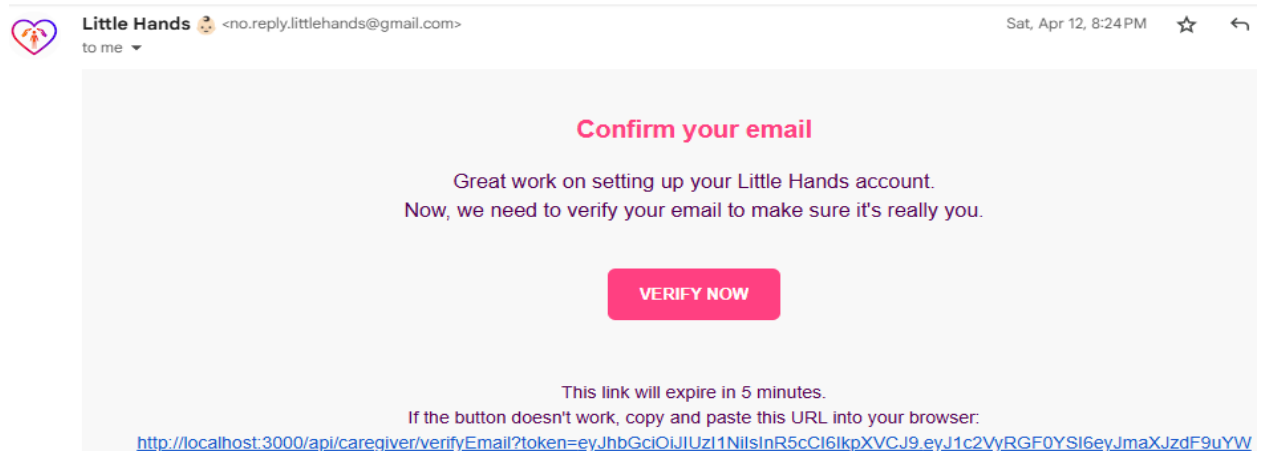


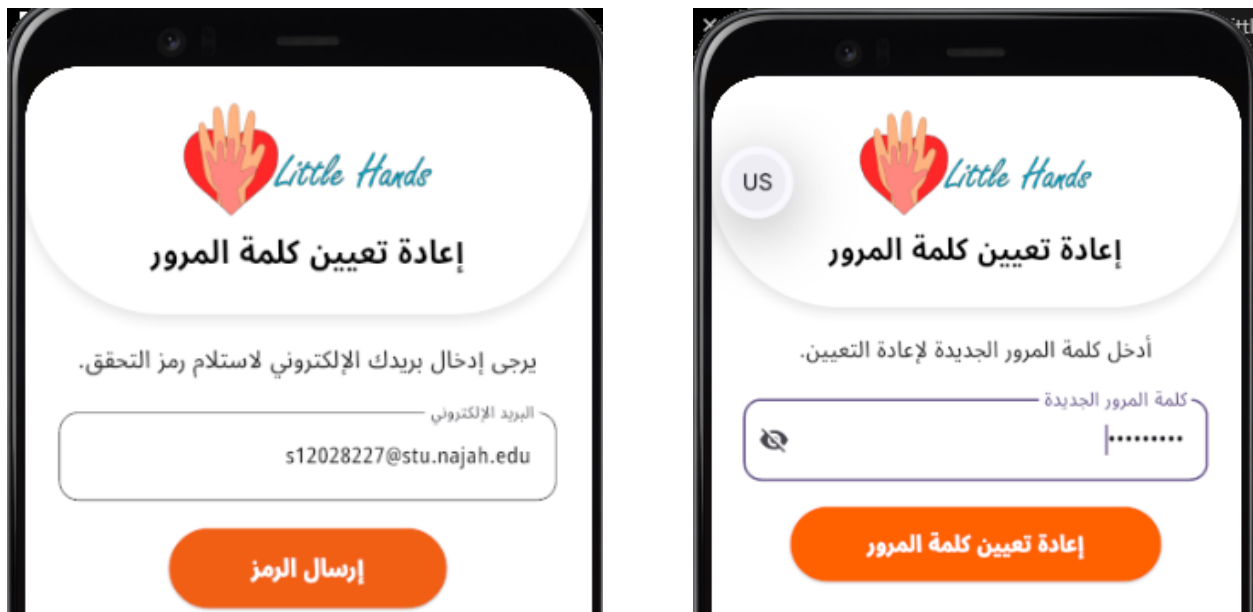
Figure 3.3: Verification email for account activation.

### 3.5.1.3 Login and Authentication

Once registered and verified, users can log in using their email and password. Upon successful login, a JSON Web Token (JWT) is generated and sent to the client. This token is used to authenticate the user in all future requests, ensuring secure access to protected features based on their role (parent or caregiver).

### 3.5.1.4 Password Recovery

Users can request a password reset via email if they forget their login credentials. However, the new password cannot be set until the user clicks the reset link sent to their email credentials.



(a) Step one: requesting reset

(b) Step two: entering a new password

Figure 3.4: Steps of password recovery process

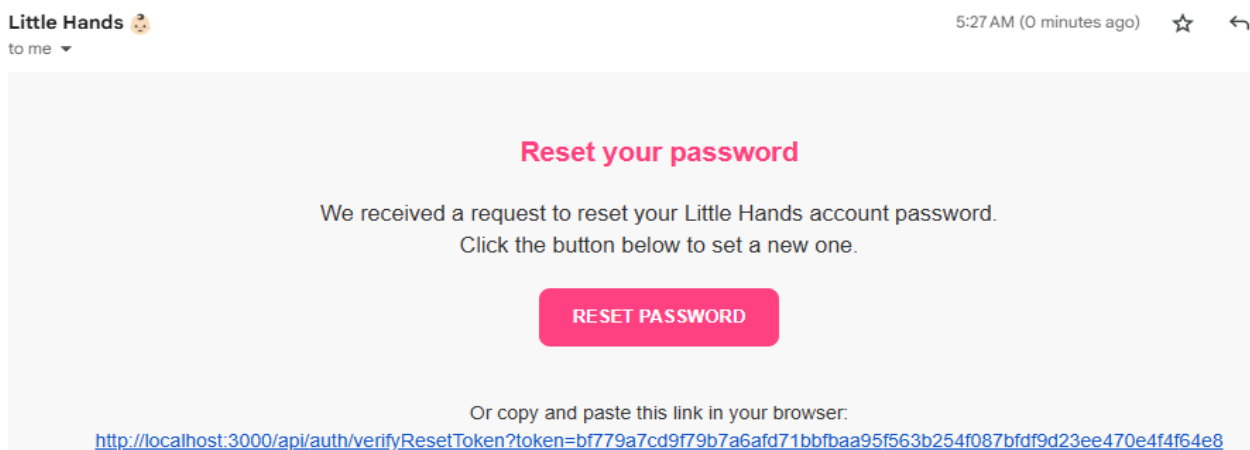


Figure 3.5: Password reset email with a secure link.

### 3.5.1.5 First Login for Caregiver (onboarding flow)

After logging in for the first time, caregivers are directed to an onboarding flow that introduces the setup process and guides them step by step toward completing their profile as shown in Figure 3.6.

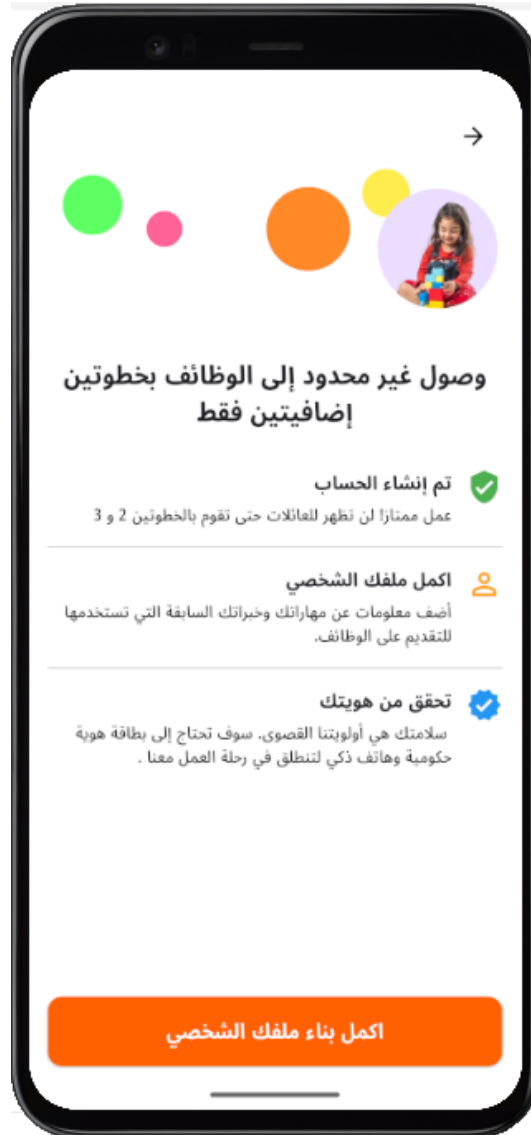


Figure 3.6: Onboarding screen guiding caregivers to complete their profile.

### 3.5.2 Caregiver Setup Process

When caregivers press on "أكمل بناء الملف الشخصي", they are taken through a step-by-step setup process to complete their profile.

#### 3.5.2.1 Choose Role (Babysitter, Expert, etc.)

Caregivers can choose from three main caregiving categories they want to offer: جليسة أطفال (Babysitter) for in-home child care, استشاري رعاية الطفل (Child Care Expert) for providing educational or psychological consultations to families, and مساعدة الأطفال ذوي الاحتياجات (Special Needs Support) for assisting children with disabilities either at home or in school. Each selection leads to a tailored setup flow based on the chosen role.



Figure 3.7: The first step of caregiver setup: selecting the caregiving role.

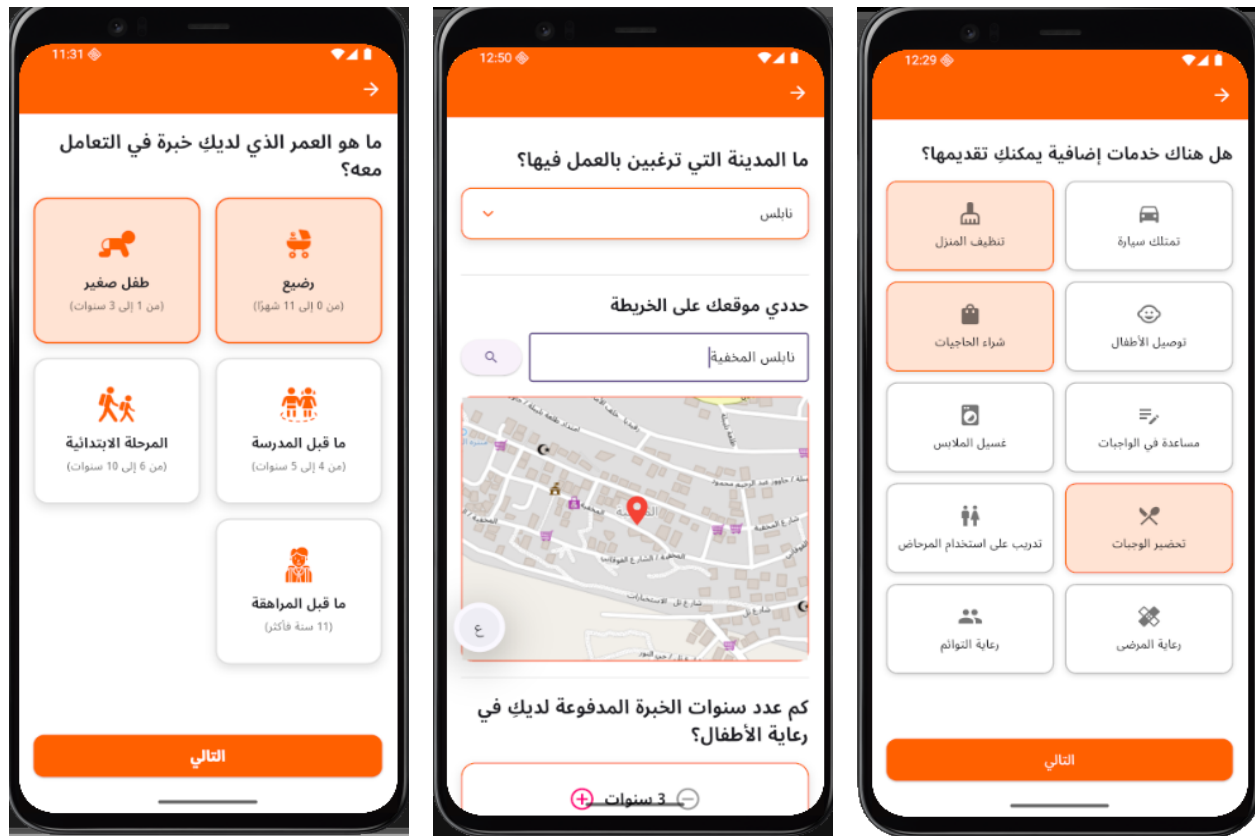
### 3.5.2.2 Fill Required Info

After selecting a role, caregivers are asked to fill out specific information tailored to that category. All caregivers must specify their preferred hourly rate, work location, and write a brief bio to introduce themselves to parents.

For example, babysitters are asked to provide the age groups they can care for, years of experience, relevant certifications (such as CPR), and choose from additional services like meal preparation, homework assistance, or light cleaning. See Figure 3.8

Child care experts select the types of consultations they provide—such as behavioral, sleep, nutrition, or family guidance—and specify related topics like sleep routines or refusal to eat. 3.9

Special needs assistants describe their experience supporting children with disabilities, the conditions they are familiar with (e.g., autism, ADHD), and whether they prefer to work in home or school settings, along with the kind of support they can offer. 3.10

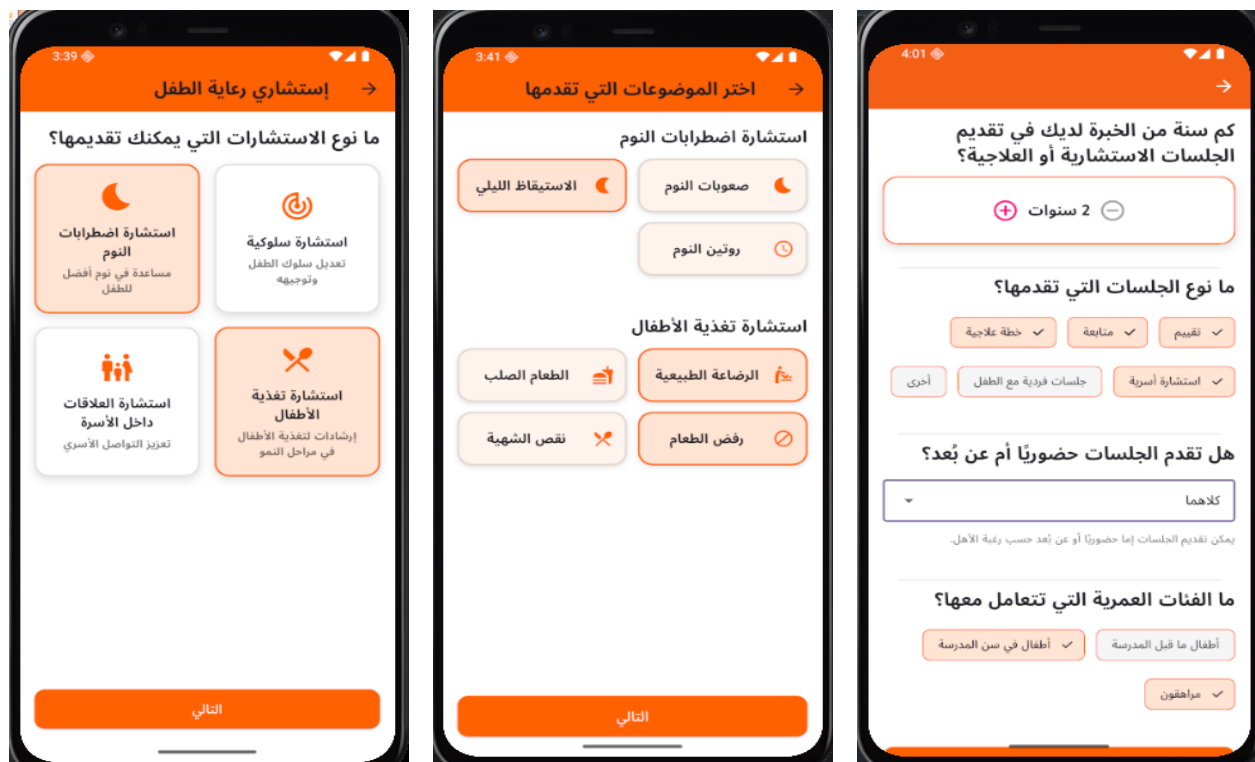


(a) Age group selection

(b) Location and experience

(c) Additional services

Figure 3.8: Examples of required profile fields for babysitters caregivers.

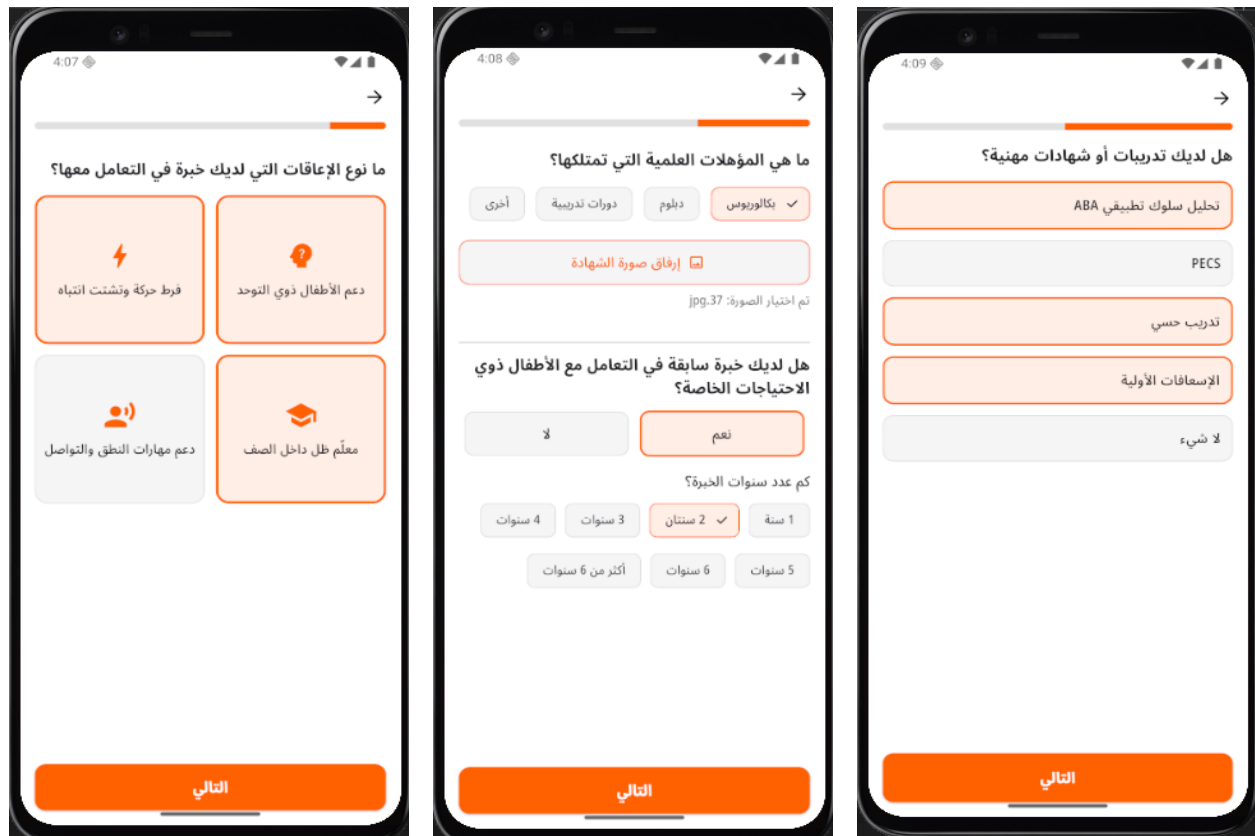


(a) Types of consultations offered

(b) Academic qualifications and license

(c) Session method and age

Figure 3.9: Examples of required profile fields for child care experts caregivers.



(a) Types of disabilities the caregiver has experience with

(b) Academic qualifications and previous experience

(c) Certificates or professional training related to special needs

Figure 3.10: Examples of required profile fields for special needs caregivers.

### 3.5.2.3 ID Verification with ID Analyzer

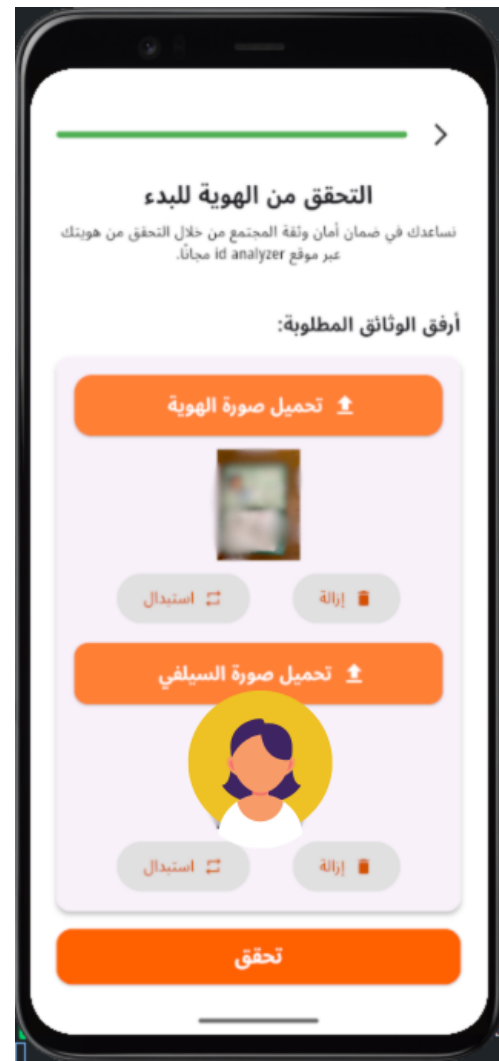
For safety and security purposes, all caregivers are required to verify their identity through an automated ID verification process. This is achieved using an external open source API provided by ID Analyzer [1], a trusted identity verification service that supports various global documents, including Palestinian national IDs and passports.

The verification process compares a live or uploaded photo of the user with the photograph on the submitted legal document (e.g., ID card or passport). The system also extracts essential information from the document, including:

- Full name
- Age
- Gender
- Date of issue



(a) Introduction screen for identity verification



(b) Document upload interface.

Figure 3.11: ID verification process using ID Analyzer.

In our application, users under the age of 18 are automatically rejected, even if their identity is successfully verified. This rule is enforced at the app level after extracting the age from the ID document. See figure 3.12. Additionally, a face-matching threshold is used to determine the level of confidence in identity confirmation:

- If the face mismatch is **high**, the request is **automatically** rejected as shown in figure 3.13.
- If the mismatch is **moderate**, the request is **flagged for manual review** by the admin team.
- If the face matches with a high confidence score, the user is **accepted and proceeds** to the next step.



Figure 3.12: Underage verification failure



Figure 3.13: Face mismatch failure.



Figure 3.14: Successful verification

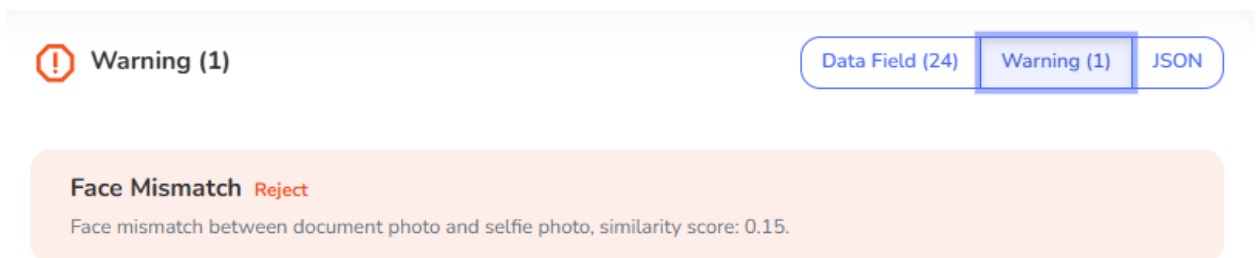


Figure 3.15: Face mismatch warning from ID Analyzer.

Issuer / Type	Name / Doc No.	Decision	Dob
Palestine Identity Card	[Redacted]	Reject	2002-12-26
Palestine Identity Card	[Redacted]	Accept	2002-12-26
Palestine Identity Card	[Redacted]	Reject	2008-02-20

Figure 3.16: ID verification results using ID Analyzer.

### 3.5.2.4 Subscription and Joining the Platform

Once a caregiver successfully completes ID verification, they are redirected to the subscription page, where they must choose a plan to officially join the platform. This step ensures that only committed and verified caregivers appear to parents in search results. Multiple subscription options are offered (monthly, quarterly, and yearly), with various discounts. Stripe, a secure and widely used open-source API [7], was integrated to handle card payments. Upon successful subscription, the caregiver's account is fully activated and made visible to parents on the platform.



Figure 3.17: Subscription plan selection screen showing monthly, quarterly, and yearly options.

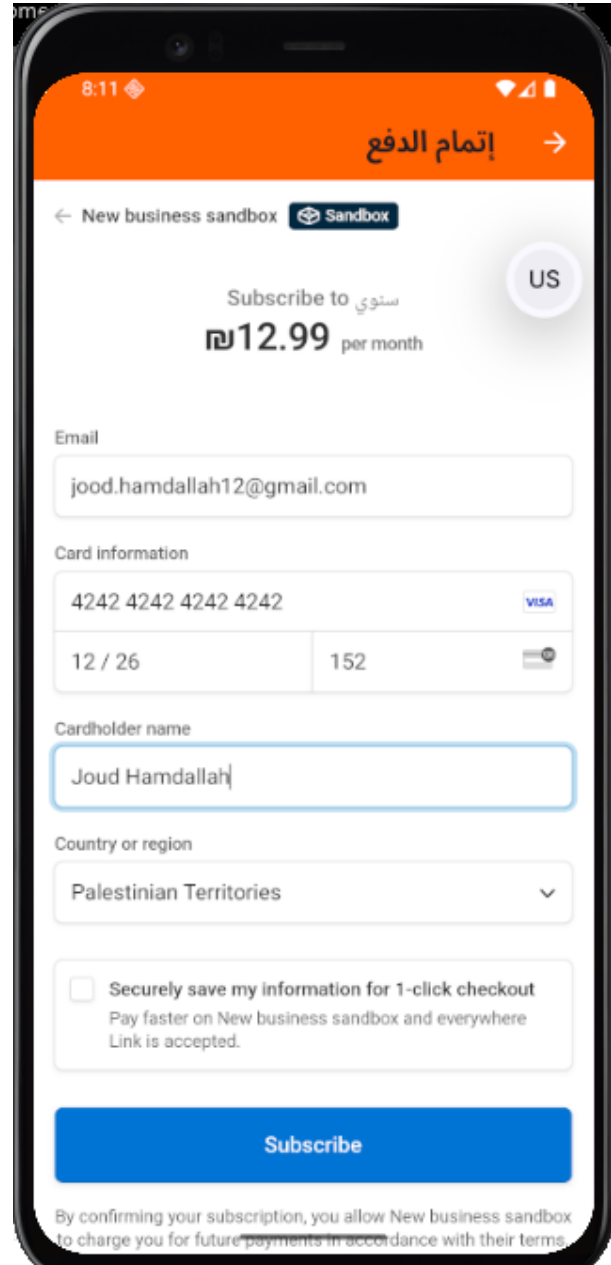


Figure 3.18: Stripe payment interface for completing the subscription using card details.

### 3.5.3 Booking Flow (Parent to Caregiver)

#### 3.5.3.1 Service Selection and Intro

Parents begin the booking process by selecting the type of service they need shown in home page. The system offers three main services:

- Babysitting (رعاية الأطفال في المنزل)
- Special Needs Support (مساعدة الأطفال ذوي الاحتياجات)
- Educational and Psychological Consultations (الاستشارات التربوية والنفسية)

Once a service is selected, the parent is shown an introductory page that describes:

- What the service is
- Who it is for
- The booking steps
- Frequently asked questions

Each service has a tailored intro screen, but all follow the same structural design. The user can then tap "ابدأ الآن" to continue. Below are examples of these intro pages:



Figure 3.19: Introductory pages for the three main services: babysitting, expert consultations, and special needs support

### 3.5.3.2 Info Collection and Matching Logic

After selecting a service and viewing its introduction, the parent proceeds to fill out a service-specific request form. This form is essential for collecting all information required to find suitable caregivers or experts.

Each form is tailored to the selected service, but typically includes:

- Child's age and needs
- Location (with map selection)
- Session preferences (timing, price)
- Additional requirements

Below are examples of the information collection screens for different services:



(a) Selecting the type of specialist needed

(b) Choosing the child's age group and describing current challenges

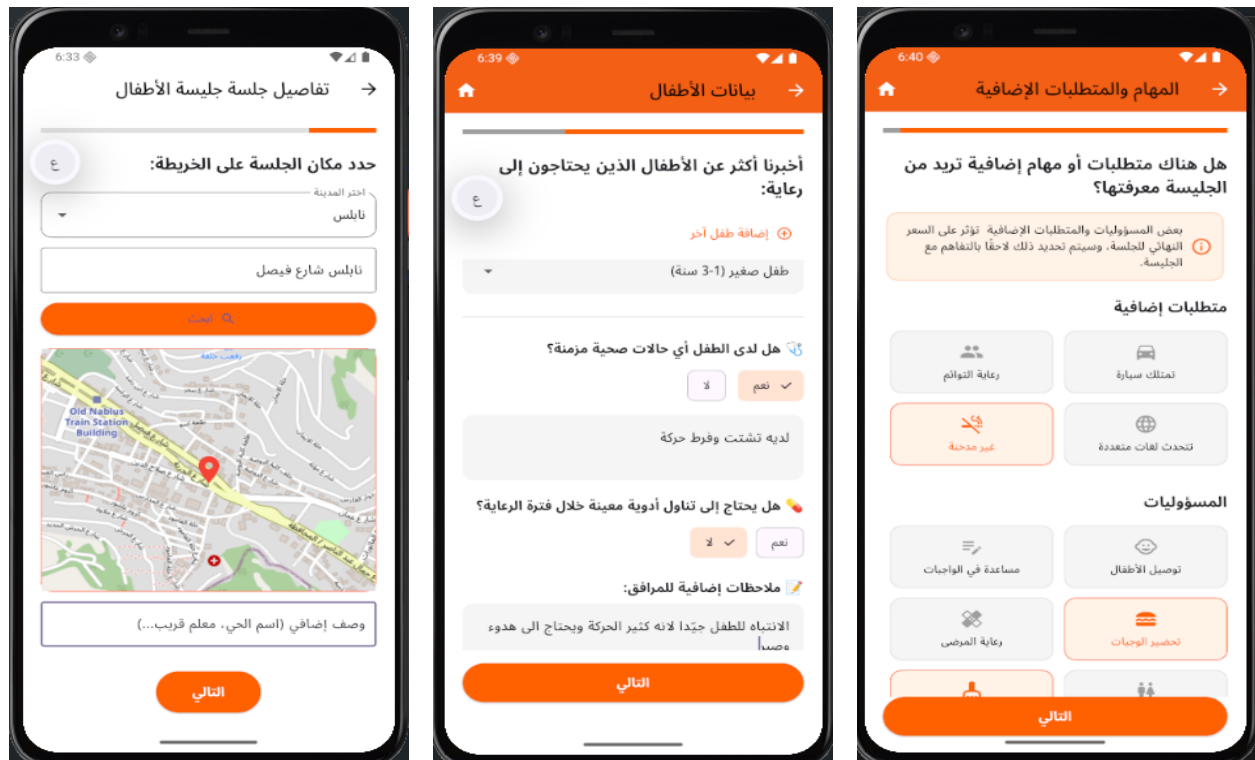
(c) Selecting the session type and preferred appointment time

Figure 3.20: Information collection screens for requesting expert consultation service



(a) Selecting the type of service needed (b) Identifying the child's condition or disability and age group (c) Choosing the service location and preferred schedule

Figure 3.21: Information collection screens for requesting special needs support

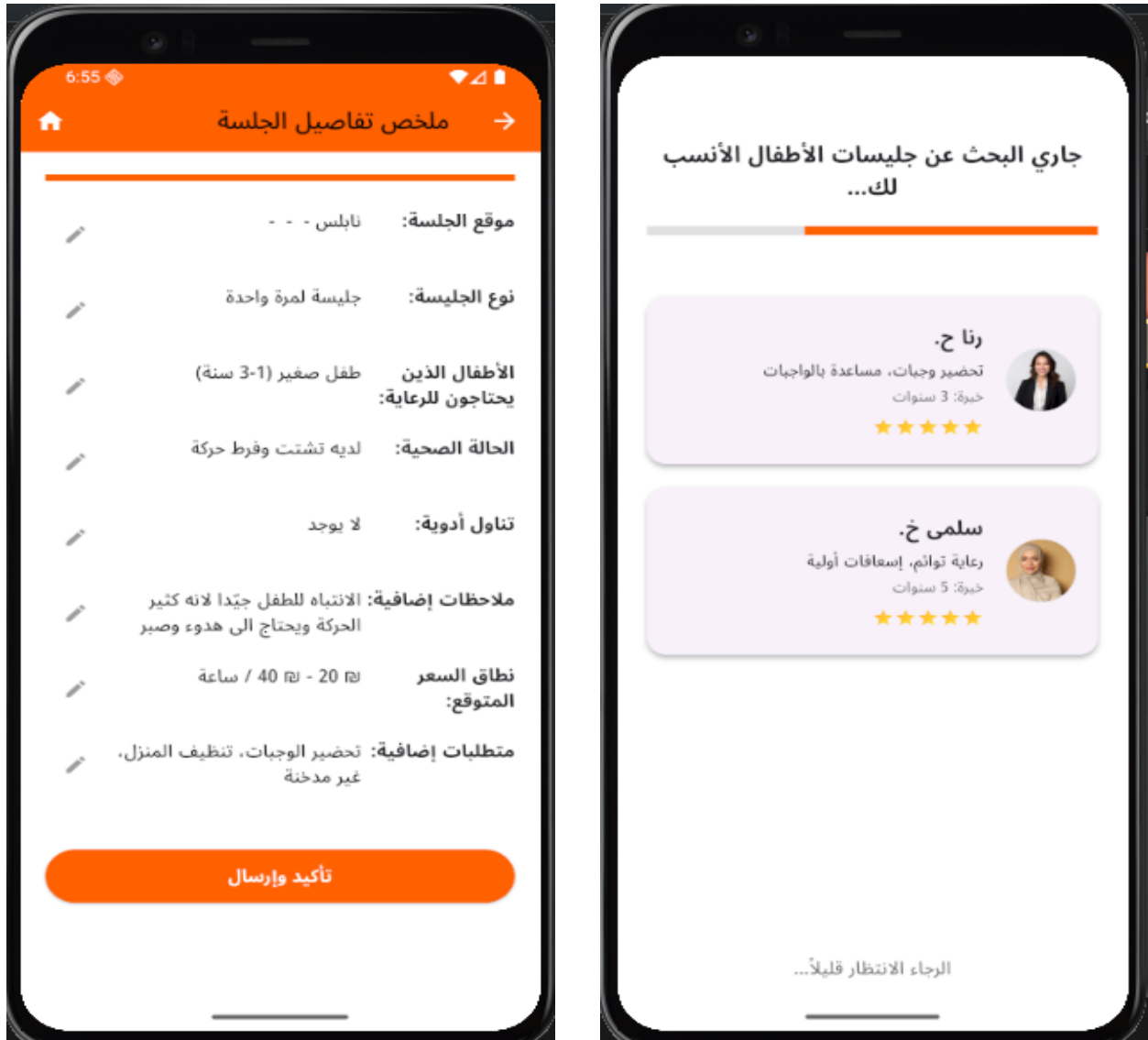


(a) Selecting the session location on the map (b) Entering child-related health, age, and medication details (c) Specifying additional requirements and responsibilities for session

Figure 3.22: Information collection screens for babysitting session requests

Although each service type has a tailored information collection form, the process that follows submission is unified across all services. Once the required details are entered, the system proceeds with a confirmation and matching phase.

To demonstrate this stage, we present an example from the **babysitting service**. After completing the form shown in figure 3.22, the parent is shown a summary screen where they can review and edit any session detail before initiating the caregiver search. Once confirmed, the app displays a visual searching screen while the system filters and identifies suitable caregivers in the background. As shown in figure 3.23



(a) Review screen summarizing all session request details

(b) Visual searching screen displayed while the system matches suitable caregivers

Figure 3.23: Review and matching initiation steps in the babysitting booking flow

### 3.5.3.3 Matching and Results

After the parent confirms the session details, the system begins searching for suitable caregivers using a weighted scoring algorithm. Each caregiver is evaluated based on how well they meet the parent's preferences in the following key areas:

- **Location proximity:** Distance between the caregiver and the session location
- **Age compatibility:** Whether the caregiver accepts children in the specified age group
- **Skills and requirements:** Match between the caregiver's skills and the parent's selected needs (e.g., cooking, homework help)
- **Price compatibility:** Whether the caregiver's hourly rate fits within the parent's preferred range.
- **Caregiver rating:** Average rating based on previous sessions.

Each of these factors contributes to a final match percentage, allowing the system to rank caregivers accordingly.

The result screen displays a list of matching babysitters, each showing their match percentage along with additional details such as region, distance from the parent, years of experience, hourly rate, and average rating. The region name is retrieved by parsing the caregiver's coordinates (`lat`, `lng`) and using the Nominatim API from OpenStreetMap [5]. Each card also includes a "قراءة التقييمات" (Read Feedback) button, allowing parents to preview reviews from previous families, and a "عرض الملف الشخصي" (View Profile) button, which opens the caregiver's detailed profile page. Caregivers with the highest scores and strongest match are shown first to help parents make a confident and efficient selection.



Figure 3.24: Results page showing matched babysitters with match percentage, region, distance, experience, and rating.

### 3.5.3.4 Viewing Caregiver Profiles

When a parent taps the "عرض ملف الجليسة" (View Caregiver Profile) button from the results screen, they are taken to a dedicated profile page that includes the caregiver's name, location, years of experience, hourly rate, distance from the parent, skills, certificates (if available), and a personal biography. A summary of the caregiver's average rating is also highlighted to help build trust and showcase caregiver quality.

In addition to viewing this information, the parent can interact with two important features:

- "قراءة التقييمات" (Read Feedback): Opens a list of detailed ratings and reviews from past sessions, including aspects like punctuality, communication, and session quality
- "إرسال رسالة" (Send Message): Opens an in-app chat window where the parent can ask questions and chat with caregiver.

These tools support transparency and informed decision-making before proceeding with the session booking.

Figures 3.25 and 3.26 shows the caregiver profile and feedback view interfaces.



Figure 3.25: Caregiver profile screen showing personal details, experience, pricing, distance, and rating summary



Figure 3.26: Feedback screen displaying detailed ratings and written reviews from previous sessions

### 3.5.3.5 Session Booking and Calendar Selection

Once the parent has reviewed the caregiver's profile and decides to proceed, they can tap the "احجز جلسة" (Book Session) button. This action begins the booking process for a new session.

Upon tapping the button, the parent is taken to a dedicated booking page that allows them to view the caregiver's available schedule, select a suitable date and time, and proceed.

The calendar shown to the parent is dynamically generated based on the caregiver's predefined availability. This availability is configured by the caregiver through their control panel, as explained later in Section 3.5.7.5.

The calendar highlights:

- Available dates and custom working hours per day (if applicable), in the upcoming weeks
- Disabled or unavailable dates (set by the caregiver)
- Unavailable booked days (fully or partially booked)



Figure 3.27: Booking calendar showing the caregiver's available days and times

After selecting an available date, the parent is prompted to choose the session start and end time. Once both times are selected and "إرسال الطلب" (Send request) is tapped, a confirmation dialog appears summarizing the booking request and asking the parent to confirm.



Figure 3.28: Parent selects session start and end time before submitting the request

Once the parent confirms the session request, it is submitted to the system for review by the caregiver. At this stage, the request is not yet approved — the caregiver must explicitly accept or reject it. The parent receives immediate confirmation via both in-app and push notifications.



Figure 3.29: Confirmation dialog summarizing selected date and time



Figure 3.30: In-app notification showing session request confirmation



Figure 3.31: Push notification confirming the session request was sent

Each booking moves through a predefined set of statuses throughout its lifecycle:

- **Pending (بانتظار الرد):** The request was sent and is awaiting the caregiver's response.
- **Rejected (تم الرفض):** The caregiver declined the session request.
- **Accepted (تم القبول):** The caregiver approved the request. At this stage, the parent can either confirm the booking directly or request a meeting with the caregiver before proceeding.
- **Meeting Booked (اجتماع محجوز):** The parent booked an online or face-to-face meeting with the caregiver to discuss the session before confirming it.
- **Confirmed (تم التأكيـد):** The parent completed the booking by selecting a payment method and confirming the session.

- **Completed (مكتمل)**: The session took place successfully.
- **Cancelled (ملغى)**: The booking was cancelled by either the parent or caregiver before the session occurred.

The request is initially added to the parent's "المحجوزات الحالية" (Current Bookings) section, with the status "بانتظار الرد" (Waiting for response), indicating the caregiver has not yet responded.



Figure 3.32: Booking appears in the parent's interface with a 'pending' status until the caregiver responds

In cases where the selected session time falls outside the caregiver's predefined working hours, the system still allows the request to be submitted. A warning is shown to inform the parent that the caregiver may reject the request.

This flexible approach supports edge cases where caregivers may be open to slight scheduling adjustments.

However, if the caregiver decides to reject the session, the booking will appear in the parent's bookings as **Rejected**, as shown in Figure 3.34. The "تم الرفض" (Rejected) status indicates that the caregiver decided not to proceed with the request due to timing or other constraints.

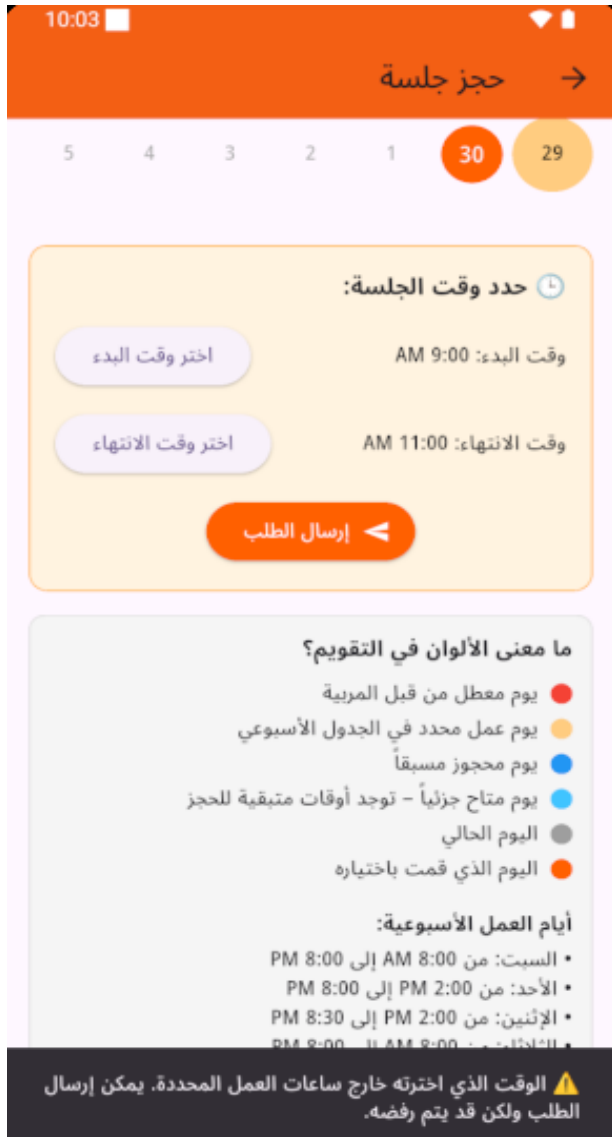


Figure 3.33: Booking a session outside working hours — warning is shown before submitting

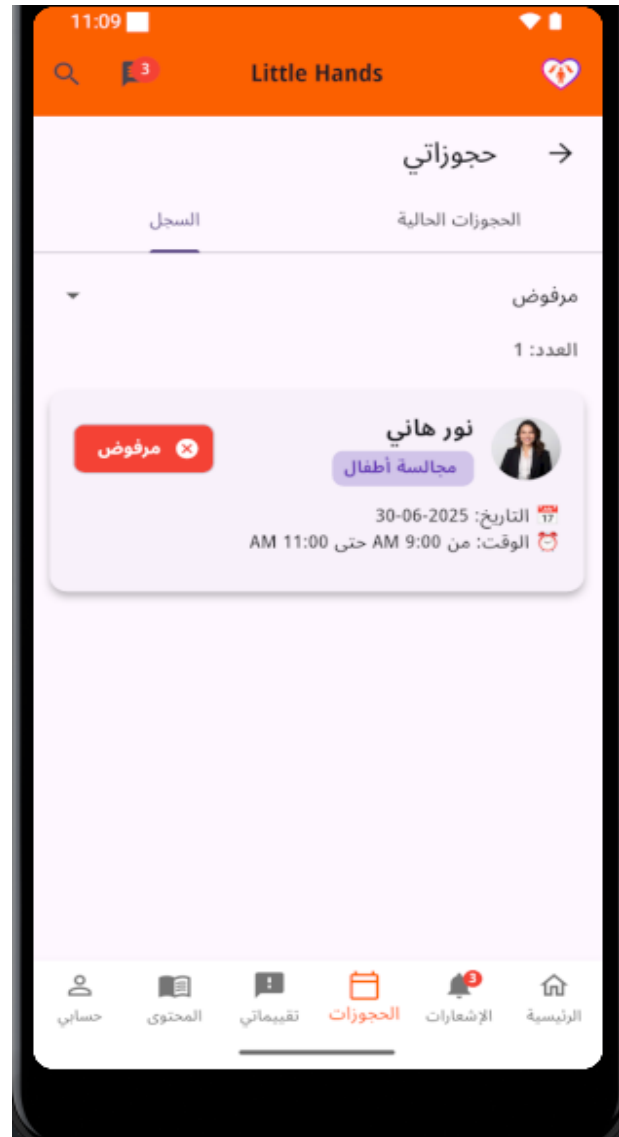


Figure 3.34: Rejected session request due to timing conflict, shown in parent's bookings

### 3.5.3.6 Caregiver Acceptance and Pricing

If the caregiver decides to proceed with the session request, they must first review the request details and enter a suitable session price before the booking is marked as **Accepted** (تم القبول). This pricing includes the caregiver's base hourly rate and any additional fees for requested responsibilities such as meal preparation or house cleaning.

This step is necessary in case the parent decides to confirm the booking directly without requesting a preliminary meeting. However, if a meeting is scheduled first, the caregiver may adjust the price later based on mutual agreement.

The following interface flow is presented to caregivers during this stage:



(a) Caregiver reviews session request and parent details

(b) Confirmation dialog before accepting the session

Figure 3.35: Reviewing and confirming a session request from the caregiver side



(c) Entering price per hour and additional service fees

(d) Price breakdown and total amount before submission

Figure 3.36: Defining and confirming pricing before session acceptance

Once the pricing is submitted, the booking appears in the parent's app as **Accepted** (تم القبول), allowing the parent to either proceed with final booking or request an introductory meeting with the caregiver.

At this point, both the parent and caregiver receive immediate notifications and an email confirming the caregiver's acceptance and the proposed session price. This ensures that both parties are aware of the updated session status and can take the appropriate next steps.



Figure 3.37: Booking status updated to "Accepted" with push notification and action options visible

After receiving the notification, the parent can open the app to find the updated booking status in the "المحجوزات الحالية" (Current Bookings) section. Two main actions are now available:

- **Confirm the booking** (إتمام الحجز الآن): by proceeding directly to payment.
- **Request an introductory meeting** (حجز اجتماع أولاً): with the caregiver before confirming.

This structure gives the parent full control over how they wish to continue, supporting both direct confirmations and pre-session communication if needed.

### 3.5.3.7 Requesting a Meeting Before Confirmation

If the parent opts to meet the caregiver before confirming the session, they can tap the "حجز اجتماع أولاً" (Book a Meeting First) button. This opens a list of available meeting times provided by the caregiver.



Figure 3.38: Parent view of caregiver's available online meeting times

If no suitable time is available, the parent may choose to:

- طلب وقت مخصص (Request a custom time)
- الدردشة مع الجليسة (Chat with the caregiver)

Once a time is selected, the meeting is booked, and both parties receive:

- An in-app notification
- A push notification
- A confirmation email with the Zoom meeting link



Figure 3.39: Meeting confirmation via push notification and in-app updates

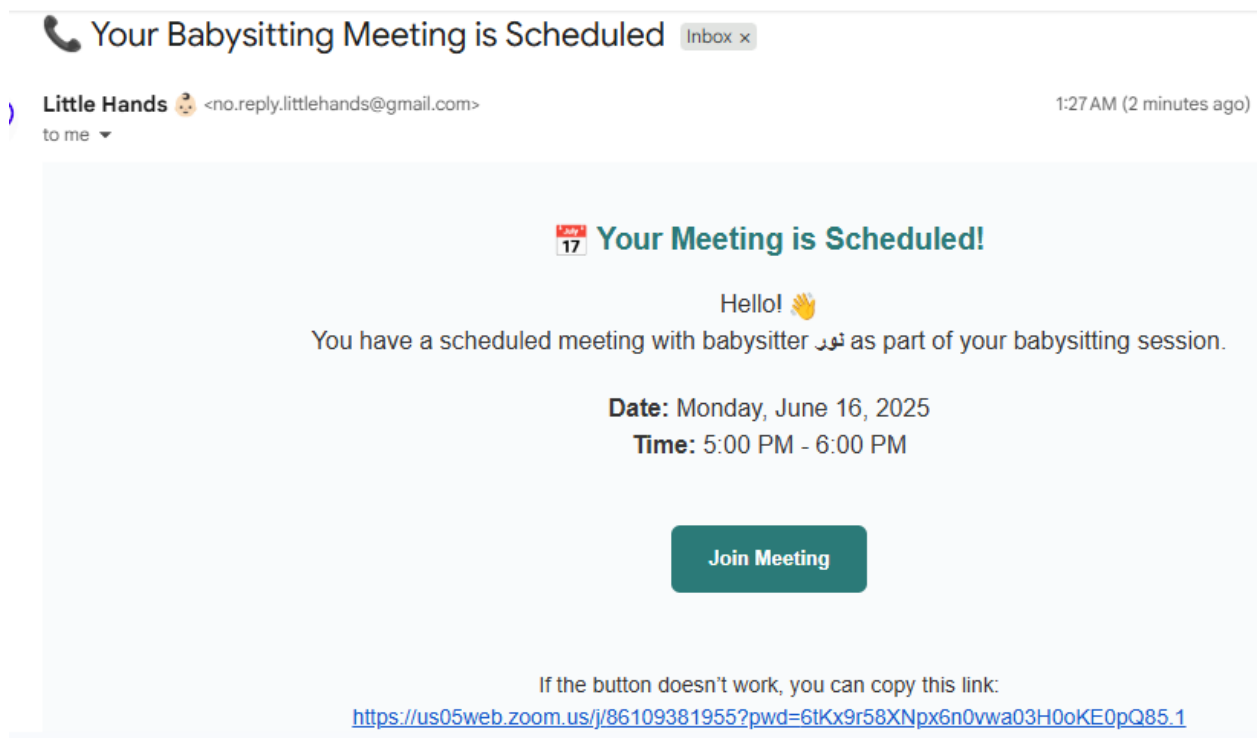


Figure 3.40: Email sent to parent confirming scheduled meeting with caregiver

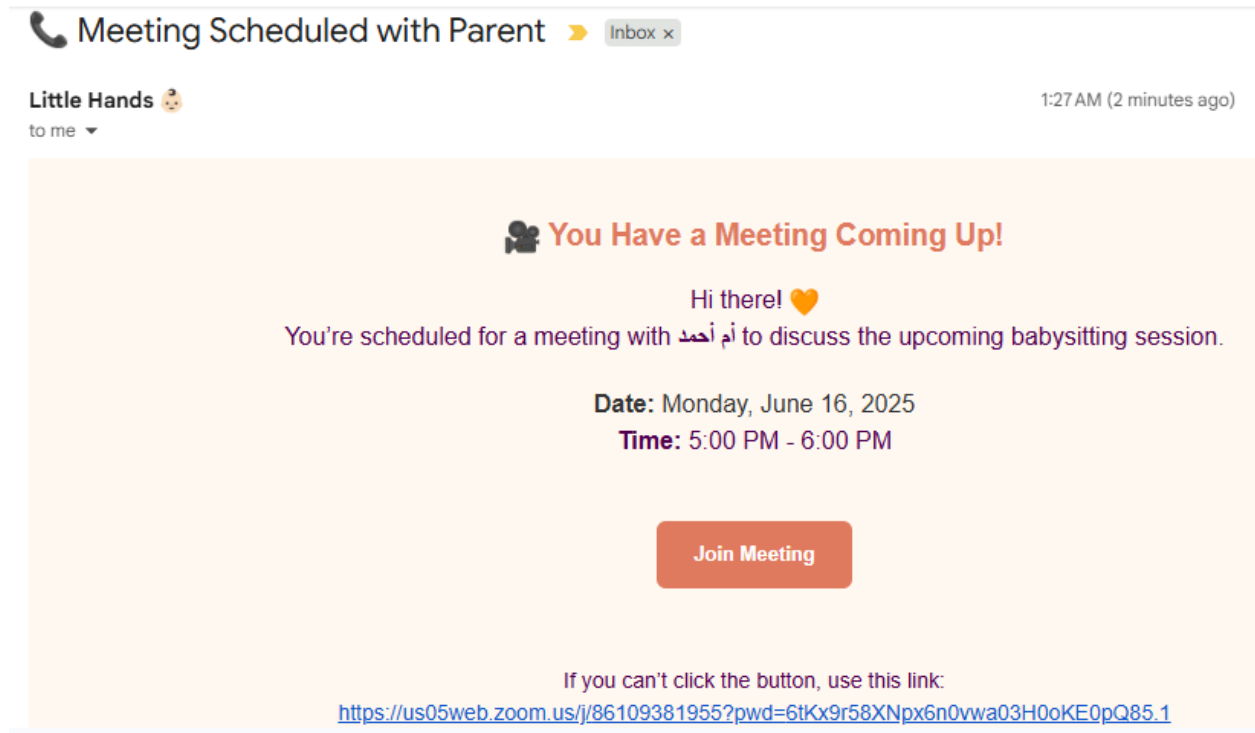


Figure 3.41: Email sent to caregiver with meeting details

**Technical note:** Meeting links are automatically generated using Zoom’s free API [8] and are valid for both parties to join at the scheduled time.

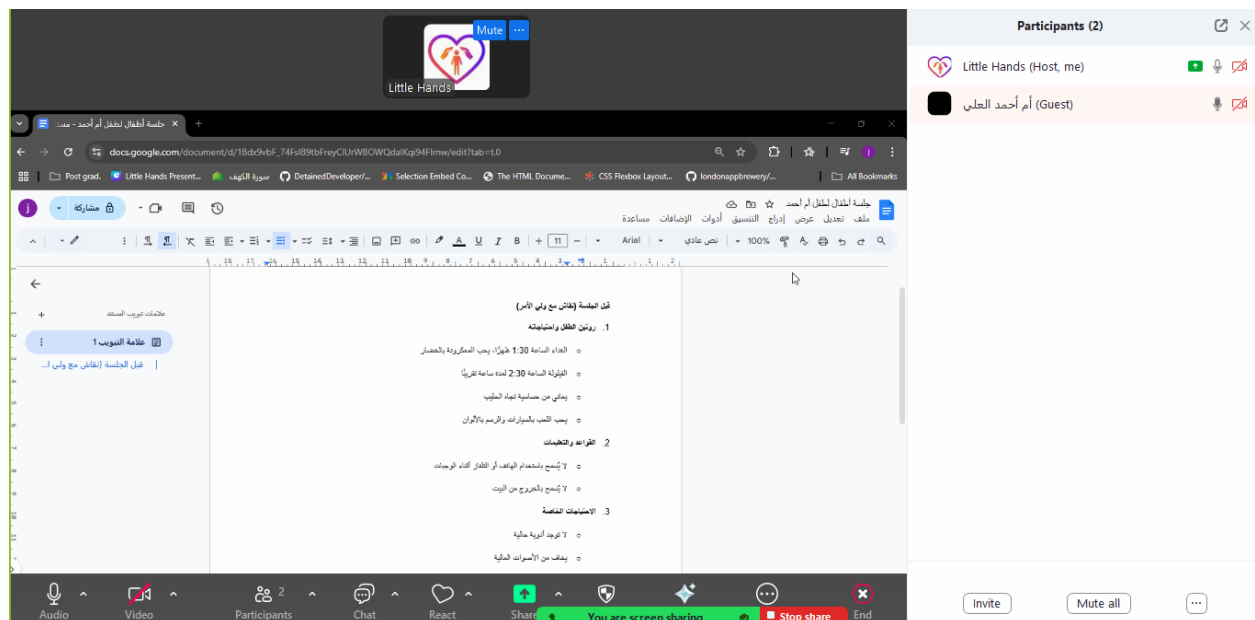


Figure 3.42: Example of an online meeting session held through Zoom

Once the meeting concludes, the parent can either:

- Confirm the session (and proceed to payment)
- Cancel the booking if they decide not to move forward



Figure 3.43: Booking status after meeting is booked, allowing parent to confirm or cancel

### 3.5.3.8 Confirming the Session and Completing Payment

If the parent decides to confirm the session directly (either without a meeting or after a successful meeting), they can press the "إتمام الحجز الآن" (Confirm Booking Now) button.

This opens the payment page where the parent can:

- Review the full **session invoice**, including hourly rate, duration, and any extra charges.
- Optionally **edit the additional tasks** (e.g., remove "تعديل المهام الإضافية").
- Chat with the caregiver if they have concerns.
- Choose a **payment method** – either pay in cash at session time or pay online via credit card.

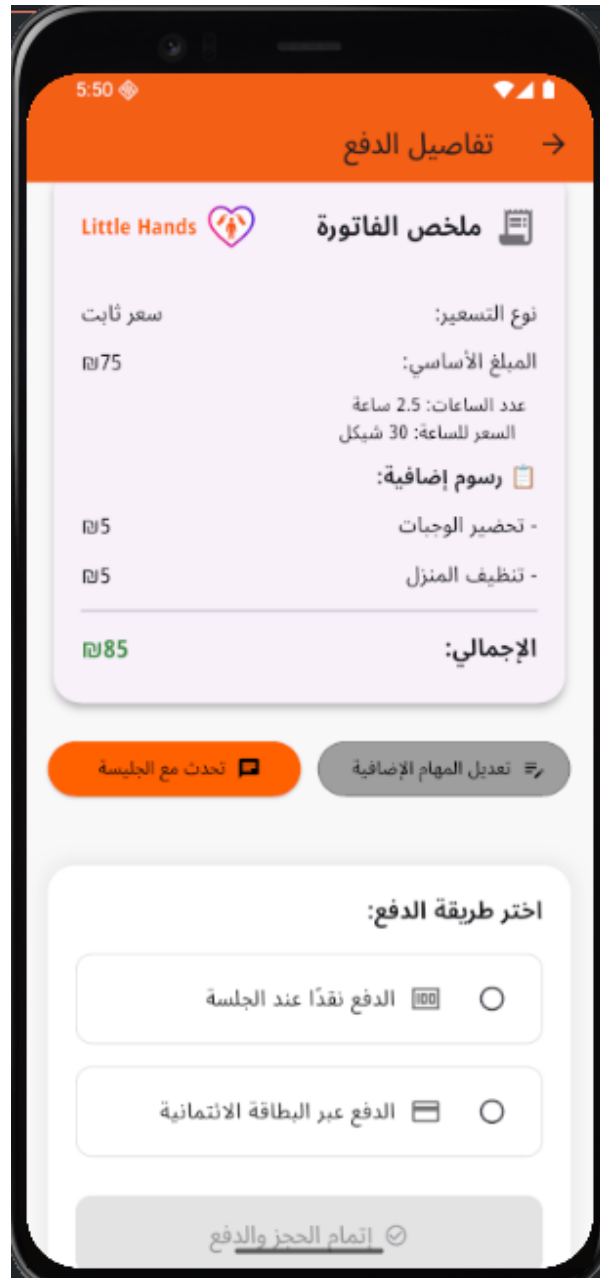


Figure 3.44: Full payment page with session breakdown, chat option, and payment method

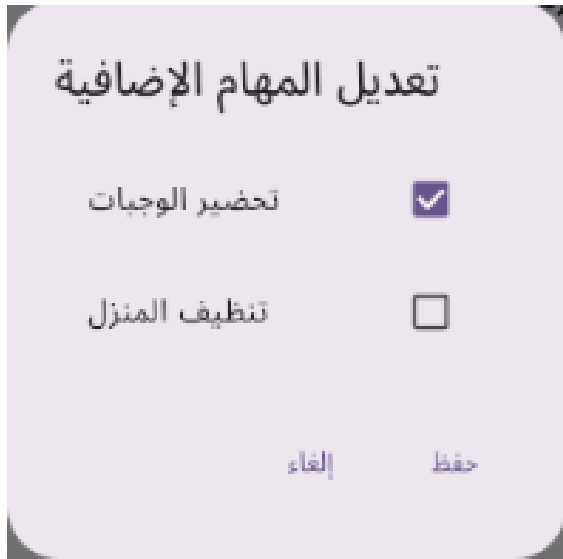


Figure 3.45: Editing additional responsibilities before confirming

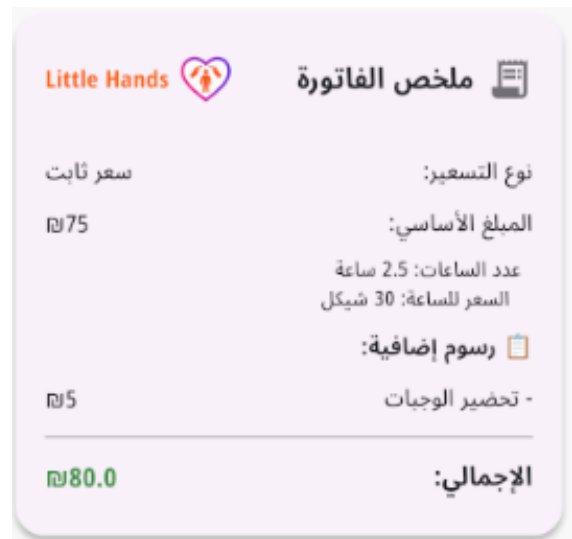


Figure 3.46: Updated invoice after removing one of the extra tasks

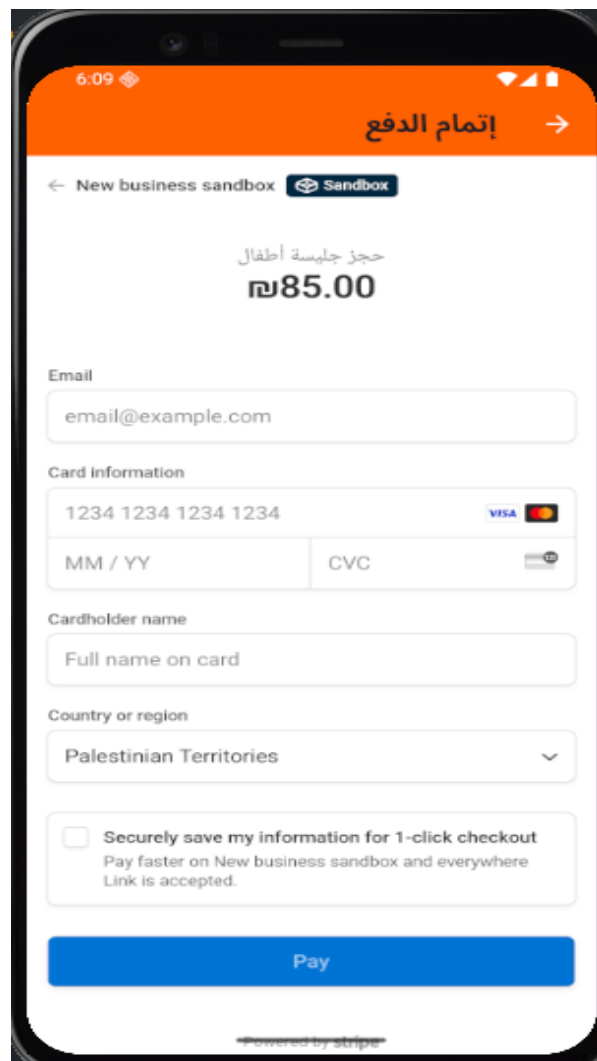


Figure 3.47: Secure online payment page via Stripe

Once the parent confirms and submits payment:

- The booking is marked as **Confirmed** ("حجز مؤكد")

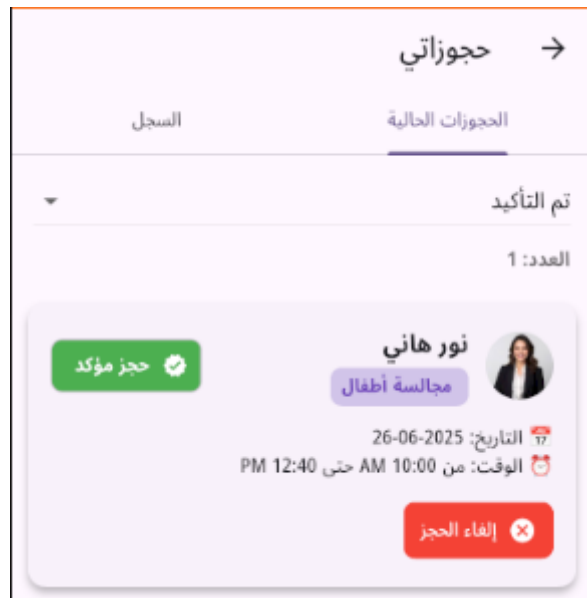


Figure 3.48: Confirmed booking as shown in the parent's current bookings

- Notifications are sent to both the parent and caregiver



Figure 3.49: In-app notification that booking was confirmed

- An email with the full session details is sent to both sides



Figure 3.50: Email to parent confirming the session



Figure 3.51: Email to caregiver notifying session confirmation

This marks the end of the booking process. The session is now officially confirmed and both parties can prepare accordingly.

### 3.5.4 Cancellation System

The cancellation system is designed to offer flexibility to both parents and caregivers, while maintaining accountability to ensure reliability and trust on the platform. Users can cancel bookings at various stages, with specific rules and consequences depending on the booking's progress and the user's role.

#### 3.5.4.1 Parent Cancellations

Parents are allowed to cancel bookings at all stages of the process:

- **Pending Stage:** Parents may cancel freely without being required to provide a reason.
- **After Acceptance:** A reason must be selected from predefined options (e.g., emergency, no longer needed).
- **After Meeting Booked:** If the parent decides not to proceed after an introductory meeting, they may cancel the session.
- **After Confirmation:** A reason is mandatory, and the parent is warned that repeated cancellations at this stage will impact their visibility to caregivers and reduce match likelihood.

#### Cancellation after Acceptance:



Figure 3.52: Parent initiates cancellation of accepted session



Figure 3.53: Reason selection screen for cancelling after acceptance

**Cancellation after Confirmation:**

Figure 3.54: Parent initiates cancellation of a confirmed session



Figure 3.55: Warning shown when cancelling a confirmed session

**Cancellation Outcome:**

Once a session is cancelled, it is marked clearly in both the booking history and details. The cancelled card includes the responsible party (parent or caregiver) and the stated reason. The parent is also given the option to find a replacement caregiver.

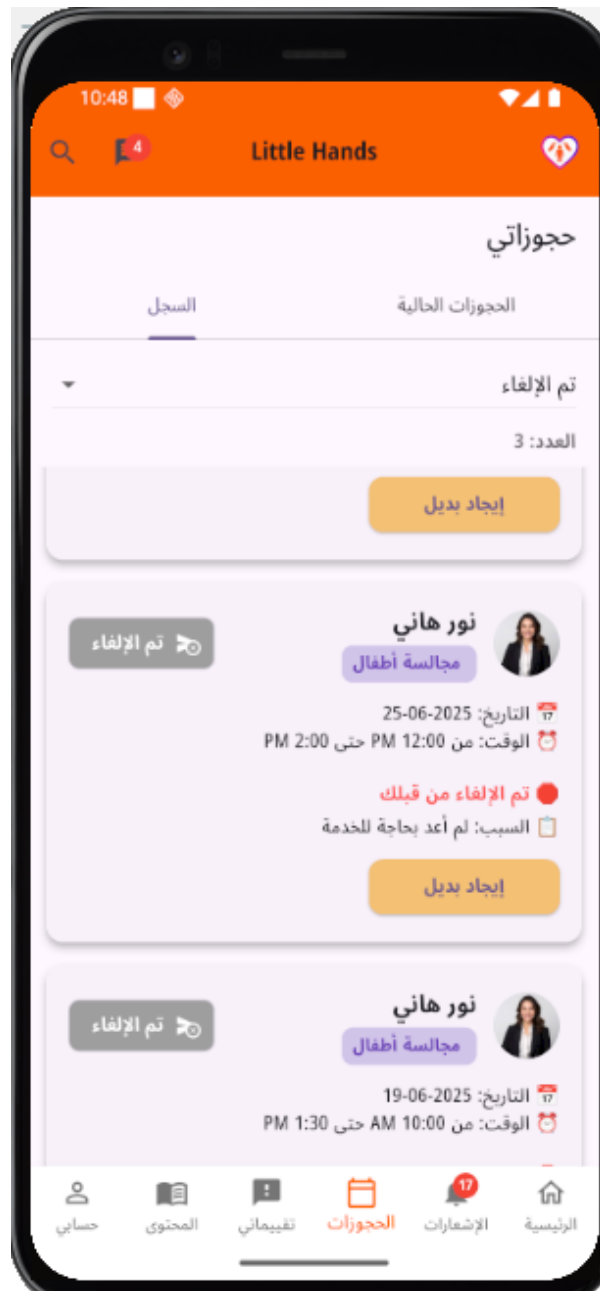


Figure 3.56: Cancelled sessions tab in the parent's booking history, showing the reason for cancellation and an option to find a replacement caregiver.

### 3.5.4.2 Caregiver Cancellations

Caregivers can also cancel bookings, but stricter rules apply to encourage commitment:

- **After Acceptance:** A cancellation reason is required.
- **After Meeting or Confirmation:** Caregivers must provide a valid reason. Repeated cancellations lead to:
  - Reduced rating and trust score
  - Temporary removal from matching results
  - A badge labeled "عدم الالتزام" (non-committed) displayed on their public profile

The following figures demonstrate the caregiver cancellation interface for a confirmed session:



Figure 3.57: Warning and reason selection when caregiver cancels a confirmed session



Figure 3.58: Booking marked as cancelled by caregiver with reason shown in card

### 3.5.4.3 Fallback Process After Caregiver Cancellation

If a caregiver cancels a **confirmed** session, the system automatically activates a structured fallback process to minimize disruption for the parent and child.

The process is as follows:

- **Parent Alert and Refund Message:**

The parent receives:

- An immediate **notification** that the caregiver canceled the session.

- A message reassuring them that alternative caregivers will be suggested.
- A **refund notice** if they had paid online, informing them that the amount will be automatically refunded to their card within a few days.



Figure 3.59: Parent receives cancellation alert



Figure 3.60: System notification indicating emergency of session cancellation with refund info

- **Searching for Replacements:**

The system:

- Searches for caregivers who match the session's requirements (city, skills, etc.)
- Verifies their availability (no conflicting bookings)
- Sends them an urgent notification about the opportunity



Figure 3.61: Fallback session opportunity shown to eligible caregivers



Figure 3.62: Session details popup shown to caregivers to see the fallback offer

- **Caregiver Response:**

If at least one caregiver accepts:

- A notification is sent to the parent
- A dialog appears with the message that a fallback candidate is available



Figure 3.63: Parent receives alert that a new candidate is available

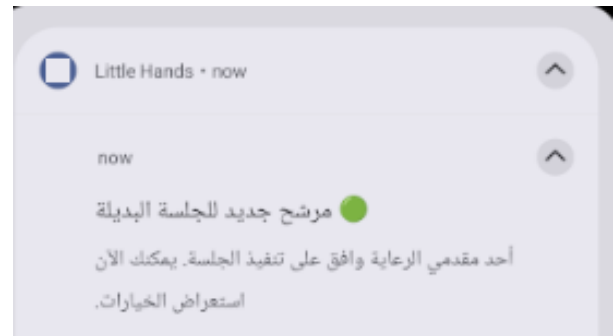


Figure 3.64: Notification message shown to parent about new fallback candidate

- **Parent Selection and Review:**

The parent:

- Reviews fallback candidates who accepted
- Sees full caregiver profile, rate, skills, and feedback
- Selects one to proceed with the session



Figure 3.65: Parent reviews and selects one of the fallback caregivers

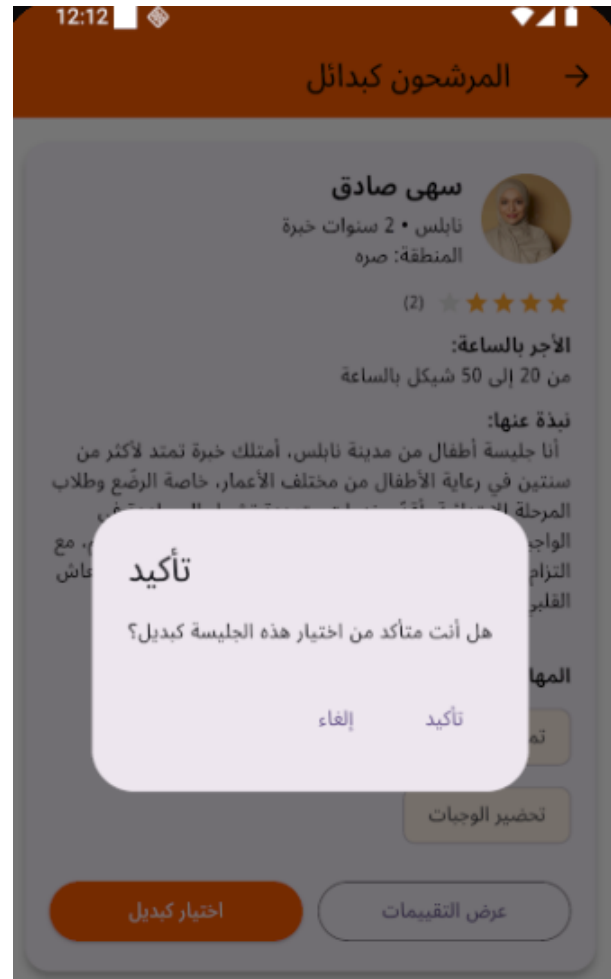


Figure 3.66: Confirmation dialog shown before sending booking to selected caregiver

- **New Booking Status and Options:**

Once a fallback caregiver is selected:

- The session is updated to “accepted” with the new caregiver
- The previously cancelled session remains visible with cancellation details
- The parent may:
  - \* Request a meeting before session (if time allows)
  - \* Or proceed to payment directly



Figure 3.67: Previous session marked as cancelled by the caregiver, with reason shown

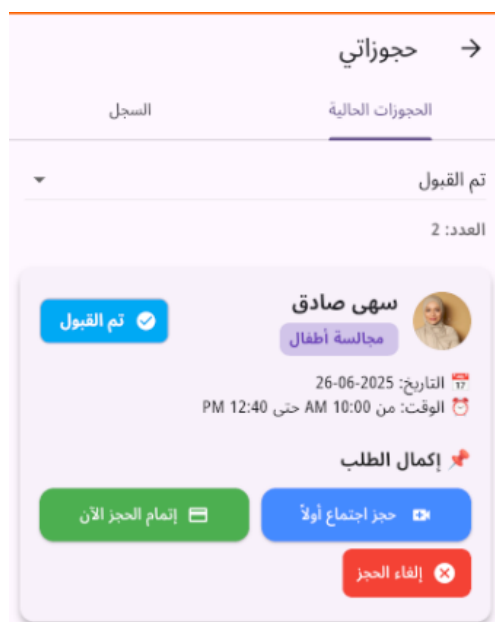


Figure 3.68: Updated booking status with the selected replacement caregiver

This system ensures that sessions are not lost due to last-minute cancellations and increases reliability across the platform.

### 3.5.5 Feedback and Rating System

To ensure transparency, quality, and trust on the platform, both parents and caregivers are given the ability to provide feedback after each session.

#### 3.5.5.1 Automatic Session Completion

Once the scheduled end time of a confirmed session passes, the system automatically marks the session as “completed” using a background **cron job** that runs every 10 minutes. This process checks all confirmed bookings and updates the status to **completed** if the session has ended and no cancellation or issue has been reported. At this stage:

- Cancellation and rescheduling are disabled

- Feedback forms become available to both parties

This ensures that every session can be reviewed fairly and timely, even if users forget to manually mark it as completed.



Figure 3.69: Session card marked as completed with feedback option

### 3.5.5.2 Parent Feedback Flow

Because babysitting services are highly sensitive, parents are encouraged to provide detailed ratings after the session. The feedback form includes several sections:

- **Punctuality** – “الالتزام بالوقت”: Was the caregiver on time?
- **Communication** – “التواصل والتنسيق”: Was coordination easy and responsive?
- **Safety and Responsibility (Optional)** – “السلامة والمسؤولية (اختياري)”: Did you feel your child was safe?
- **Additional Requirements** – “المتطلبات الإضافية”: Were tasks like meal prep or cleaning fulfilled?
- **Overall Satisfaction** – “الرضا العام”: A mandatory final rating for the overall experience
- **Optional Comments** – “تعليقات إضافية (اختياري)”: For any additional notes or suggestions

تقييم الجلسة →

شكراً لك على استخدامك لمنصتنا! نرجو منك تقييم الجلسة لمساعدتنا على تحسين الخدمة.

مقدم/ة الرعاية: نور  
تاريخ الجلسة: 30-05-2025

**الالتزام بالمواعيد** 🕒  
هل حضرت مقدمة الرعاية في الوقت المحدد؟

5 4 3 2 1  
★ ★ ★ ★ ★

تأخرت ثلث ساعة عن الموعد المحدد

**التواصل معك كولي أمر** 💬  
هل كانت وسيلة التواصل معك واضحة وفعالة طوال فترة التنسيق أو الجلسة؟

5 4 3 2 1  
★ ★ ★ ★ ★

نعم، تم التواصل بسهولة عبر التطبيق، وكانت ترد بسرعة وبأسلوب محترم وواضح.

ع

Figure 3.70: Parent feedback form – Punctuality and Communication

تقييم الجلسة →

**السلامة والمسؤولية (اختياري)** 🛡️  
هل شعرت أن طفلك كان في بيئة آمنة؟

5 4 3 2 1  
★ ★ ★ ★ ★

تعاملت بحرص ومسؤولية، ولم تترك الطفل وحده

**تنفيذ المتطلبات الإضافية** 📋  
هل قامت مقدمة الرعاية بتنفيذ ما طلبته من متطلبات إضافية بالشكل المطلوب؟

5 4 3 2 1  
★ ★ ★ ★ ★

نفذت كل المطلوب، لكن لم تقم بتنظيف المنزل كما هو متفق عليه.

**الرضا العام (إجباري)** 😊  
تقييمك العام للتجربة.

5 4 3 2 1  
★ ★ ★ ★ ★

ع

Figure 3.71: Parent feedback form – Safety, Tasks, and Satisfaction

**الرضا العام (إجباري)** 😊  
تقييمك العام للتجربة.

5 4 3 2 1  
★ ★ ★ ★ ★

تجربة إيجابية جدًا، وسنكررها بالتأكيد

**ملاحظات إضافية عامة** 📝

قمنا بطلب جلسة طارئة بسبب وجود عزاء في العائلة، وكنا بحاجة ماسة لمن يعتني بطفلنا. الجلسة كانت متجاوبة بسرعة، ووصلت في الوقت المحدد. اهتمت بالطفل بشكل رائع، وقامت بعمل بتحضير الطعام له

**ما الذي يمكن تحسينه؟** 💡

هل لديك اقتراح لتحسين جودة الخدمة؟

ع

إرسال التقييم ←

Figure 3.72: Parent feedback form – Additional comments and submission

Once the parent submits their feedback, the booking card is updated to reflect that the rating has been successfully completed. This prevents duplicate submissions and gives the parent clear confirmation that their input has been recorded.



Figure 3.73: Booking card updated to reflect feedback was submitted

This feedback is displayed on the caregiver's public profile to help future parents make informed decisions. Each review includes individual category ratings, comments, and an overall satisfaction score. The system calculates an average score from all parent ratings and displays it prominently.



Figure 3.74: Caregiver feedback page displaying detailed session reviews from parents



Figure 3.75: Another example of public caregiver feedback with average score and review

### 3.5.5.3 Caregiver Feedback

After a session is automatically marked as “completed,” babysitters here are given the opportunity to rate the parent. This feedback system helps caregivers share their experience and allows others to assess potential future clients. The form includes multiple criteria:

- **Punctuality** – “الالتزام بالوقت”: Did the parent start and end the session on time?
- **Communication** – “التواصل”: Was the parent available for communication before and during the session?
- **Payment** – “الالتزام بالدفع”: Was the agreed payment made on time without delays?
- **Overall** – “التقييم العام”: Your overall experience with the parent during this session.

Caregivers can also write optional comments under each category. After submitting the form, the booking card updates with a “تم التقييم” badge to confirm the feedback was submitted.

The screenshot shows the 'تقييم ولي الأمر' (Parent Rating) form. At the top, it displays the user's location as 'US' and the session details: 'تقييم الجلسة' (Session Rating), 'اسم ولي الأمر: أم أحمد العلي' (Parent Name: Mrs. Ahmad Ali), and 'تاريخ الجلسة: 25-06-2025' (Session Date: 25-06-2025). The form is divided into three main sections:

- الالتزام بالوقت (Punctuality):** The question asks if the parent started and ended the session on time. The rating is 4 stars (4 out of 5). A comment box contains: 'تأخرت الأم في استقبالي بداية الجلسة، وعند نهايتها لم تكن جاهزة لإنهائها، مما سبب تأخيرًا' (The mother was late in greeting me at the start of the session, and at the end she was not ready to finish it, which caused a delay).
- التواصل (Communication):** The question asks if the parent was available for communication. The rating is 4 stars (4 out of 5). A comment box contains: 'لم ترد على المكالمات أو الرسائل وقت الحاجة، خاصة عندما حدث طارئ بسيط.' (I did not respond to calls or messages when needed, especially when a minor emergency occurred).
- الالتزام بالدفع (Payment):** The question asks if the agreed payment was made on time. The rating is 4 stars (4 out of 5). A comment box is empty.

Figure 3.76: Caregiver rating form – Punctuality, Communication, and Payment

The screenshot shows the final submission step of the 'تقييم ولي الأمر' (Parent Rating) form. It displays the overall rating section:

- التقييم العام (Overall Rating):** The question asks for the overall experience. The rating is 4 stars (4 out of 5). A comment box contains: 'تجربة غير مريحة، ولن أكرر التعامل معها إن توفرت خيارات أخرى.' (Unpleasant experience, I will not repeat dealing with her if other options are available).

At the bottom, there is an orange button labeled 'إرسال التقييم' (Submit Rating).

Figure 3.77: Caregiver rating form – Final submission step

Once feedback is submitted, it becomes visible to other caregivers when they receive a booking request from

the same parent. A button labeled "عرض التقييمات" allows them to read reviews before deciding to accept or reject the request.



Figure 3.78: Caregiver views reviews written about a parent before accepting

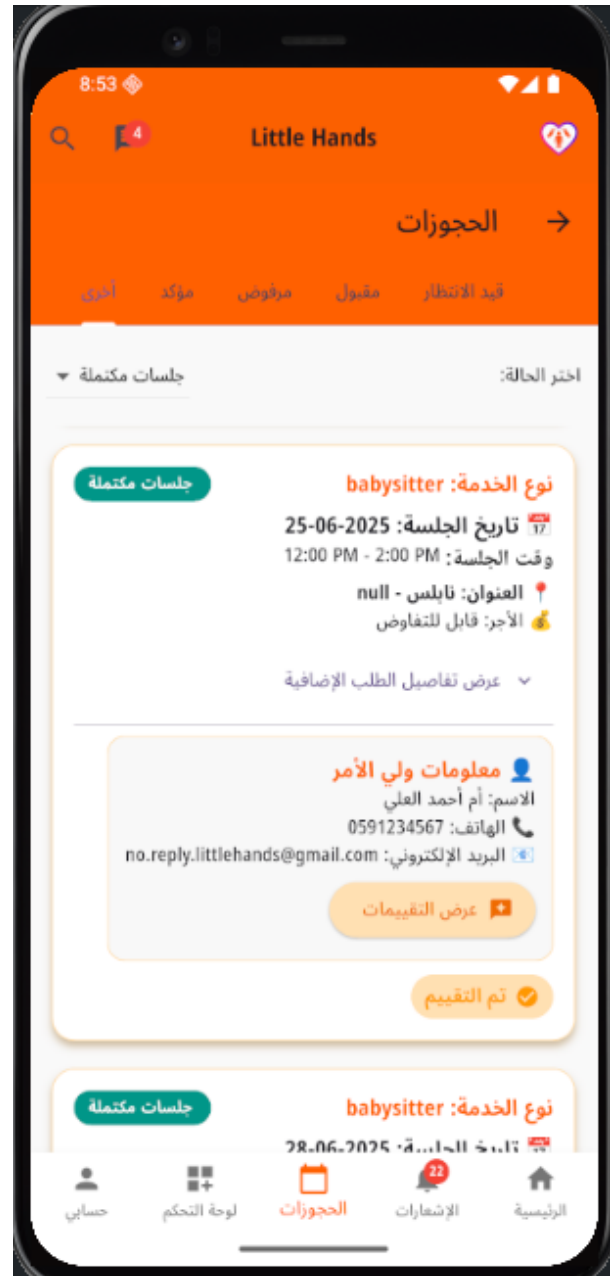


Figure 3.79: Booking card updated to show caregiver's feedback was submitted

This two-way rating system strengthens accountability and builds mutual trust across the platform by helping both sides make more informed decisions.

### 3.5.6 Chat and Communication System

The application supports real-time chat between parents and caregivers, powered by Firestore. This allows direct communication at various stages, such as:

- Before booking a session (from the caregiver profile screen)
- After a session is accepted, to discuss details or adjustments
- During confirmation and payment stages

Messages are timestamped and grouped by conversation, ensuring organized interaction throughout the booking flow.



Figure 3.80: Chat interface between parent (right) and caregiver (left) discussing the extension of the session duration by half an hour.

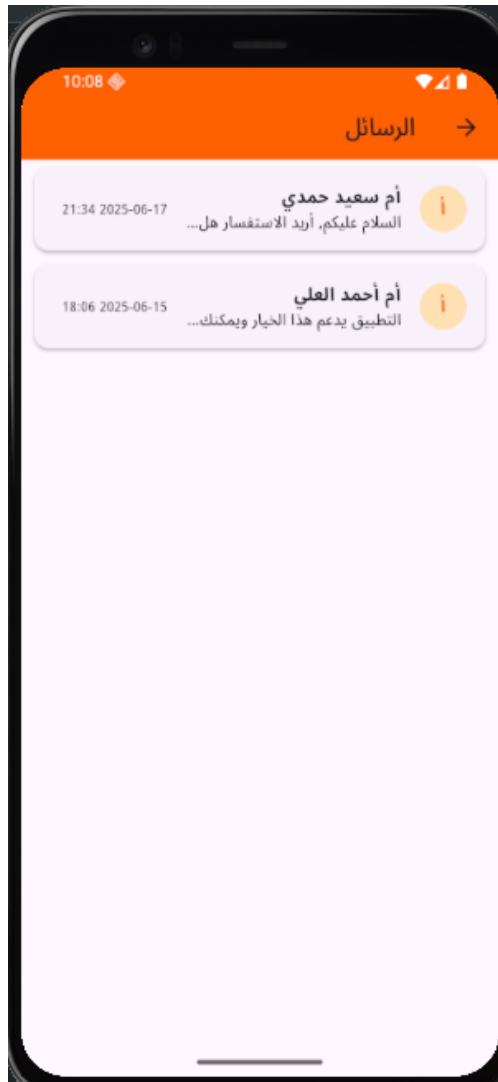


Figure 3.81: Caregiver message inbox showing chats from different parents

### 3.5.6.1 Chatbot Assistant Integration

To enhance the experience, the system also includes a built-in chatbot assistant. This assistant is embedded in the chat interface and supports users with:

- Suggested replies and quick responses
- Auto answers for common questions (e.g., payment help or session edits)



Figure 3.82: Chatbot guiding the parent through the booking steps



Figure 3.83: Chatbot handling user issues with session booking

### 3.5.7 Caregiver Interface Pages

The caregiver section of the Little Hands app includes a dedicated navigation system that allows caregivers (babysitters, experts, or shadow teachers) to access and manage all aspects of their work. The app consists of six main pages, each accessible through a bottom navigation bar. Each page is described in the following subsections.

#### 3.5.7.1 Homepage (Main Dashboard)

After a caregiver logs in, they are directed to the main page, which acts as a quick performance dashboard. This page summarizes important metrics and personalized insights to help caregivers monitor and improve

their work.

- **Dashboard Metrics:** Includes key performance indicators such as:
  - Average session rating
  - Total booked sessions
  - Today's scheduled sessions
  - Number of received feedbacks
  - Average session rate
  - Total earned income
- **Today's Session Info:** If applicable, shows full session details including time, child age, city, and payment method.
- **Highlighted Feedback:** A top-rated parent review is shown to encourage the caregiver.
- **Monthly Activity Chart:** Visual chart of session counts over the past 4 weeks.



(a) Main dashboard showing profile, rating, number of sessions, feedback count, session rate, and income.

(b) Today's session details, highlighted feedback from a parent, and session chart over the past month.

Figure 3.84: Caregiver Main Page providing insights, upcoming session info, and performance highlights.

### 3.5.7.2 Notifications Page

The Notifications Page in the caregiver interface provides real-time updates about booking activity, session changes, and other important alerts. It ensures caregivers stay informed and respond promptly to changes.

- **Alert Types:** Notifications include:
  - New booking requests from parents.
  - Booking confirmations.
  - Session cancellations (e.g., last-minute or due to replacement).
  - System alerts and reminders.



Figure 3.85: Caregiver Notifications Page showing new bookings, confirmations, and urgent session alerts with status highlighting.

### 3.5.7.3 Bookings Page

This page allows caregivers to manage all their session bookings in one place. Bookings are organized by status: pending, accepted, meeting booked, confirmed, completed, rejected, and cancelled. Each status determines the available actions a caregiver can take.



Pending booking with a rejection confirmation dialog.

Accepted booking showing parent info and session actions.

Figure 3.86: Bookings Page for Caregivers: manage and respond to sessions.

### 3.5.7.4 Feedback and Ratings

This page provides an overview of all feedback received from parents after completed sessions. It helps the caregiver monitor their performance and maintain service quality.

- **Overall Rating:** Shows the caregiver's average score for that session.
- **Parent Feedback:** Lists written reviews submitted by parents.
- **Rating Categories:** Includes star ratings for key aspects such as time commitment and communication.

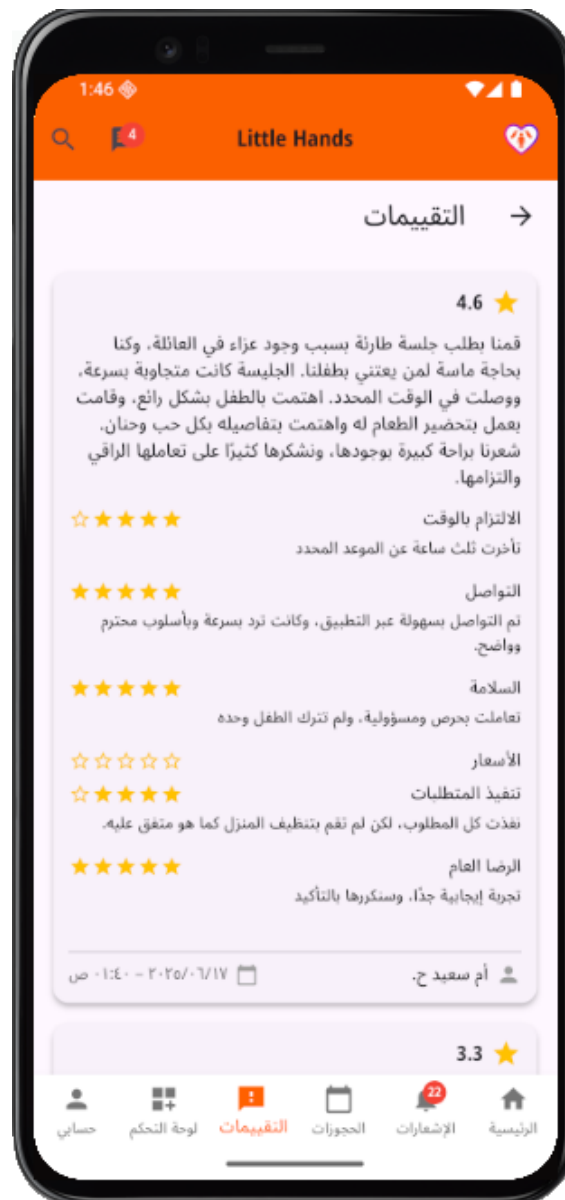


Figure 3.87: Feedback Page showing overall caregiver rating and parent comments.

### 3.5.7.5 Control Panel (Work Schedule)

This is one of the most essential pages in the caregiver interface, allowing the caregiver to manage and customize their availability. It is divided into three main sections:

- **Weekly Preferences (مواعيد العمل):** The caregiver can select which days of the week they are available.

For each day:

- They can enable or disable the day.
- Define whether to accept one session only or multiple sessions.
- Set the working hours by specifying the start and end time.
- **Calendar View (التقويم):** A monthly calendar displays all days with color-coded indicators:
  - Days can be customized individually (e.g., disable a specific date, override working hours, change session count).
  - When clicking on a booked day, session details appear for the caregiver to review.
- **Meeting Availability (مقابلات):** This section allows the caregiver to add specific date-time slots where they are available to meet with parents before confirming bookings.



Figure 3.88: Weekly work schedule definition.



Figure 3.89: Calendar view showing session statuses.



Figure 3.90: Editing a specific day's availability.



Figure 3.91: Defining available meeting time slots.

### 3.5.7.6 Articles and Expert Posts

This section is available exclusively for caregivers registered as experts. It enables them to upload research papers or advice articles in PDF format, along with an optional cover image. Using Google Gemini API [4], the content is automatically summarized and converted into concise, card-style posts visible to parents. Experts can preview how their advice appears and delete any post if needed.



Figure 3.92: Expert uploading a new advice post (PDF + image).



Figure 3.93: Preview of generated article cards for parents.

Figure 3.94: Expert Posts: Upload and view summarized articles powered by AI.

### 3.5.7.7 Profile Page

This page provides a personalized overview of the caregiver's profile. It displays essential information including:

- **Profile Photo and Name:** Clearly shown at the top for identity recognition.
- **Basic Details:** City of residence, years of experience, and smoking status.
- **Skills and Services:** A list of caregiving services the caregiver can offer (e.g., meal prep, cleaning, special needs care).
- **Certifications:** Any official certifications held by the caregiver (e.g., First Aid).

The profile page helps parents understand the caregiver's qualifications at a glance and ensures transparency

in the platform.



Figure 3.95: Caregiver Profile Page showing identity, services offered, and certifications.

### 3.5.8 Parent Interfaces

The Little Hands application offers a user-friendly and intuitive interface for parents to manage their bookings, view content, communicate with caregivers, and stay updated on session progress. The following sections describe the main pages available to parents:

#### 3.5.8.1 Home Page

The home page welcomes parents with a friendly layout that highlights the platform's key services. It features:

- Promotional content to encourage parents to book sessions.
- A list of available services such as babysitting, expert advice, and support for special needs.

- A “Contact Us” section to allow users to report problems or provide feedback.
- A showcase of some of the top-rated and featured caregivers.
- Highlights of highly-rated feedback from other parents to build trust and confidence.



Figure 3.96: Parent Home Page – Carousel and Services Overview



Figure 3.97: Parent Home Page – Services and Contact Section

### 3.5.8.2 Notifications Page

This page displays all notifications relevant to the parent. Notifications include:

- Updates on booking requests (e.g., accepted, rejected).
- Meeting confirmations or cancellations.
- Changes in session timing or caregiver status.
- System messages related to payments or scheduling.

The page also distinguishes between read and unread notifications for easier management.



Figure 3.98: Notifications page showing booking updates and status changes.

### 3.5.8.3 Bookings Page

The Bookings page is divided into two main sections:

- **Current Bookings:** Ongoing or upcoming sessions that the parent has scheduled.
- **Booking History:** A record of completed, cancelled, or expired sessions.

Parents can filter bookings based on status (e.g., pending, accepted, meeting booked, confirmed, cancelled).

This page allows parents to:

- Confirm bookings and proceed to payment.

- Cancel requests at different stages.
- Request a meeting before confirming a session.
- View caregiver profiles and session details.
- Submit feedback after the session ends.



(a) Current bookings view: manage, confirm, cancel or request meetings.



(b) History view: completed and cancelled sessions, feedback options.

Figure 3.99: Bookings Page: Shows both current and past sessions, with controls to manage bookings, confirm or cancel, and provide feedback.

### 3.5.8.4 Feedbacks Page

In this section, parents can view all the feedback they have submitted about caregivers. Feedback may be submitted:

- After completed sessions (covering punctuality, price fairness, communication, etc.).
- After cancelled sessions (explaining the reason for cancellation).

Each feedback includes star ratings and optional comments, helping parents reflect on their past experiences and aiding the platform in maintaining quality.

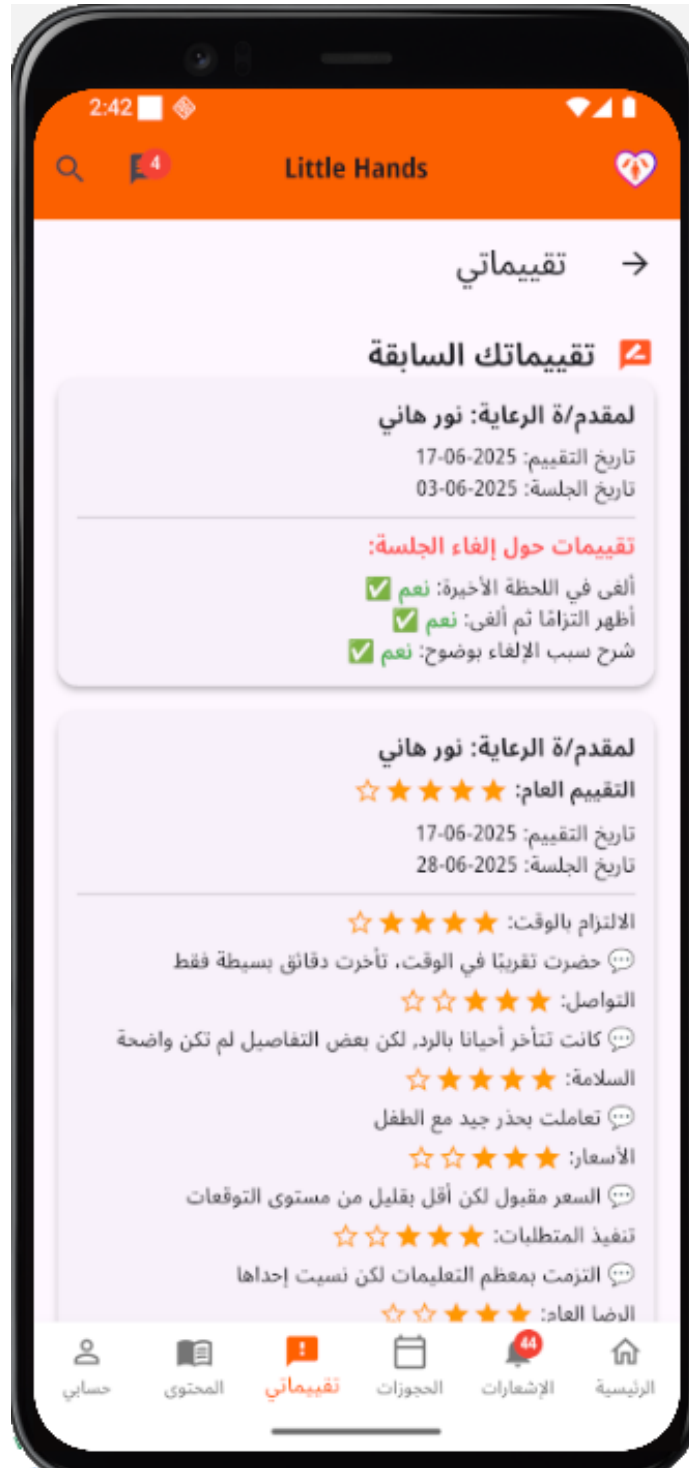


Figure 3.100: Feedbacks Page: Displays all reviews and detailed ratings written by the parent after each completed or cancelled session, including multiple rating categories and comments.

### 3.5.8.5 Content Page

This page contains expert posts and articles uploaded by specialists on the platform. These posts are summarized from PDF uploads using AI (Google Gemini API) and presented in a card format, making them easy for parents to read. Topics may include child nutrition, sleep habits, behavioral advice, and more.

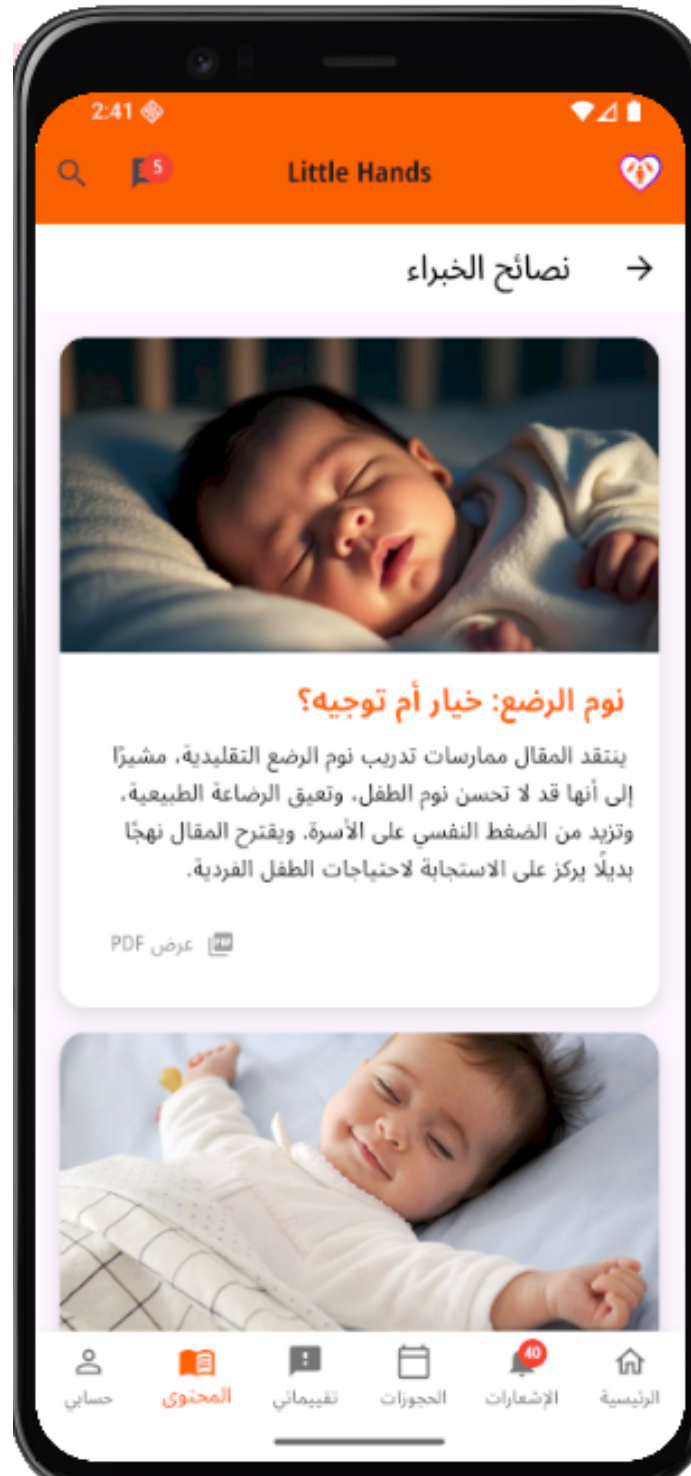


Figure 3.101: Content Page: Displays expert posts in summarized card format.

### 3.5.8.6 Profile Page

This page presents the parent's personal information in a clean and organized layout. It includes:

- Full name, city of residence, and email address.
- A list of children added automatically from past bookings.
- Options to update personal details or contact support.

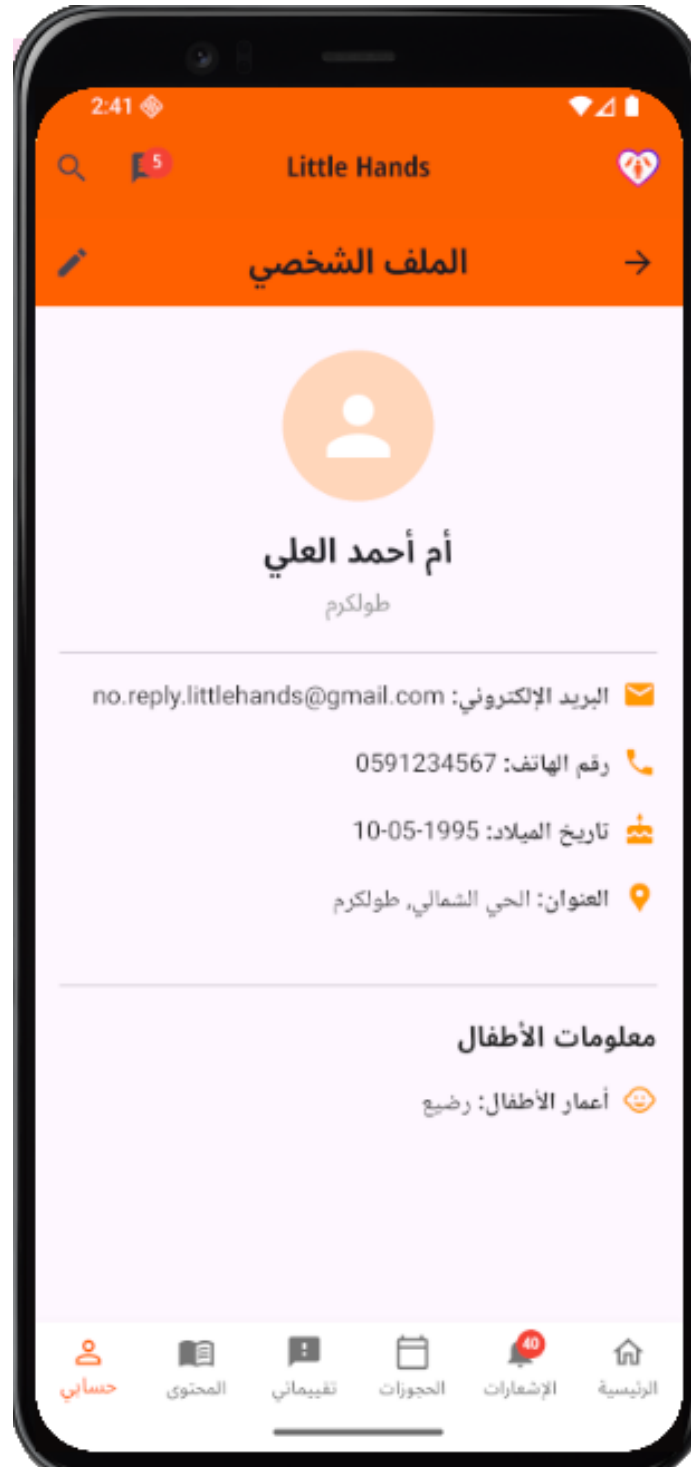


Figure 3.102: Profile Page: Allows the parent to view and manage their personal information.

This page helps personalize the platform experience and ensure accurate caregiver matching.

### 3.5.9 Web Platform Overview

In addition to the mobile application, the Little Hands platform includes a responsive web-based system that supports both administrators and users. This section details the functionalities provided.

#### 3.5.9.1 Admin Interface

The admin interface provides full control over users, sessions, and shared content. It is designed with simplicity and clarity, using a sidebar menu and responsive cards to summarize activity.

- **Dashboard:** Displays an overview of key statistics including total parents, caregivers, bookings, and expert posts. Also includes booking trends over the past 7 days and platform updates.

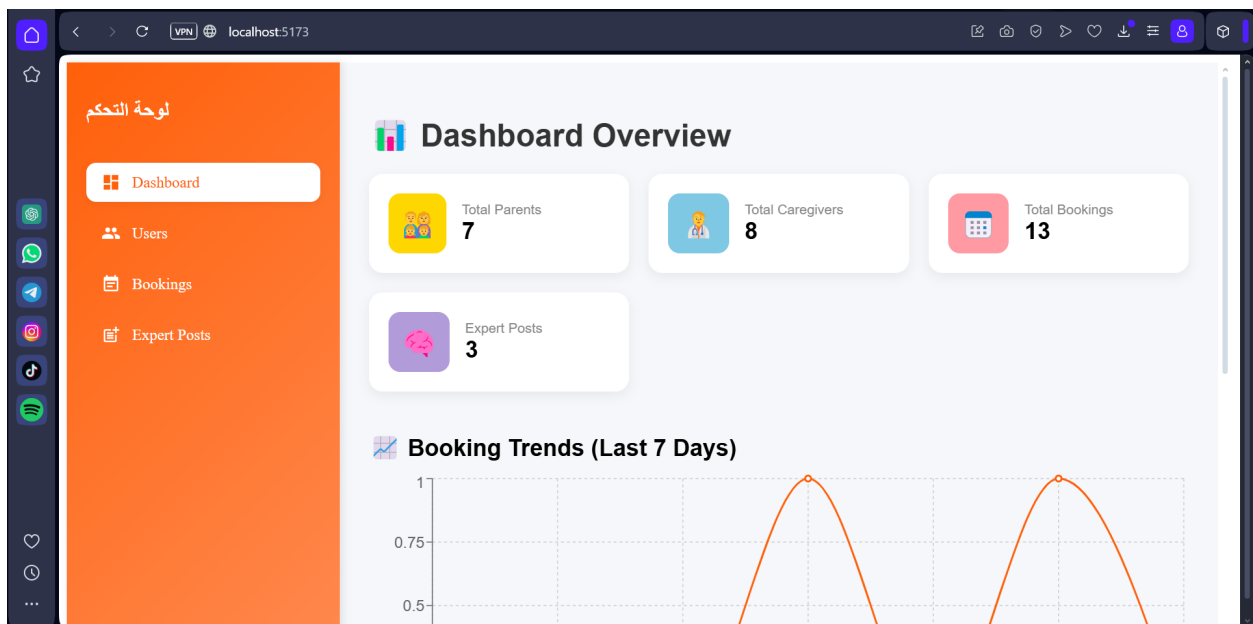


Figure 3.103: Admin Dashboard Overview with statistics.

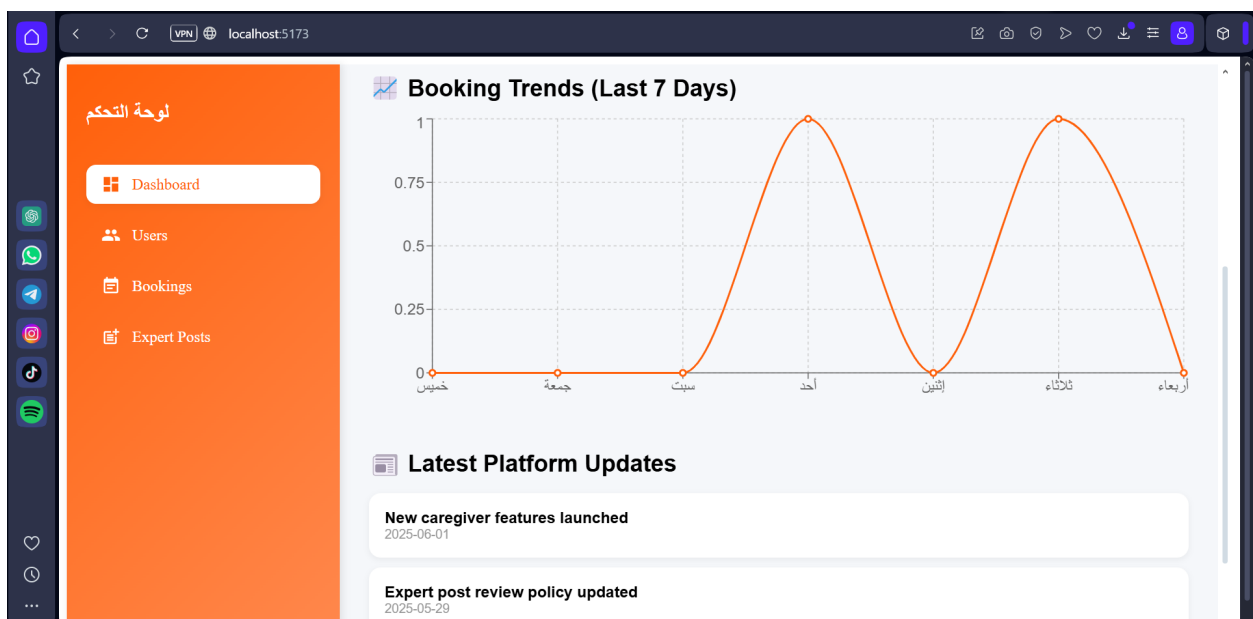


Figure 3.104: Booking trends chart and latest updates in the dashboard.

- **Users Management:** Enables filtering and managing all platform users by role (parents, babysitters, experts, special needs) and city. Admins can view details and remove users if necessary.

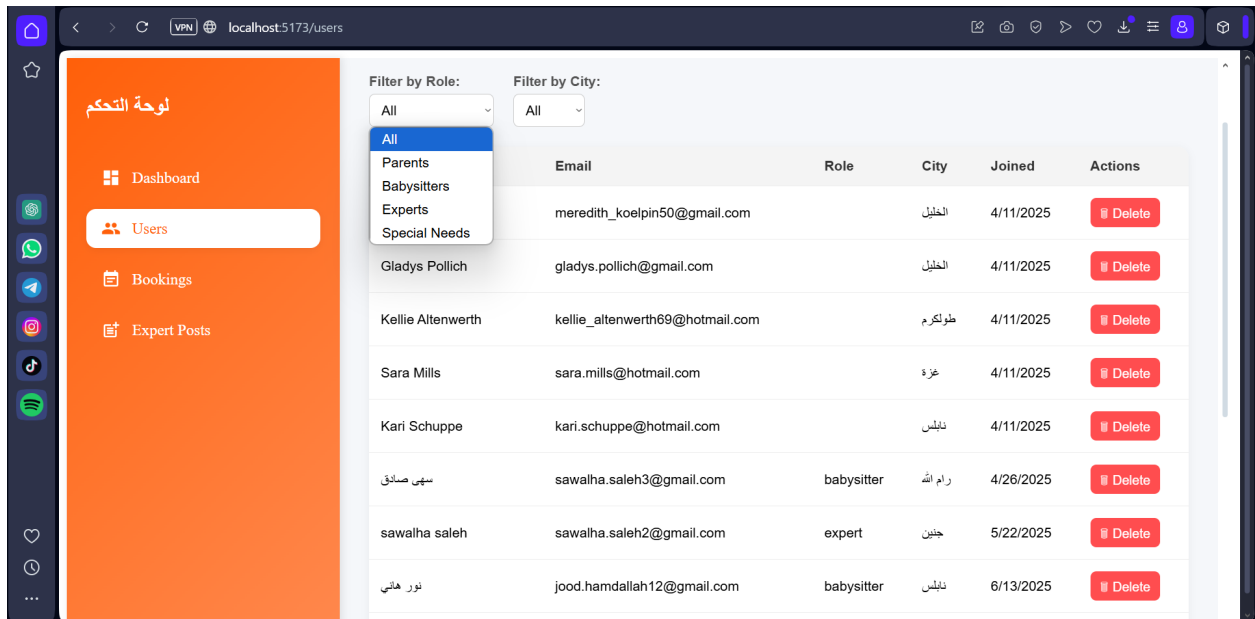


Figure 3.105: Users management with filters and delete action.

- **Bookings Management:** Provides an overview of all bookings made on the platform, with filters and details to monitor and resolve any issues.

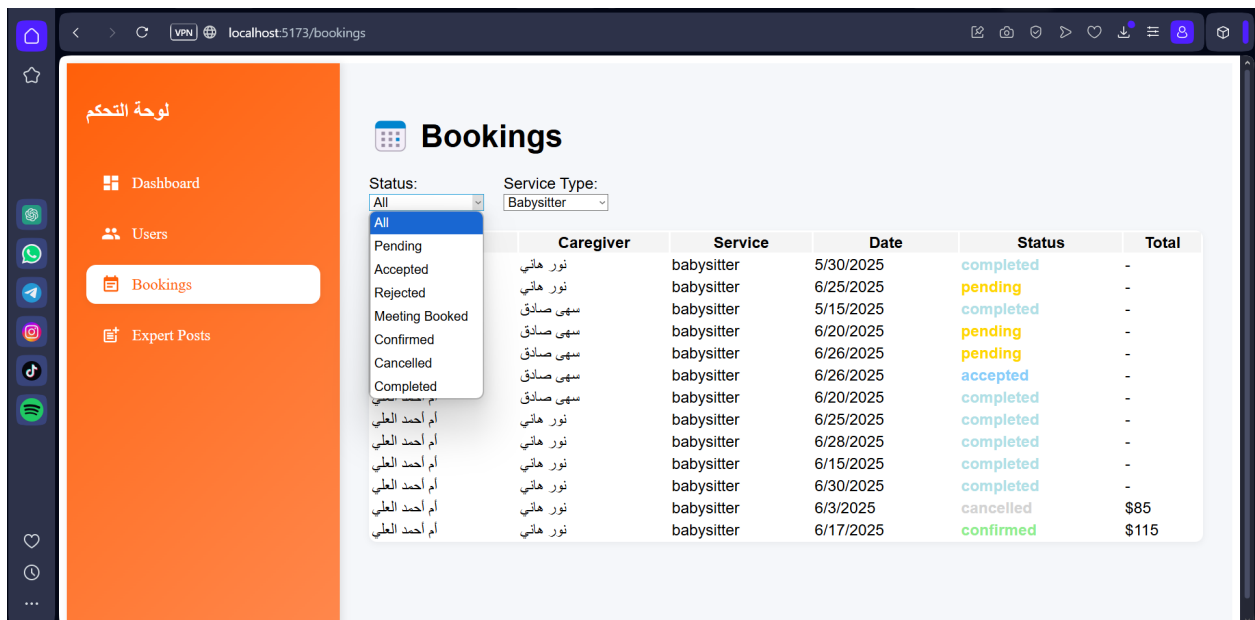


Figure 3.106: Admin view of platform-wide bookings.

- **Expert Posts Management:** Allows reviewing, approving, or deleting posts submitted by expert caregivers before they appear in the app's content section for parents.



Figure 3.107: Reviewing expert-submitted content before publishing.

### 3.5.9.2 Users Web Interface

The web interface for users provides seamless access to essential features, including account registration, login, browsing caregivers, managing bookings, and reading expert content—tailored to each user type based on their role.

- **Welcome Page:** Introduces the platform with a call-to-action for parents or caregivers.

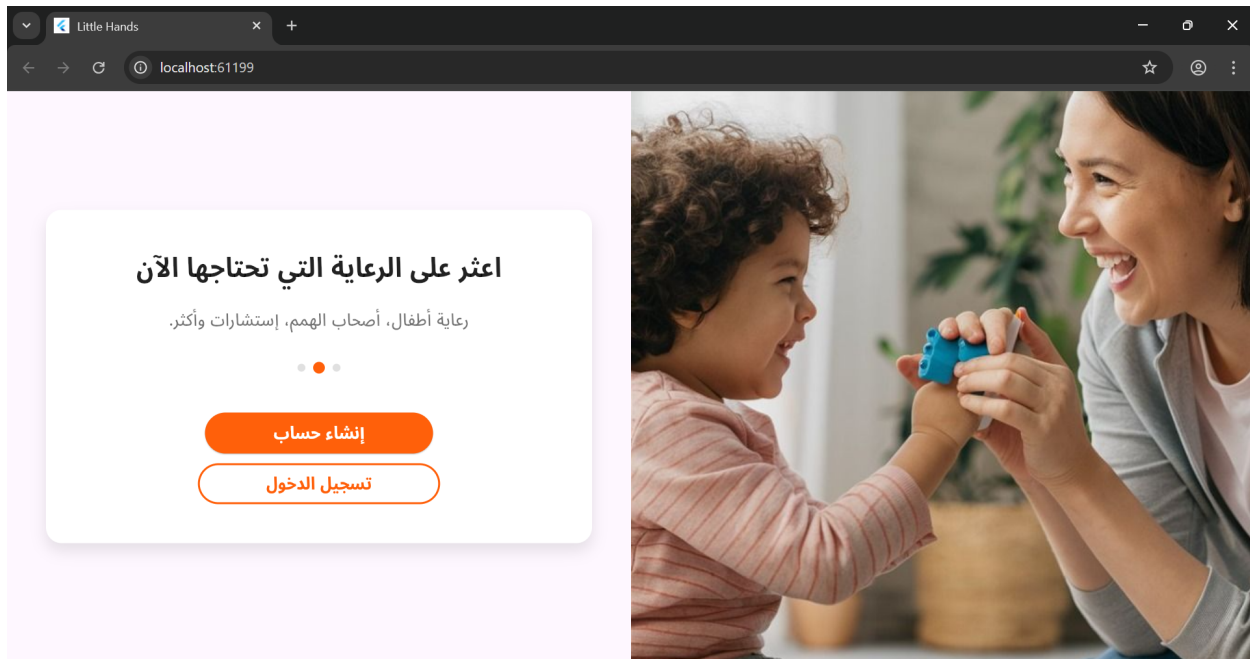


Figure 3.108: Welcome page of the Little Hands web interface.

- **Login Page:** Allows existing users to securely log into their accounts.

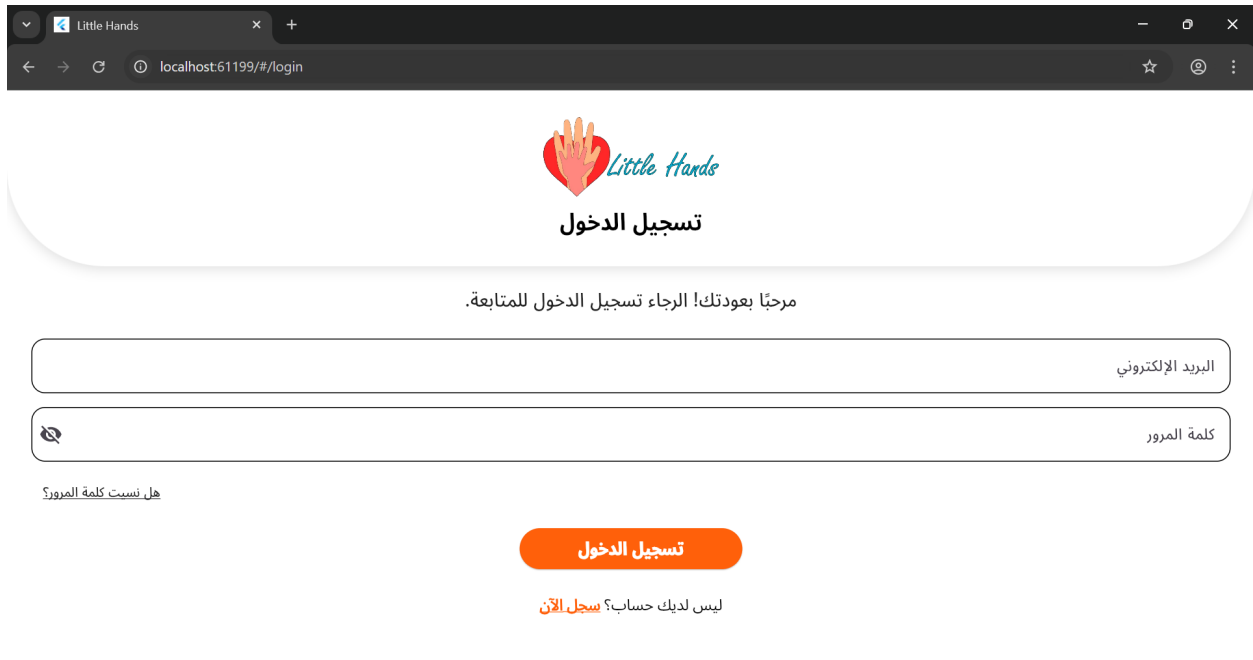


Figure 3.109: Login interface for parents and caregivers.

- **Sign Up Page:** Separate sign-up flows for parents and caregivers, collecting necessary personal and location information.

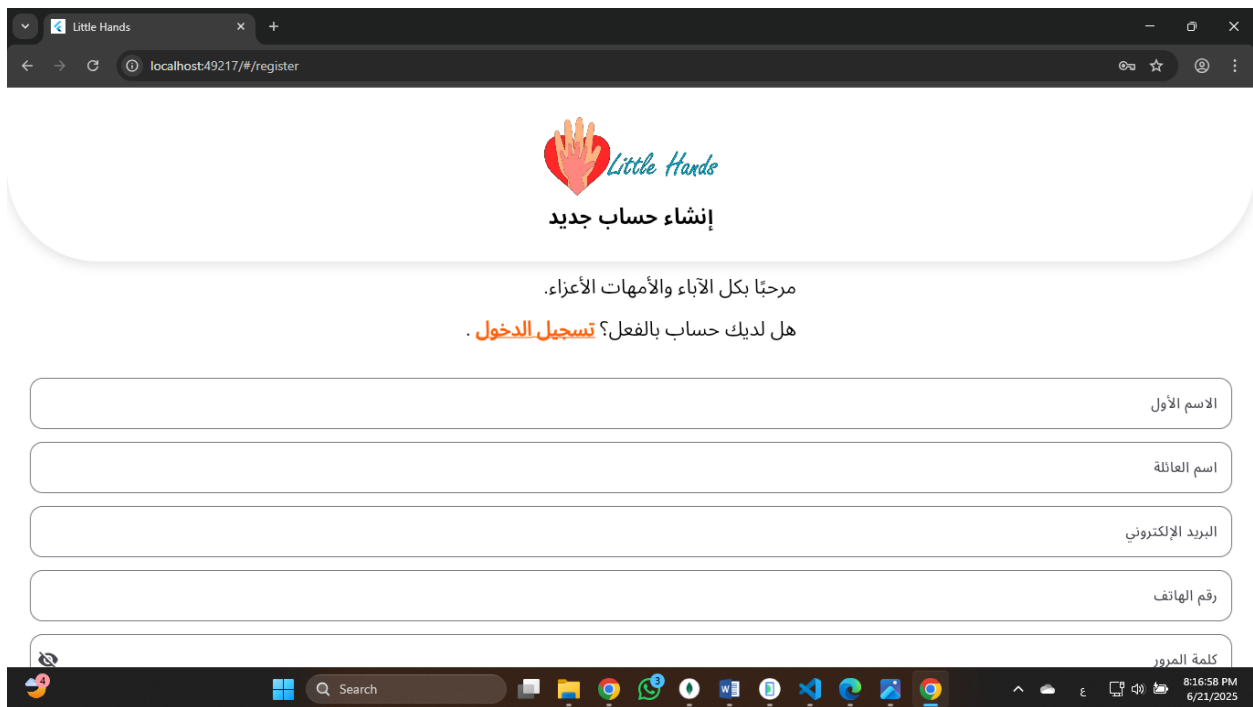


Figure 3.110: Sign-up page for parent.

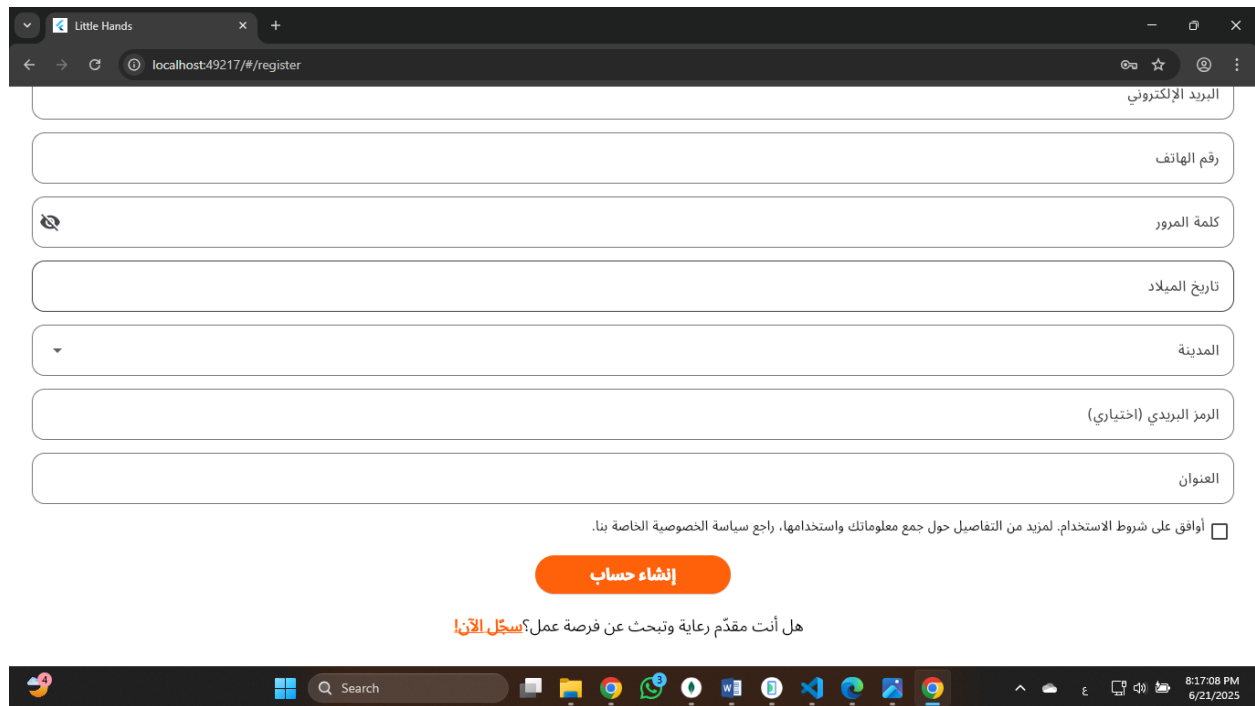


Figure 3.111: Extended parent registration fields.

The parent interface in the web version of **Little Hands** is organized into five core sections accessible from the sidebar: Home, Notifications, Bookings, Feedbacks, and Profile. Each section is designed for ease of use and clear navigation.

- **Home Page:** Serves as a welcoming and informative dashboard. It includes a service selector, introductory messages, and promotional content.

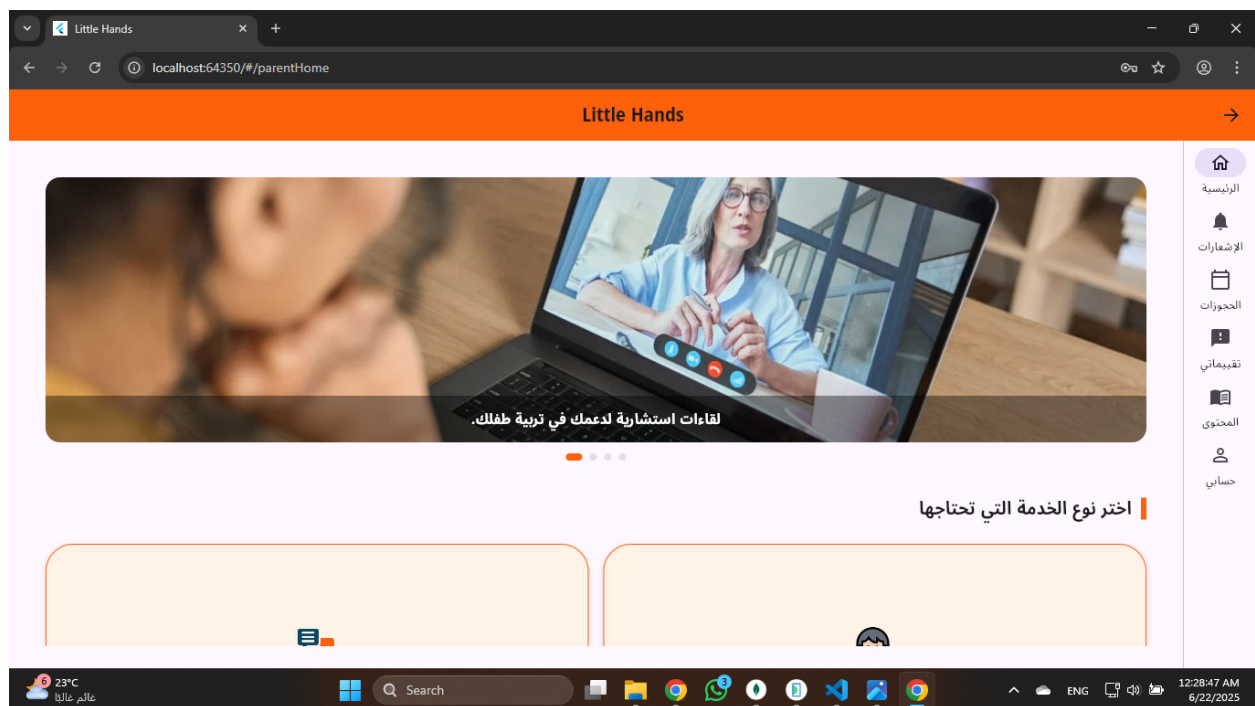


Figure 3.112: Parent Home Page – displaying services and platform vision.



Figure 3.113: Home Page – service cards and value statements.

- **Notifications Page:** Displays all updates regarding bookings, meetings, and session status in a clear list format.

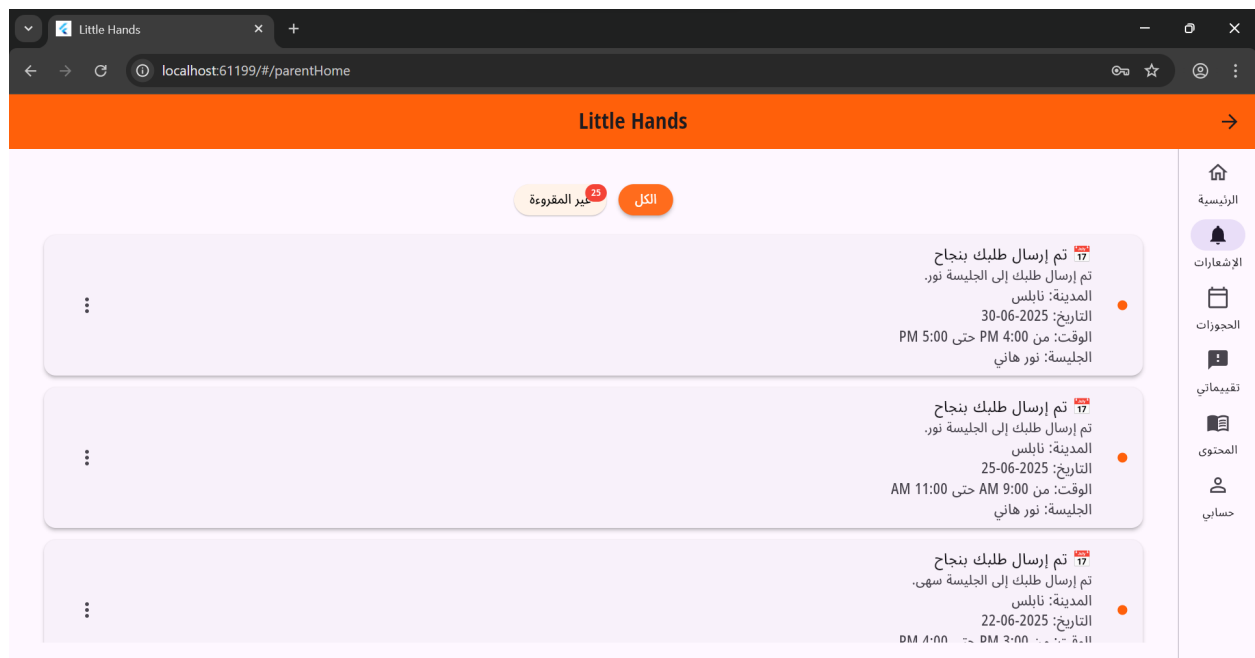


Figure 3.114: Notifications Page – list of session-related updates.

- **Bookings Page:** Split into current and historical bookings. Parents can view session status, proceed to payment, or request meetings.

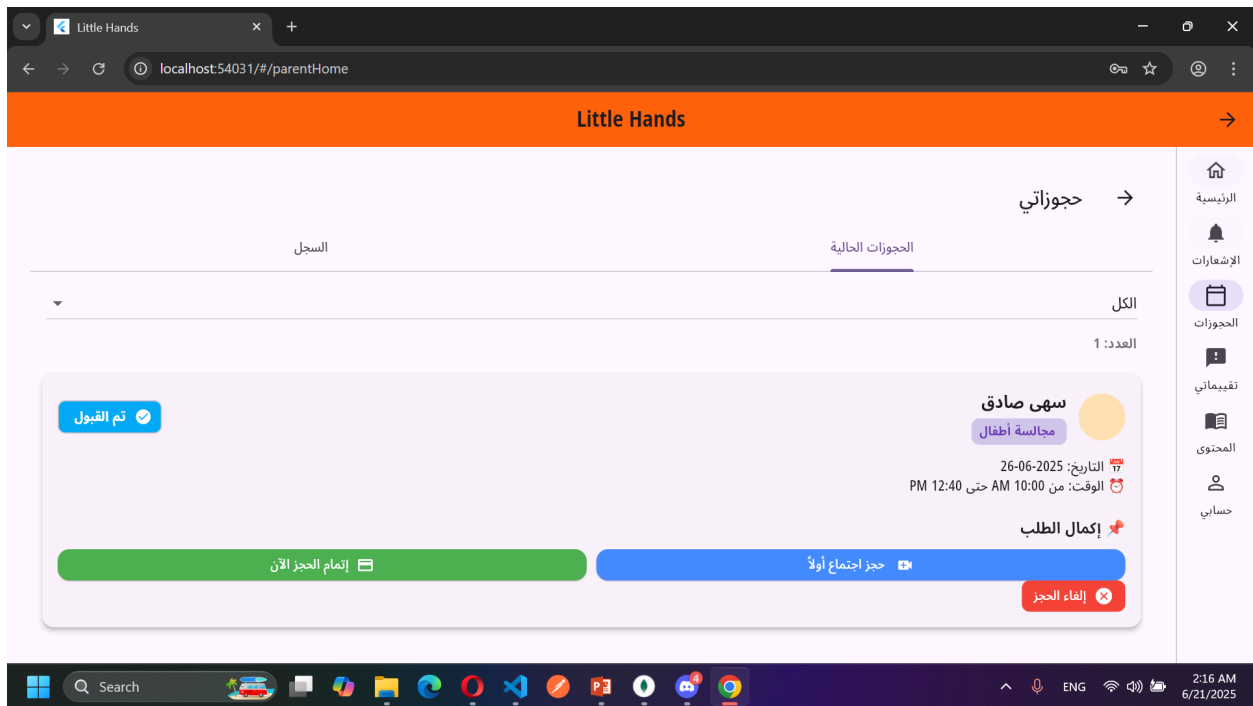


Figure 3.115: Bookings Page – showing current session actions.

- **Feedbacks Page:** Displays feedback given by the parent to caregivers after completed sessions, covering multiple criteria.

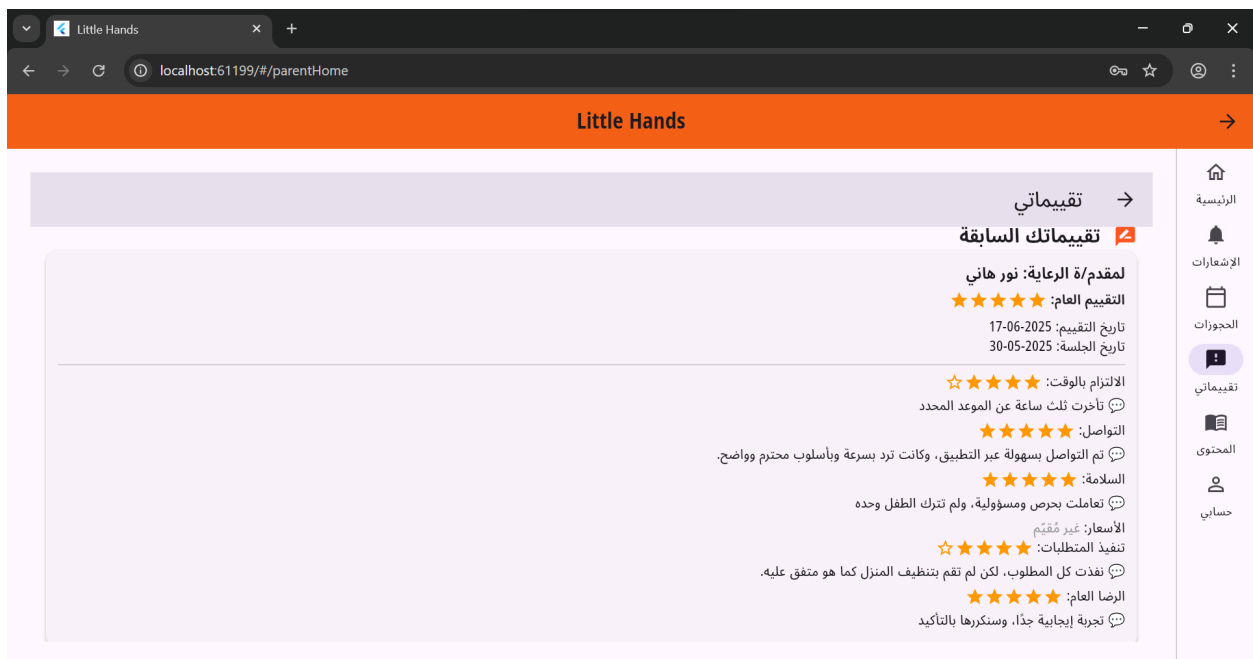


Figure 3.116: Feedback Page – with detailed ratings and comments.

- **Profile Page:** Contains the parent's personal information, including contact info and city, with an option to edit details.

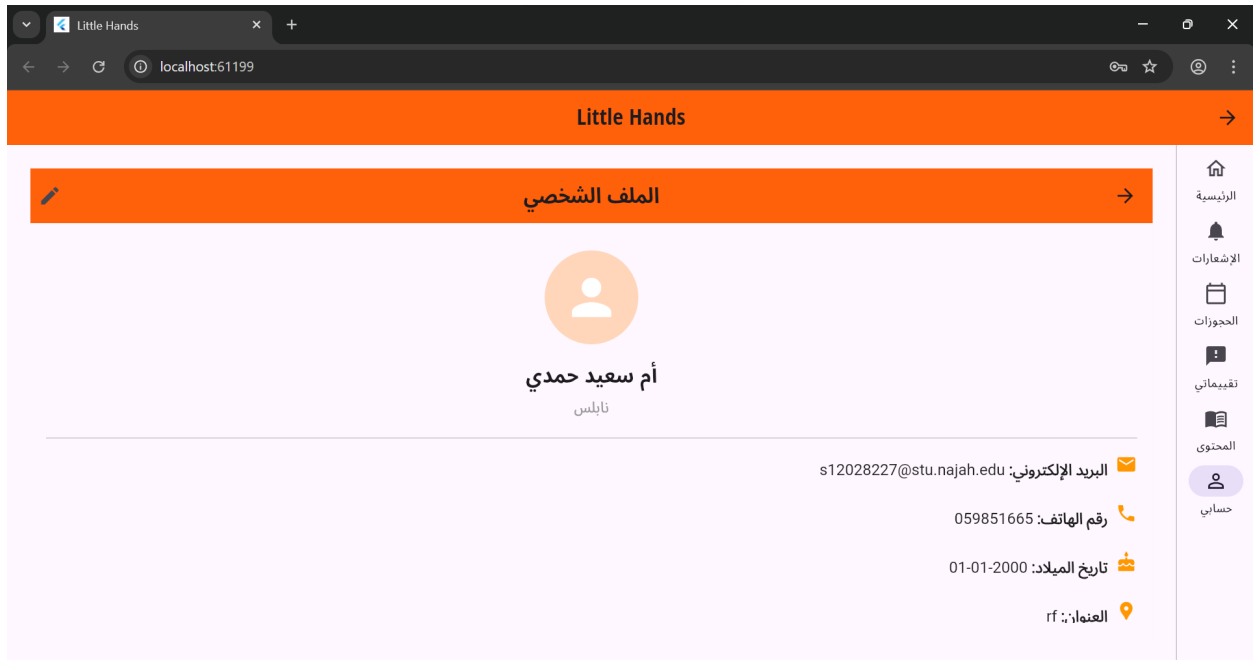


Figure 3.117: Parent Profile Page – personal and contact details.

# Chapter 4

## Results and Discussion

Little Hands was developed as a comprehensive childcare platform to facilitate communication between parents and caregivers. This chapter explains what was achieved during the development of the system and how the app was tested during design and coding. The user interface is fully designed, the backend is working, and the app meets its main goals. Although the system has not been launched for real users yet, it is fully built and ready to be tested as a working product.

### 4.1 Results

The development of the Little Hands platform resulted in several important outcomes across mobile, web, and backend systems. The key results were:

- **Role-Based Access and Interfaces:** The system successfully supported multiple user roles—parents, caregivers (babysitters, special needs supporters, experts), and administrators—with each role accessing a tailored interface and features relevant to their needs.
- **Interface Completion:** All major screens for mobile and web platforms were completed, including login, registration, caregiver profiles, session booking, payment confirmation, feedback forms, and admin dashboards.
- **Booking Workflow Testing:** The full booking flow was implemented and tested, including session request, caregiver response, price negotiation, meeting booking, and final confirmation. Parents could choose between one-time or regular sessions.
- **Backend Integration:** The Node.js backend was fully connected to the frontend interfaces. API routes for booking, feedback, payments, and user management responded correctly during testing.
- **Notifications and Real-Time Updates:** Push notifications using Firebase and real-time socket events using Socket.IO were integrated successfully. During tests, users received booking updates and session status changes instantly.
- **Feedback System:** Parents and caregivers were able to rate and review each other after completed sessions. Ratings were saved and displayed properly in user profiles.

## 4.2 Discussion

### Challenges and Solutions

Throughout the development of the Little Hands platform, several key challenges were encountered. These shaped both the design decisions and the overall architecture of the system. Below are the most notable constraints and how they were addressed:

- **Multi-Role Platform Design:** One of the most complex challenges was designing a system that supports multiple roles—parents, babysitters, special needs supporters, and experts. Each user type required different registration flows, permissions, and interface behavior. The database structure and logic were carefully built to adapt dynamically based on user roles, ensuring a smooth and role-specific experience across all parts of the app.
- **Trust and Safety Requirements:** Since the platform deals with services related to children, establishing trust was a top priority. To increase safety, the system included ID verification using external APIs, meeting options before confirmation, and mutual feedback after sessions. These features aimed to build credibility and allow users to feel secure when using the platform.
- **Booking Logic Complexity:** The booking process was not linear and had to support both one-time and recurring sessions. It involved several stages: request, acceptance, price definition, optional meeting, confirmation, and payment. Implementing this logic required careful planning to ensure smooth transitions between states, consistent status updates, and compatibility across mobile and web.
- **Flexible Payment and Pricing Flow:** Caregivers needed the ability to set either fixed or hourly pricing, and add costs for special requirements. At the same time, parents needed to view clear and fair pricing before confirming. To solve this, a two-phase flow was introduced: caregivers could send session prices after viewing request details, and parents could either confirm directly or request a meeting.
- **Critical Nature of the Service:** Services like babysitting and special needs care require a high level of responsibility. The platform was developed with an emphasis on trust, proper caregiver onboarding, and safety-first workflows. Every feature—from booking to feedback—was designed to protect the child and support families professionally.
- **Lack of Local References:** No similar platform was found in Palestine, which made it difficult to define appropriate workflows. Research was extended to international solutions and benefited from global platforms as references. To ensure cultural relevance, the team discussed and evaluated different features by informally asking parents and potential users about their needs and preferences.
- **Absence of Industry Standards:** Since few companies offer comprehensive childcare platforms locally, there were no established standards to follow. Booking flows, onboarding steps, and pricing logic had to be created from scratch, based on best practices and iterative improvements during development.

## Chapter 5

# Conclusion and Future work

### 5.1 Conclusion

This project "**Little Hands**" was successfully developed, as a digital platform that helps parents and caregivers connect in an organized and safe way. The system was designed to offer services such as babysitting, expert advice, and support for children with special needs. It works on both mobile and web platforms.

The app includes different roles—parents, caregivers, and admins. Each role has its own interface and features. For example, parents can book sessions, caregivers can manage their schedules, and admins can track everything through a dashboard.

All main features were completed, including user registration, session booking, real-time updates, feedback, and flexible pricing. The system allows users to receive notifications, track bookings, and make choices like paying in cash or requesting meetings.

Although the platform has not been deployed live, all parts were connected and tested during development. The backend was built using Node.js and MongoDB, while the mobile app used Flutter.

Building this system taught us a lot about designing real products and services. Since there are no similar apps in Palestine, we had to research global solutions and adjust them to local culture and market demand by talking to families and reviewing similar needs.

The experience helped us improve our technical and analytical skills, especially in building full systems, managing user roles, and thinking carefully about trust and safety in childcare services.

Little Hands is now a complete and ready-to-launch platform that could help families across the region once it is deployed.

## 5.2 Recommendations for Improvement

While the Little Hands platform is functionally complete, there are several key areas that could be improved or extended in future versions to increase its usefulness, safety, and impact:

- **Multilingual Support:** The current version supports Arabic only. Future releases should support multiple languages, especially English, to serve a wider audience and support non-Arabic speaking caregivers or parents.
- **AI-Powered Recommendations:** A custom-trained AI model could be used to suggest caregivers and services based on user preferences, location, feedback, and session history. This would make the caregiver matching process faster, smarter, and more personalized.
- **Automated Matching and Suggestions:** The system can be enhanced to provide automatic caregiver recommendations and smart suggestions for services based on user behavior and needs.
- **Session Reminders and Expiry Handling:** Implementing automated reminders for parents and caregivers to complete actions such as confirming sessions, submitting feedback, or responding to requests. Inactive or unresponded session requests could automatically expire after a set time.
- **Face-to-Face Meeting Options:** Adding support for arranging in-person meetings (besides online ones) would increase trust between users, especially for first-time sessions.
- **Expanded Service Locations:** While the platform currently supports home-based sessions, especially for babysitting services, future updates could allow caregivers to provide services in additional settings such as schools, kindergartens, or community centers—offering more flexibility to both parents and caregivers.
- **Security and Trust Measures:** The platform can integrate advanced security features such as official background checks and criminal record verification for caregivers, possibly in partnership with legal or governmental entities.
- **Building Public Trust:** Since the concept of hiring childcare online is still new in some communities, future efforts should include awareness campaigns, user education, and strong marketing strategies to encourage adoption.
- **Special Offers and Engagement:** Future updates can include promotional campaigns, seasonal offers, or discounts to increase user engagement and reward loyal customers.
- **Expand Childcare Services:** To better support families, it is recommended to expand the platform’s offerings to include a wider range of childcare services. These could involve at-home tutoring, early childhood education, speech and behavioral support, as well as parenting guidance classes. Providing these services would strengthen the platform’s role as a complete solution for children’s care and development.
- **Parental Support Features:** Additional tools and tips for parents, such as booking guides, safety checklists, and parenting content, could be provided to help them feel more confident and informed when using the platform.

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