



AN-NAJAH NATIONAL UNIVERSITY
FACULTY OF ENGINEERING & INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER ENGINEERING

GRADUATION PROJECT I

Home Grown
Craft Community Platform



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Disclaimer

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Abstract

The rapid growth of digital marketplaces has created new opportunities for promoting local handmade products; however, many artisans still face challenges in reaching customers, managing their businesses efficiently, and participating in exhibitions through a unified digital platform. To address these challenges, this project presents *HomeGrown*, an integrated cross-platform marketplace designed to connect customers, artisans, exhibition owners, and administrators within a single responsive environment.

The platform was developed using *Flutter* for the frontend and *Laravel* for the backend, with *MySQL* used for data management and *Firebase* services providing real-time messaging and push notifications. HomeGrown combines e-commerce functionality with social networking features, allowing users to browse and purchase handmade products, communicate through real-time chat, share stories and posts, follow artisans, submit ratings and comments, and participate in community interactions.

To enhance the user experience, the platform incorporates an AI-inspired personalized recommendation system based on a hierarchical scoring algorithm that analyzes user interactions and preferences to generate customized product feeds. In addition, a rule-based Business Insights module provides artisans with intelligent recommendations derived from sales performance, customer engagement, and stock availability. The system also supports exhibition management, promotional offers, analytics dashboards, and comprehensive administration tools for monitoring platform performance.

The implemented platform successfully achieved its intended objectives by integrating multiple services into a unified ecosystem that supports local artisans, improves customer engagement, and simplifies exhibition and business management. The results demonstrate the feasibility of combining e-commerce, real-time communication, data analytics, and intelligent recommendation techniques to create a scalable and practical digital marketplace that contributes to the promotion and sustainability of local handmade products.

Chapter 1: Introduction

1.1 General Background

The rapid growth of digital technologies and electronic commerce has transformed the way people buy, sell, and promote products and services. Online platforms have become an essential tool for connecting businesses with customers, enabling wider market reach, improving communication, and providing more convenient shopping experiences. As a result, many small businesses and independent creators have increasingly relied on digital platforms to showcase their products and expand their customer base.

Handmade and home-based businesses represent an important sector that contributes to local economic development and encourages creativity and entrepreneurship. Despite the quality and uniqueness of their products, many artisans face challenges in reaching potential customers, promoting their work effectively, and managing sales opportunities. In many cases, these businesses depend heavily on social media platforms, which often lack dedicated tools for product management, customer interaction, and business growth.

At the same time, craft exhibitions play a significant role in supporting artisans by providing opportunities to present their products to a larger audience. However, communication between artisans, exhibition organizers, and customers is often fragmented across multiple channels, making it difficult to manage participation requests, invitations, and event-related activities efficiently.

To address these challenges, HomeGrown was developed as an integrated marketplace platform that connects artisans, customers, exhibition owners, and administrators within a unified digital environment. The platform enables artisans to showcase and manage their products, allows customers to discover and purchase handmade products, and provides exhibition owners with tools to organize exhibitions and invite suitable artisans. In addition, the platform incorporates modern features such as real-time messaging, notifications, analytics dashboards, and an AI-powered recommendation system to enhance user engagement and improve the overall experience.

By bringing all stakeholders together into a single platform, HomeGrown aims to support local artisans, simplify exhibition management, strengthen communication among users, and contribute to the growth of the handmade products market through technology-driven solutions.

1.2 Objectives

The main objective of this project is to design and develop **HomeGrown**, an integrated digital platform that connects artisans, customers, exhibition owners, and administrators within a unified environment that supports the promotion, management, and sale of handmade products while enhancing communication and user engagement.

The specific objectives of the project are as follows:

For Customers

- Enable customers to discover and browse handmade products through an intuitive and user-friendly interface.
- Allow customers to search for products and artisans efficiently.
- Provide customers with the ability to place orders and track their purchases.
- Enable direct communication between customers and artisans through a real-time messaging system.
- Allow customers to explore exhibitions and express interest in attending them.
- Provide personalized product recommendations based on user interactions and preferences.

For Artisans

- Enable artisans to create and manage their product listings.
- Provide tools for managing orders and customer interactions.
- Allow artisans to participate in exhibitions and respond to invitations.
- Provide analytics and performance insights to support business growth.
- Enable artisans to communicate directly with customers through an integrated chat system.

For Exhibition Owners

- Allow exhibition owners to create, manage, and promote exhibitions.
- Enable exhibition owners to discover artisans and send participation invitations.
- Provide tools for managing participation requests and exhibition activities.

For Administrators

- Provide administrators with a comprehensive overview of platform activities.
- Enable monitoring and management of users, products, exhibitions, and orders.
- Generate analytical reports and platform statistics.
- Support effective decision-making through growth and performance insights.

Artificial Intelligence Objectives

- Develop an AI-powered recommendation system that analyzes user interactions and behavior to provide personalized product recommendations and improve product discovery.
- Implement sentiment analysis techniques to classify customer comments and reviews as positive or negative, helping artisans better understand customer feedback and satisfaction levels.
- Provide analytical insights and performance metrics for artisans, enabling them to monitor sales, customer engagement, and product performance.
- Generate intelligent business recommendations that assist artisans in identifying trends, improving marketing strategies, and enhancing overall store performance.
- Enhance the overall user experience by delivering relevant content and personalized recommendations based on user interests and platform activity.

1.3 Significance of the Project

HomeGrown is significant because it provides a unified digital platform that addresses many of the challenges faced by artisans, customers, and exhibition owners. Instead of relying on separate tools and social media platforms, users can access all essential services through a single integrated environment.

The platform supports local artisans and home-based businesses by increasing their visibility and helping them reach a larger customer base. This creates new opportunities for small businesses to promote and sell their products more effectively.

HomeGrown also improves communication and interaction between different stakeholders through centralized management, real-time messaging, and organized exhibition participation. This reduces administrative effort and enhances the overall user experience.

Furthermore, the integration of intelligent technologies enables more personalized and data-driven experiences, helping users discover relevant products and allowing artisans to gain better insights into customer feedback and business performance.

By encouraging entrepreneurship and supporting the growth of handmade product businesses, HomeGrown contributes to strengthening the local economy and promoting digital transformation within the handmade products sector.

1.4 Organization of the Report:

This report is organized into six chapters. Chapter 1 introduces the project background, problem statement, objectives, significance, and overall report structure. Chapter 2 presents the literature review and discusses related work relevant to digital marketplaces and supporting technologies. Chapter 3 describes the project methodology, including the applied standards and specifications, design constraints, and detailed system implementation. Chapter 4 presents the obtained results and analysis of the developed platform and its key functionalities. Chapter 5 discusses the achieved objectives, project contributions, limitations, and future development opportunities. Finally, Chapter 6 concludes the report by summarizing the main findings and providing recommendations for future improvements and extensions of the HomeGrown platform.

Chapter 2: Theoretical Background and Previous Work:

2.1 Theoretical Background

2.1.1 Online Marketplace Platforms:

Online marketplace platforms are digital systems that connect sellers with buyers through a single platform. They allow sellers to display and manage their products while enabling customers to browse, search, and purchase products easily. These platforms help small businesses and artisans reach a larger audience and increase their market visibility.

2.1.2 Exhibition Management Systems:

Exhibition management systems are used to organize and manage exhibitions and events digitally. They provide tools for creating exhibitions, managing registrations, handling invitations, and facilitating communication between organizers and participants. These systems improve efficiency and simplify exhibition administration.

2.1.3 Artificial Intelligence Technologies:

Recommendation Systems

Recommendation systems use artificial intelligence techniques to analyze user behavior and interactions in order to suggest relevant products. They are commonly used in e-commerce platforms to improve product discovery and enhance user experience.

Sentiment Analysis:

Sentiment analysis is an artificial intelligence technique used to classify customer comments and reviews as positive, negative, or neutral. It helps businesses understand customer opinions and improve their products and services based on user feedback.

2.2 Previous Work

2.2.1 Etsy:

Etsy is a popular online marketplace specializing in handmade and creative products. It allows artisans to sell their products to customers worldwide and provides tools for product management and customer communication.

2.2.2 Amazon Handmade:

Amazon Handmade is a marketplace dedicated to handmade products. It enables artisans to sell their products while benefiting from Amazon's large customer base and secure transaction system.

2.2.3 Eventbrite:

Eventbrite is an event management platform that helps organizers create and manage events, registrations, and participant activities. It is widely used for conferences, exhibitions, and public events.

Chapter 3: Methodology

3.1 Standards and Specifications

The HomeGrown platform was developed using modern software engineering standards and widely adopted technologies to ensure reliability, scalability, security, and maintainability. The frontend was implemented using *Flutter*, providing a responsive cross-platform application for both mobile and web environments, while the backend was developed using the *Laravel Framework* following the MVC architectural pattern.

Communication between the frontend and backend is based on *RESTful APIs* with data exchanged in *JSON* format. User authentication and authorization are securely managed using *Laravel Sanctum* and token-based authentication mechanisms.

The platform integrates *Firebase Cloud Messaging (FCM)* to deliver real-time push notifications and *Firebase Realtime Database* to support instant messaging functionality between users. In addition, *MySQL* is used as the primary relational database management system for storing and managing application data with integrity and consistency.

The user interface follows responsive design principles to ensure a consistent and user-friendly experience across different devices and screen sizes. Furthermore, the system incorporates custom AI-based features, including a personalized recommendation algorithm and a rule-based business insights module, to enhance user experience and support intelligent decision-making.

3.2 Constraints

- During the development of the HomeGrown platform, several technical challenges and limitations were encountered:
- Designing a Personalized Recommendation Algorithm: One of the main challenges was developing a recommendation system capable of generating personalized product feeds for different users based on their interactions, interests, and engagement history while also ensuring fair visibility for newly joined artisans.
- Managing Dynamic Product Offers: Implementing an automated offer management system required handling offer creation, modification, expiration, and automatic updates to product sale status without manual intervention, ensuring data consistency across the platform.

- **Synchronizing Data Across Multiple User Roles:** Since the platform supports customers, artisans, exhibition owners, and administrators, maintaining consistent and synchronized data between all roles while preserving role-specific permissions required careful backend design and validation
- **Real-Time Messaging and Notification Integration:** Implementing the real-time messaging system and push notifications using Firebase services was one of the major challenges, as the development team had no prior experience with Firebase Realtime Database and Firebase Cloud Messaging (FCM). Integrating these services with the Flutter frontend and Laravel backend while ensuring reliable real-time synchronization required significant learning, testing, and debugging efforts.

3.3 System Implementation

3.3.1 Login and Password Recovery Mechanism:

This figure illustrates the complete user authentication and password recovery workflow implemented in the HomeGrown platform. The process begins with the login interface, where users authenticate using their registered email address and password. In cases where the password is forgotten, the integrated recovery mechanism allows users to request a verification code that is securely sent to their registered email address through the platform's email service. After receiving and verifying the code, users are redirected to the password reset interface, where they can define and confirm a new password. This multi-step verification procedure enhances account security by ensuring that only authorized users can reset their credentials while providing a simple, reliable, and user-friendly recovery experience.

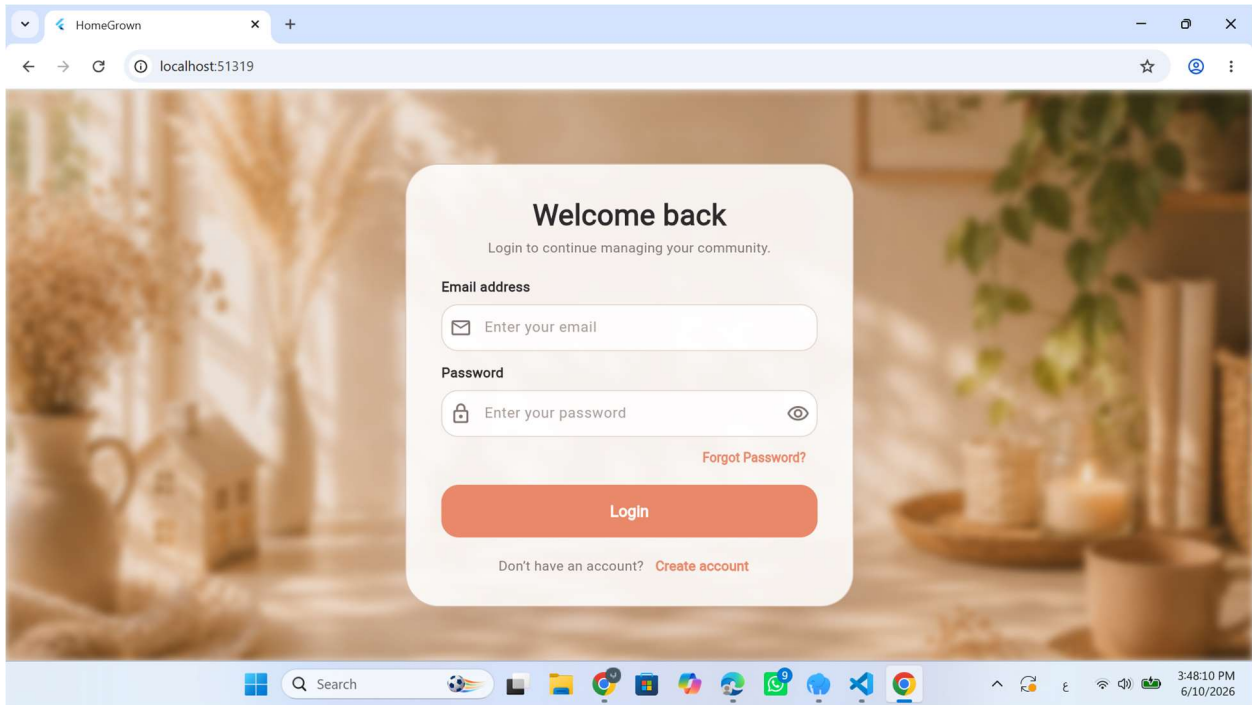


Figure 1 : User Login Interface

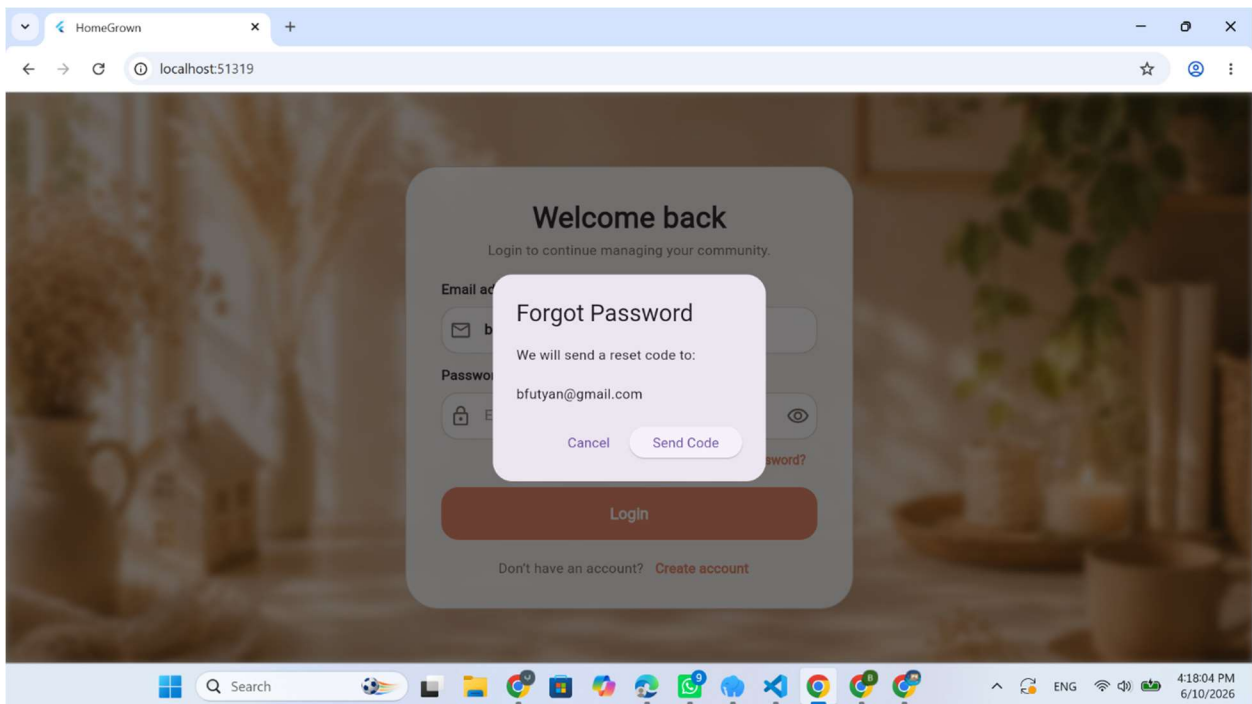


Figure 2 : Forgot Password Request Dialog

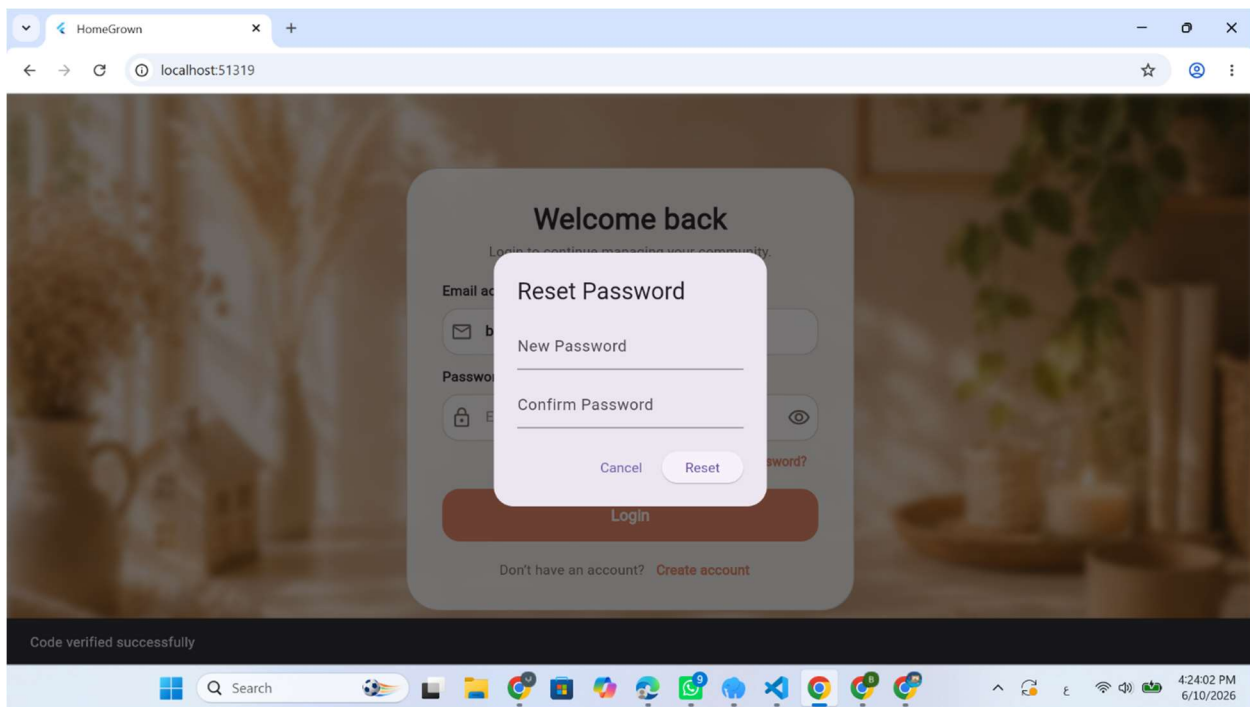


Figure 3 : New Password Setup Interface



Figure 4 : Password Reset Verification Email

3.3.2 User Registration and Email Verification Process

This figure illustrates the complete user registration and email verification workflow implemented in the HomeGrown platform. The registration interface enables new users to create an account by providing essential personal information, including their name, email address, phone number, location, and password. During the registration process, users are also required to select their account role from the available options — Customer, Artisan, or Exhibition Owner— allowing the system to provide role-specific functionalities and interfaces after authentication. To ensure the authenticity of the provided email address, the platform automatically generates and sends a unique verification code to the user's registered email through the integrated email service. The user is then prompted to enter the received verification code in a dedicated verification dialog before the registration process is completed successfully. This verification mechanism enhances platform security, prevents the creation of unauthorized or invalid accounts, and ensures the integrity and reliability of user information stored within the system.

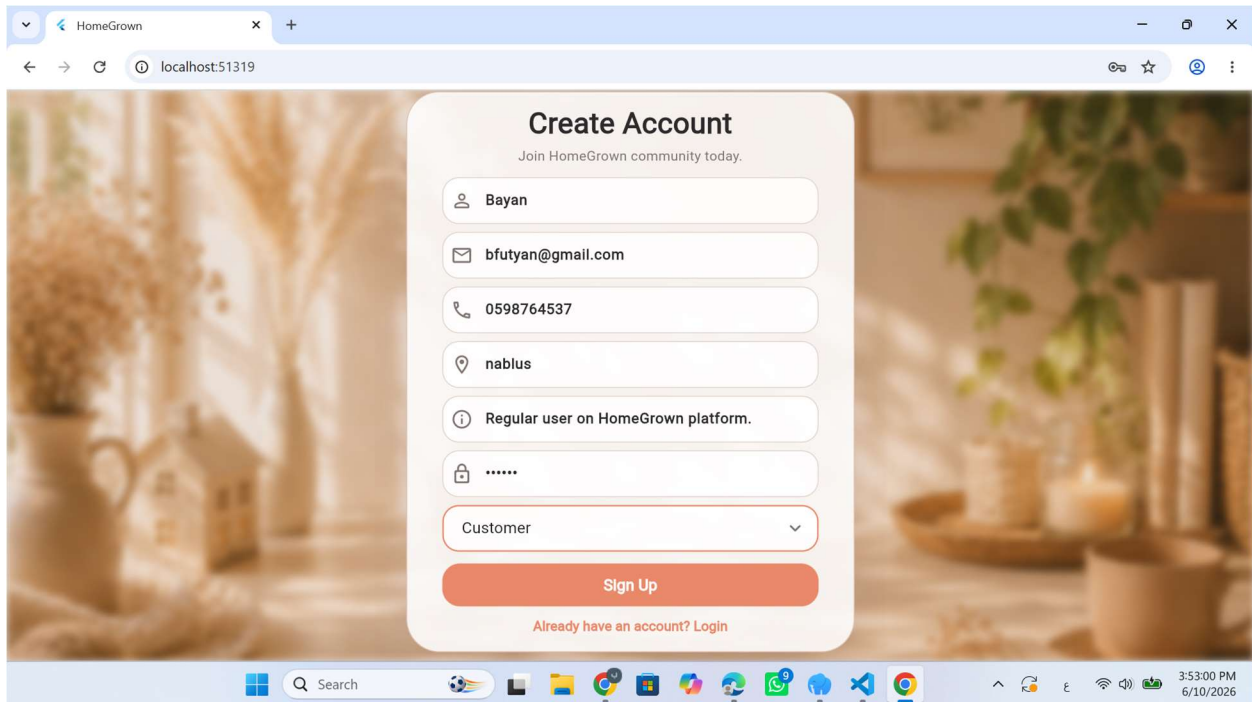


Figure 5 : User Registration Interface

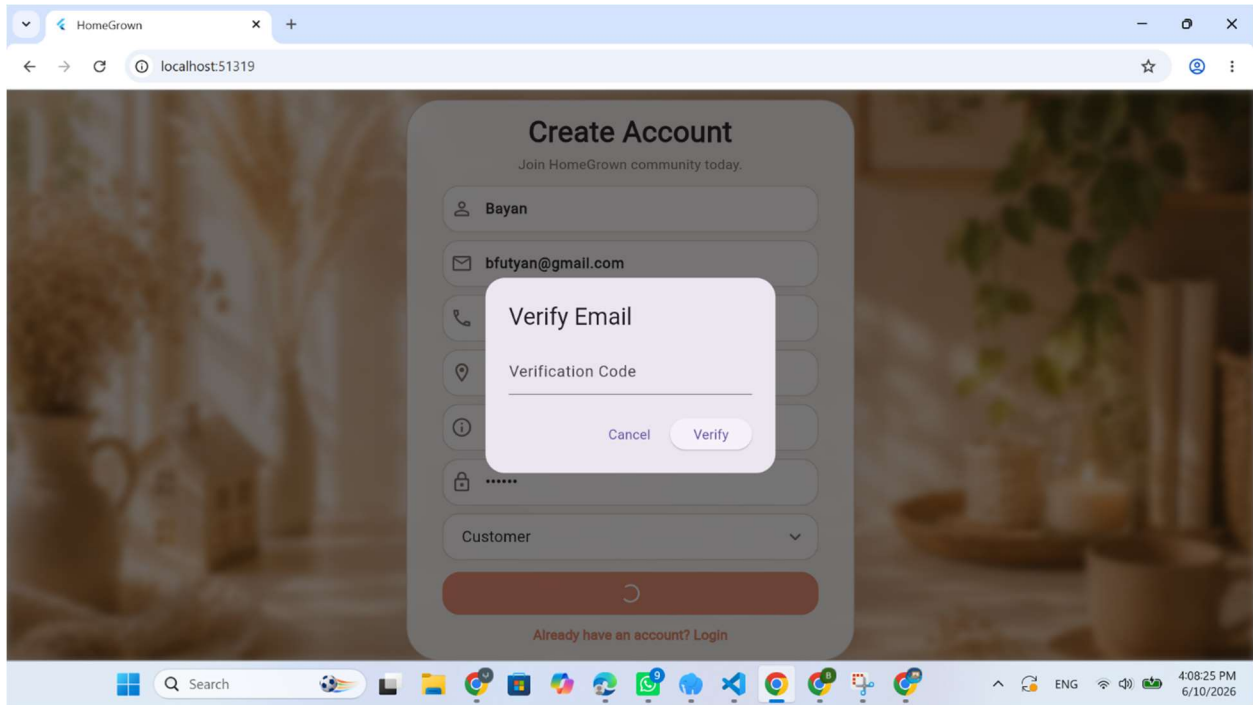


Figure 6 : Email Verification Dialog During Registration



Figure 7 : Registration Verification Email

3.3.3 Artisan Pages

3.3.3.1 Artisan Dashboard:

The Artisan Dashboard provides a comprehensive overview of the artisan's business activities and serves as the main entry point for managing the store within the HomeGrown platform. At the top of the dashboard, an ****Action Center**** presents a quick summary of newly received orders, unread messages, and exhibition-related updates, allowing artisans to monitor important activities at a glance. The ****Store Overview**** section displays key performance indicators, including the total number of followers, published products, and the overall customer rating, providing a concise summary of the store's performance.

In addition, the dashboard showcases the artisan's latest products along with their corresponding number of likes, enabling quick monitoring of customer engagement and product popularity. It also displays the upcoming exhibitions in which the artisan is participating, including relevant exhibition details and participation status. Furthermore, a dedicated ****Recent Activity**** section presents the latest interactions on the artisan's products, such as comments and likes from customers, while the notification indicator provides instant awareness of newly received platform notifications. This unified interface enables artisans to efficiently monitor and manage their business operations from a single centralized dashboard.

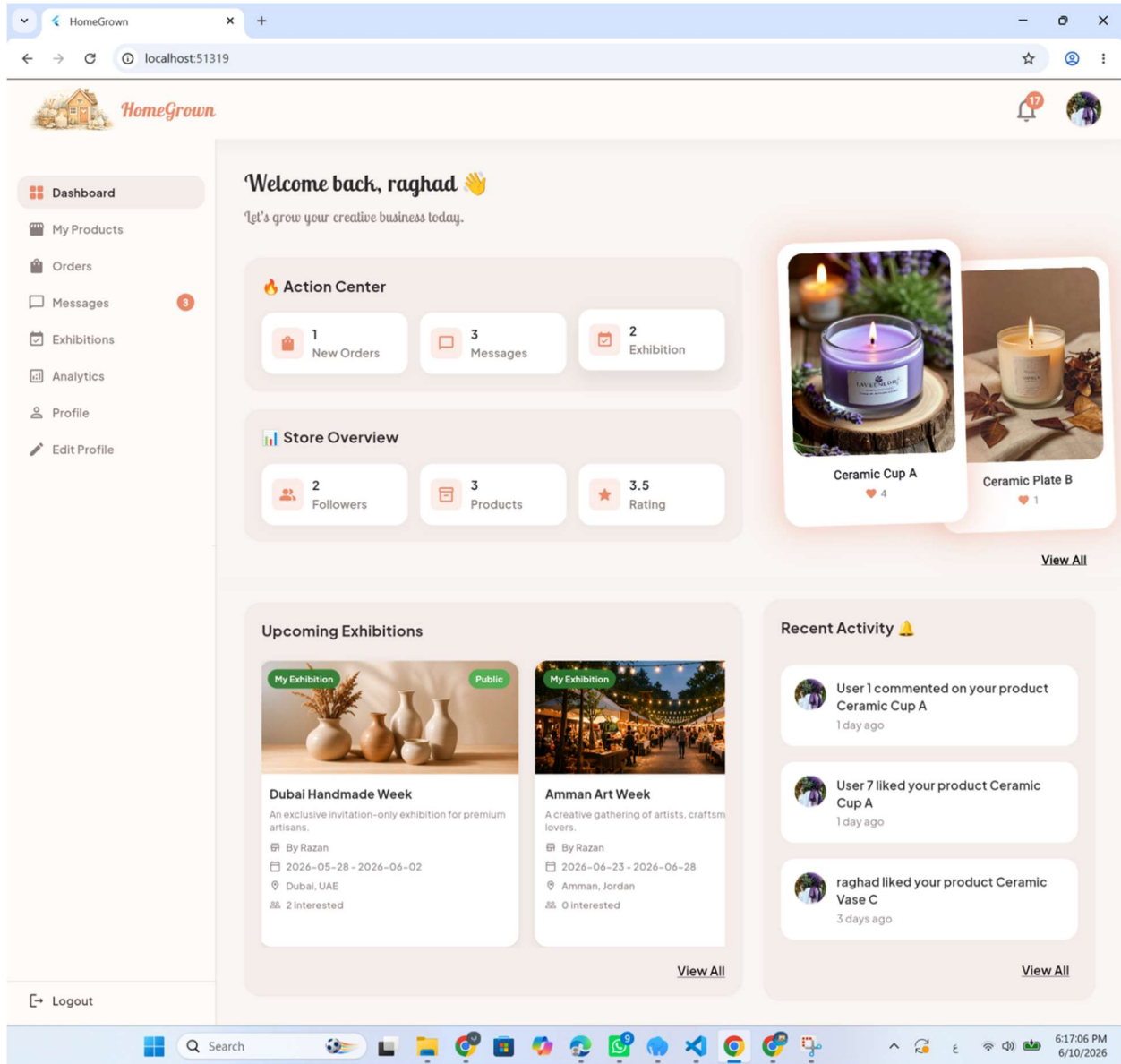


Figure 8 : Artisan Dashboard Interface

3.3.3.2 Real-Time Notification System

The HomeGrown platform incorporates a real-time notification system that keeps artisans continuously informed about important activities related to their stores and products. A notification badge displayed in the top navigation bar indicates the total number of unread notifications, allowing users to quickly recognize newly received updates. By selecting the notification icon, artisans can view a list of recent notifications, including events such as product likes, customer comments, exhibition updates, and other platform activities. The system also supports notification status management, where notifications are visually distinguished as read or unread. Once a notification is opened or marked as read, its status is updated accordingly, and the unread notification counter is automatically decreased, ensuring that the displayed count always reflects the current state of pending notifications. This feature enhances user awareness and enables efficient tracking of real-time interactions within the platform.

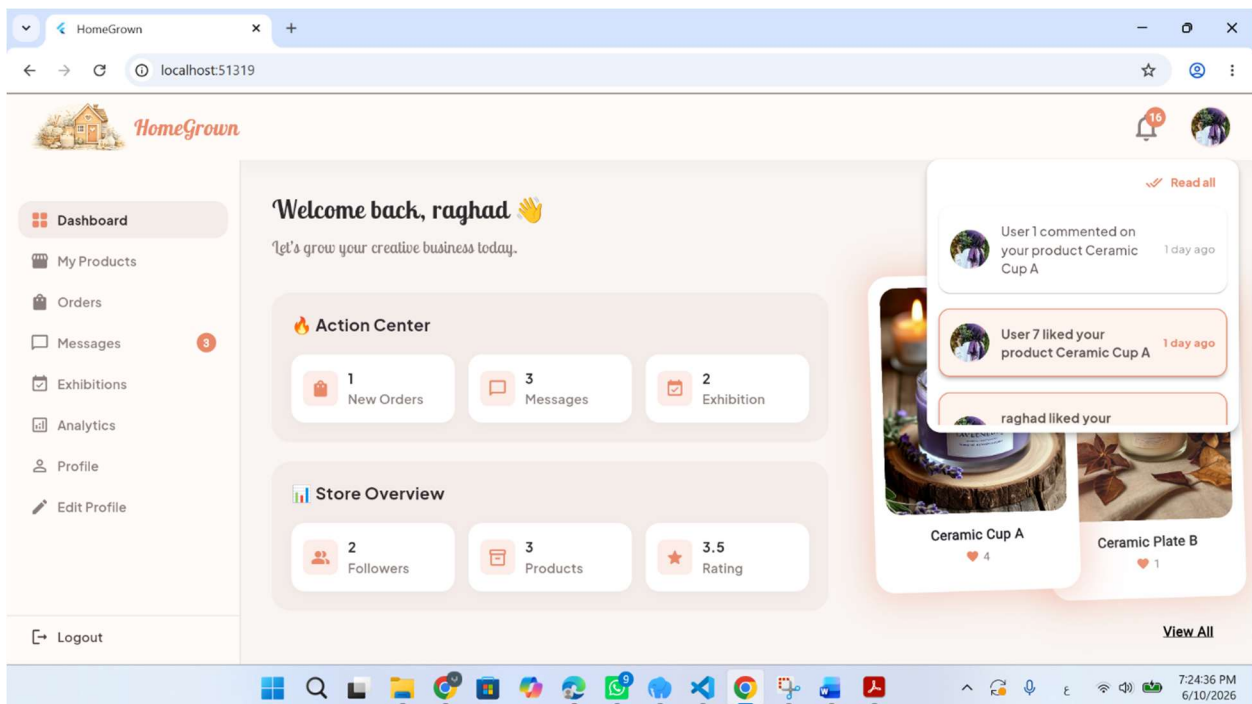


Figure 9 : Notification Dropdown Interface with Read and Unread Status Indicators

3.3.3.3 My Products Table

My Products page provides artisans with a centralized interface for managing their products. It displays product images, categories, stock quantities, prices, sales statistics, customer interactions, AI sentiment indicators, and available offers. The page serves as the main dashboard for monitoring and organizing product inventory efficiently.

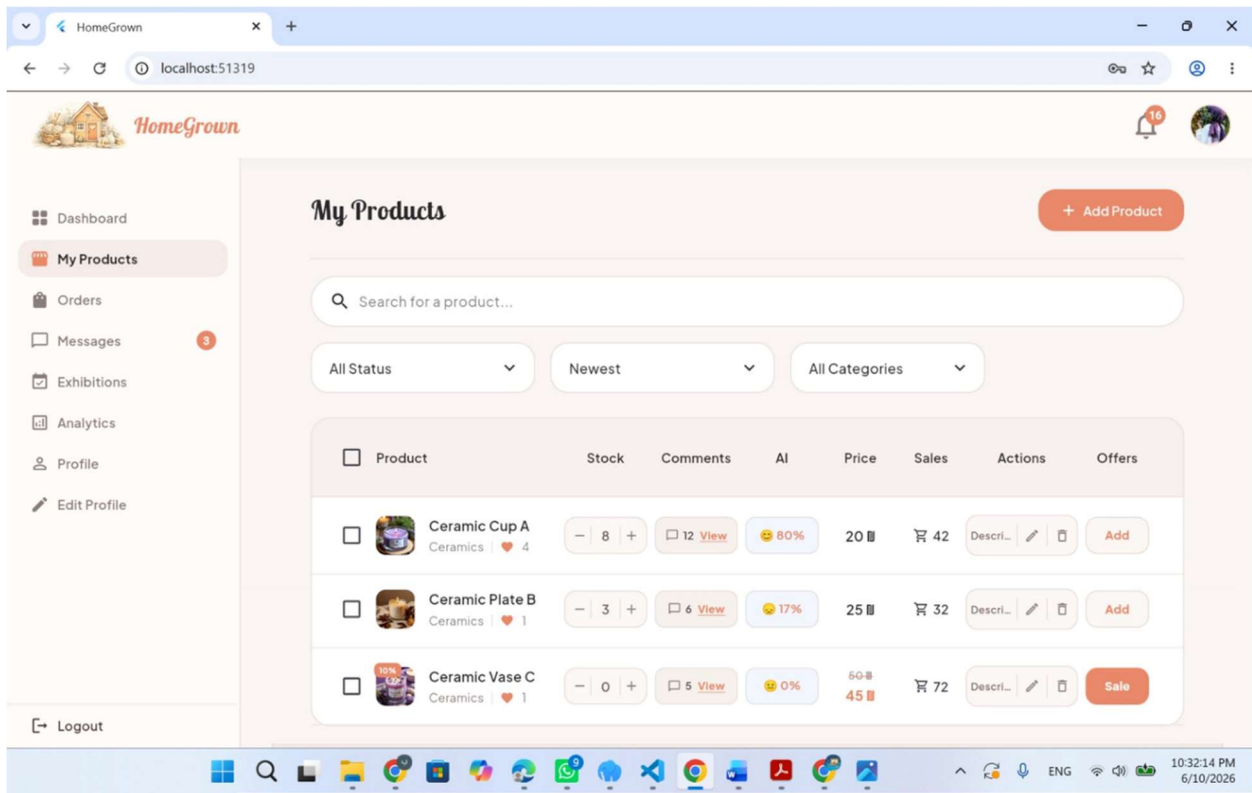


Figure 10 :Artisan Product Management Interface

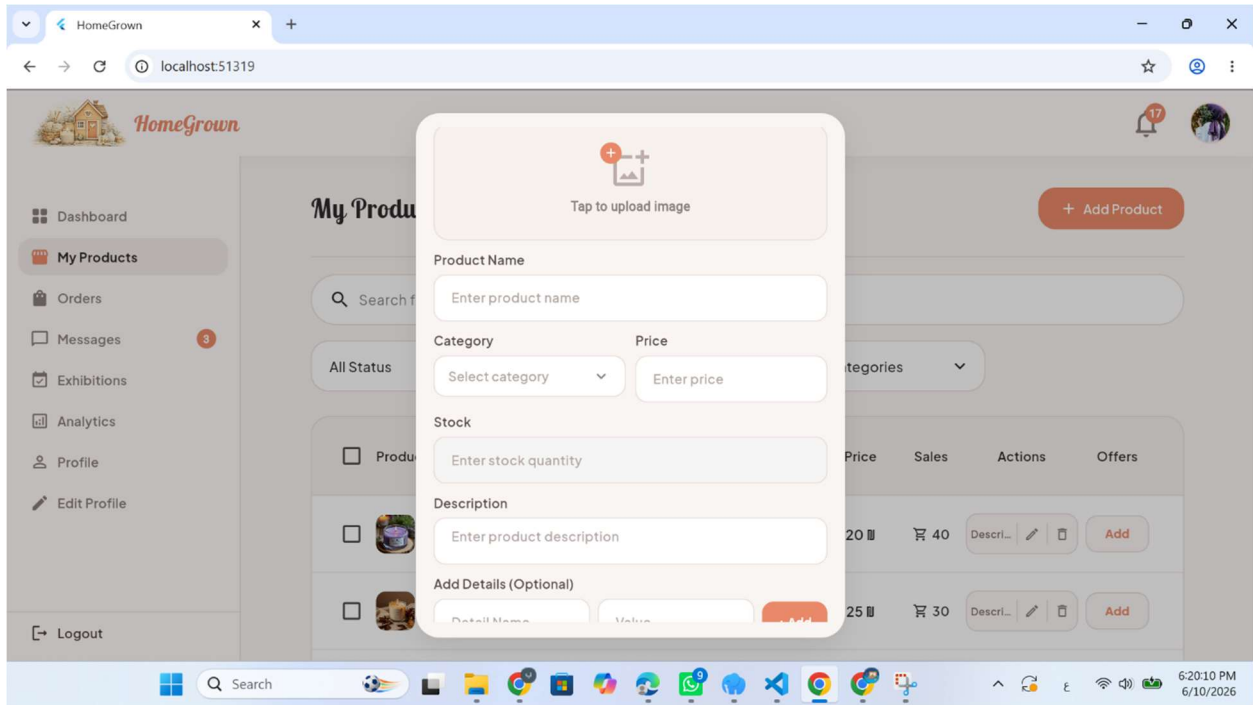


Figure 11 : Add New Product Interface

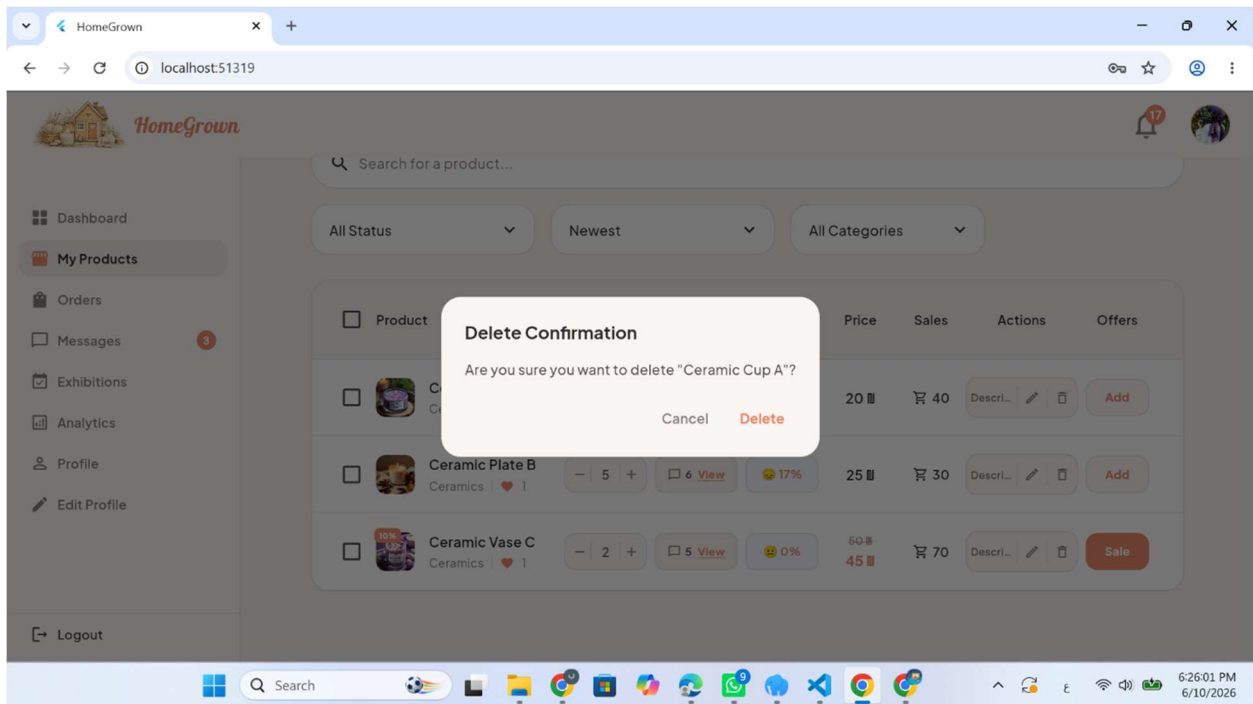


Figure 12 : Product Deletion Confirmation Dialog

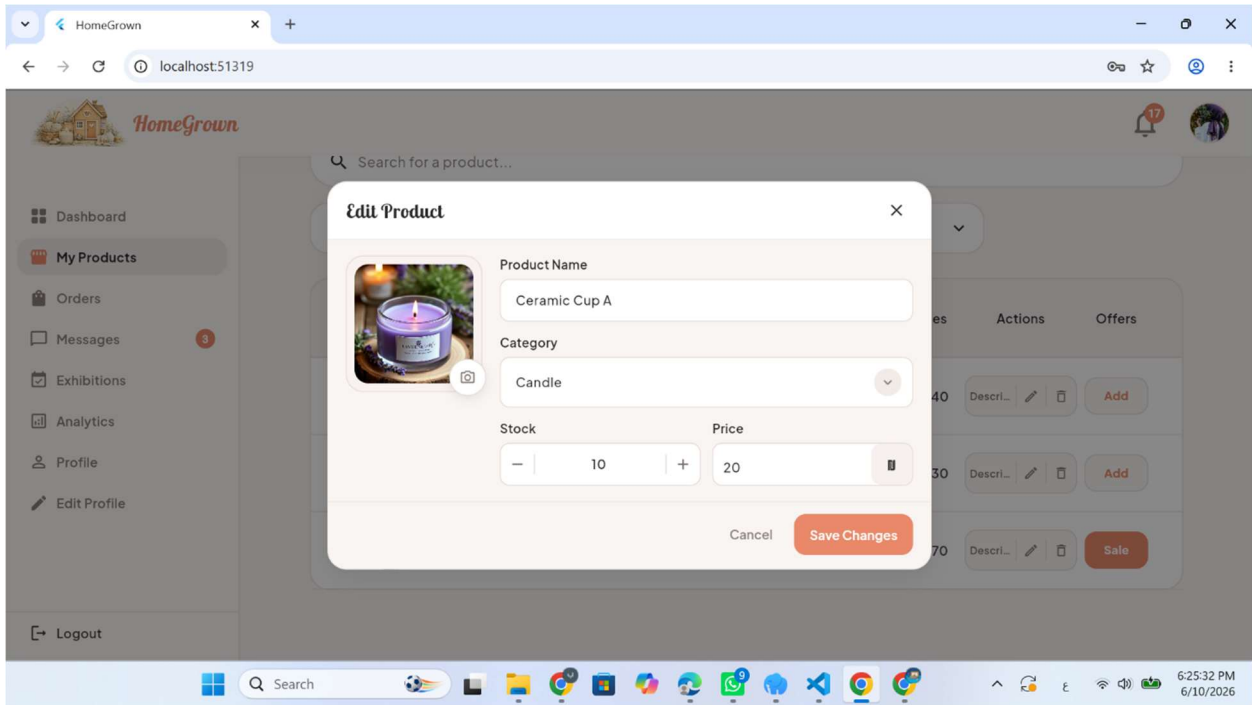


Figure 13 : Edit Product Interface

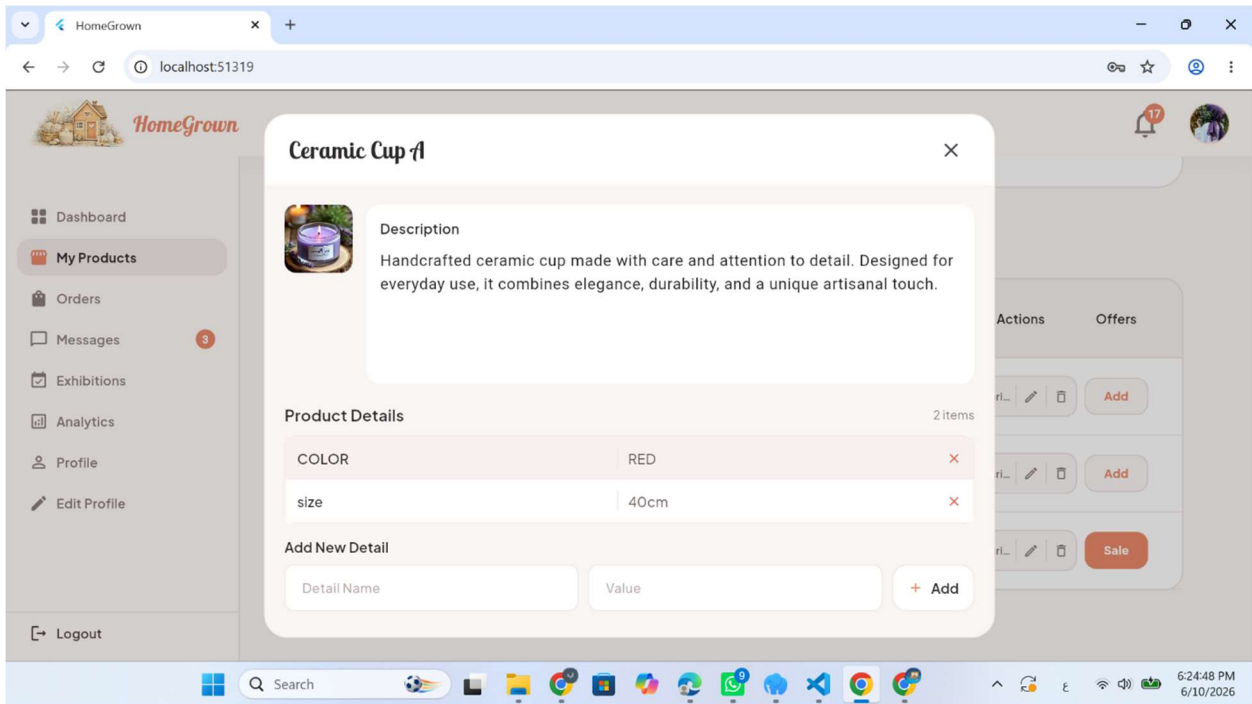


Figure 14 : Product Description Details Interface

3.3.3.4 Product Search and Customer Feedback

The platform enables artisans to quickly search for products and monitor customer interactions through an integrated comments interface. Artisans can review customer feedback, reply directly to comments, and leverage AI-powered sentiment analysis to classify comments into positive, neutral, and negative categories while providing an overall sentiment score. This functionality helps artisans better understand customer opinions and continuously improve their products and services.

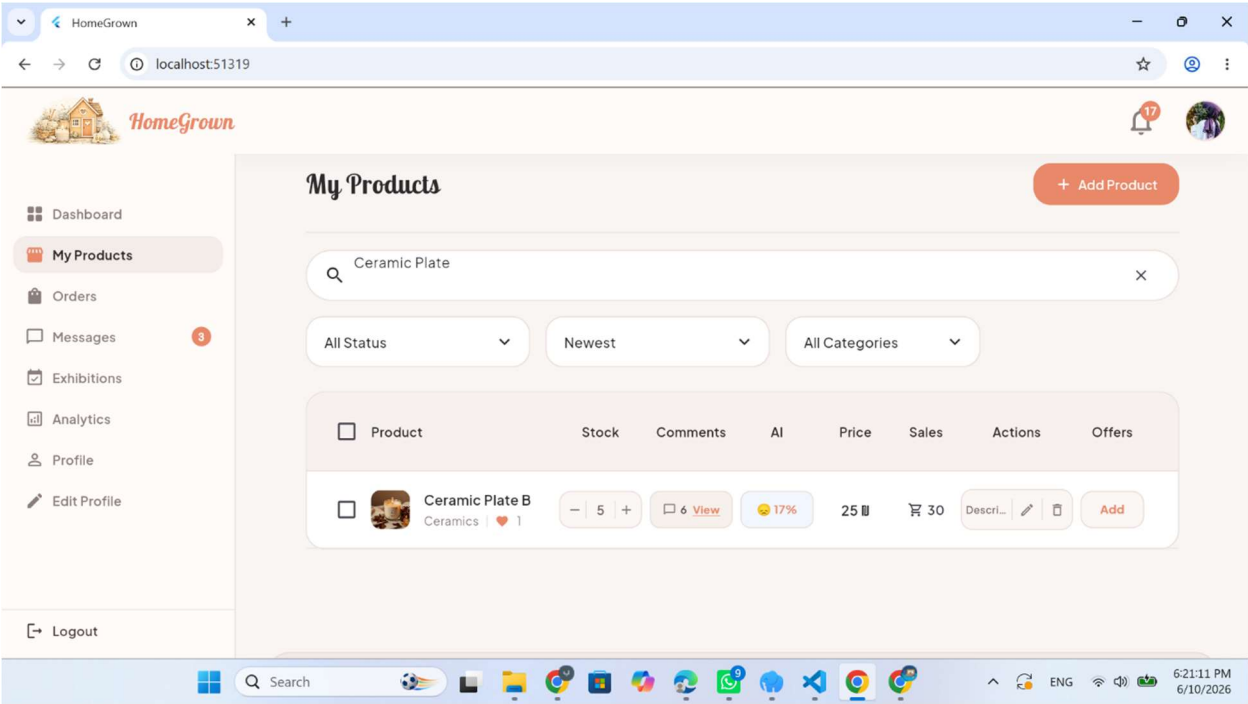


Figure 15 : Product Search and Filtering Interface

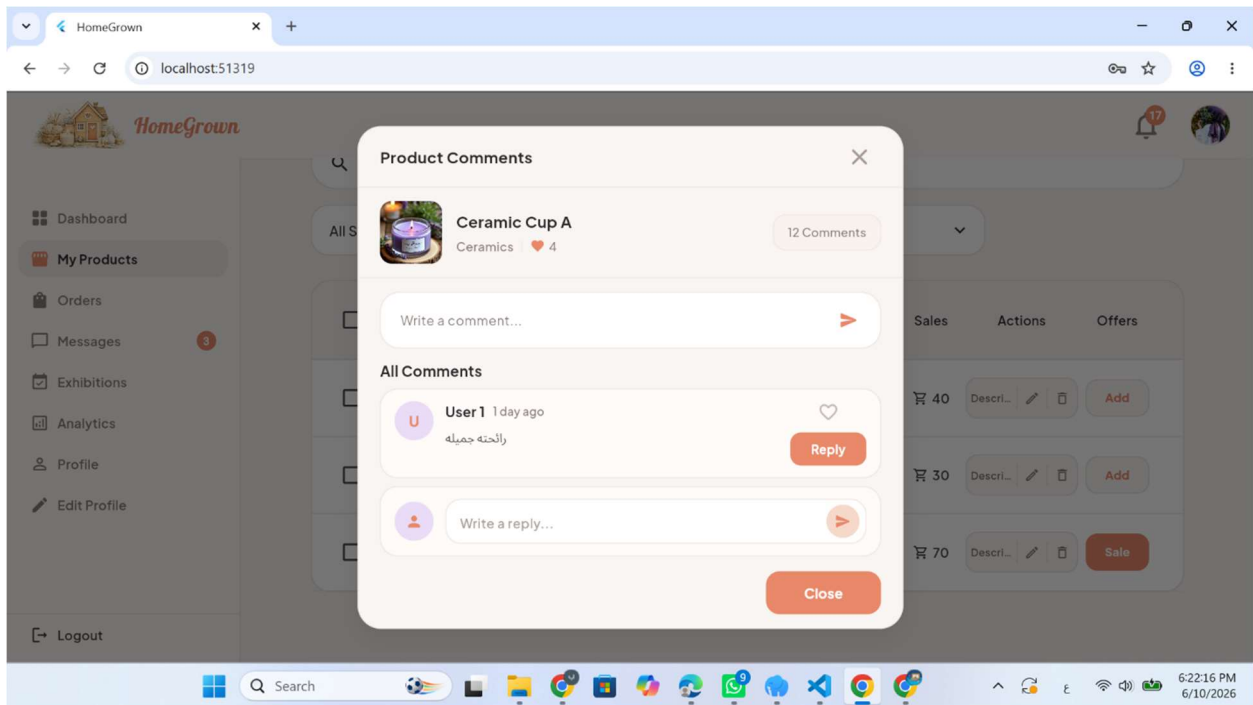


Figure 16 : Product Comments and Reply Management Interface

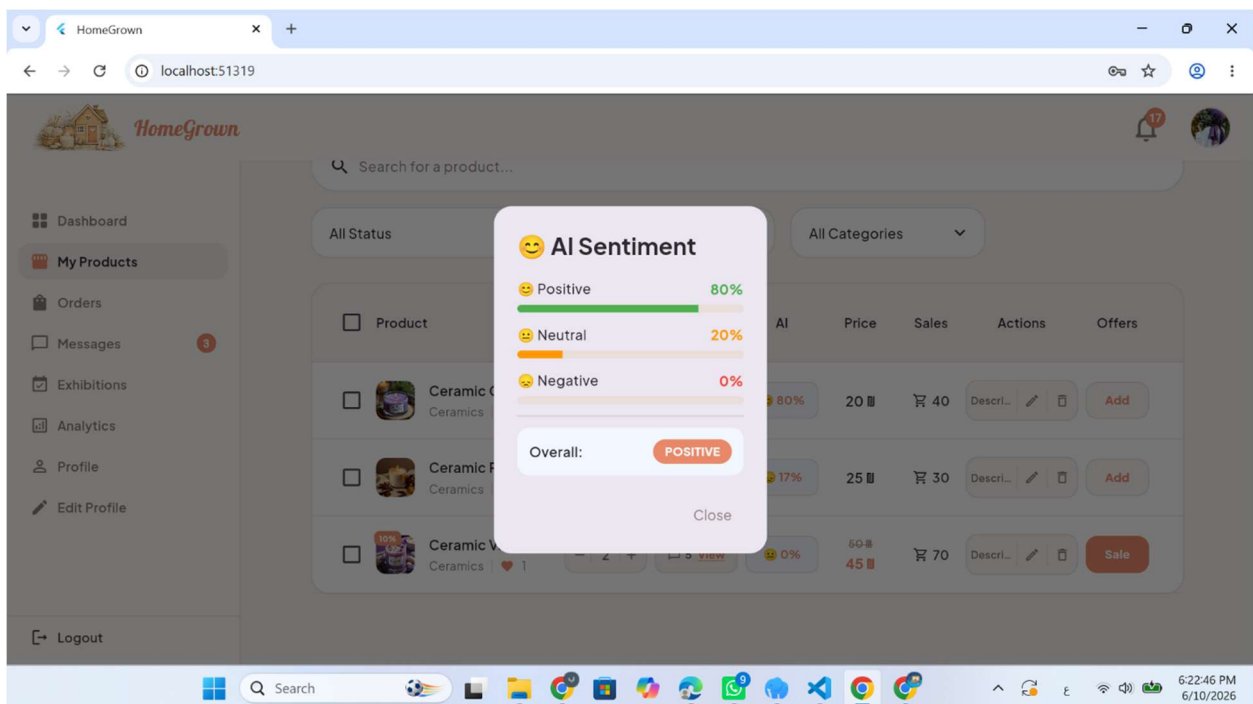


Figure 17 : AI-Based Product Sentiment Analysis Interface

3.3.3.5 Product Offers and Bulk Discount Management

The platform provides flexible promotional management tools that allow artisans to create offers for individual products or apply discounts simultaneously to multiple selected products. Before applying a bulk discount, artisans can use filtering options, such as category-based filters, to display a specific group of products and then apply the promotion to all selected items within that filtered result. The system allows artisans to specify the discount percentage as well as the promotion start and end dates, and also supports modifying existing offers by updating their discount values or extending their duration. Furthermore, an automated event-driven mechanism continuously monitors offer expiration dates and automatically removes expired promotions once their scheduled period ends, ensuring that product pricing remains accurate and up to date without requiring manual intervention.

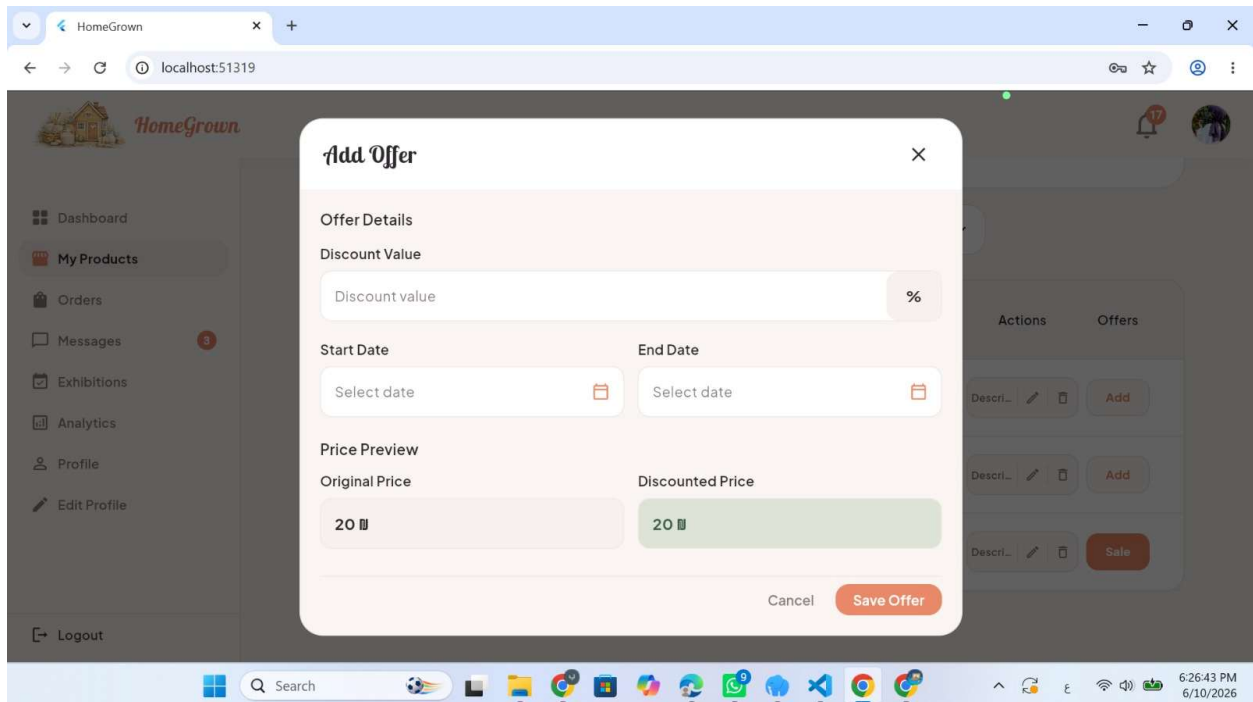


Figure 18 : Product Offer Creation Interface

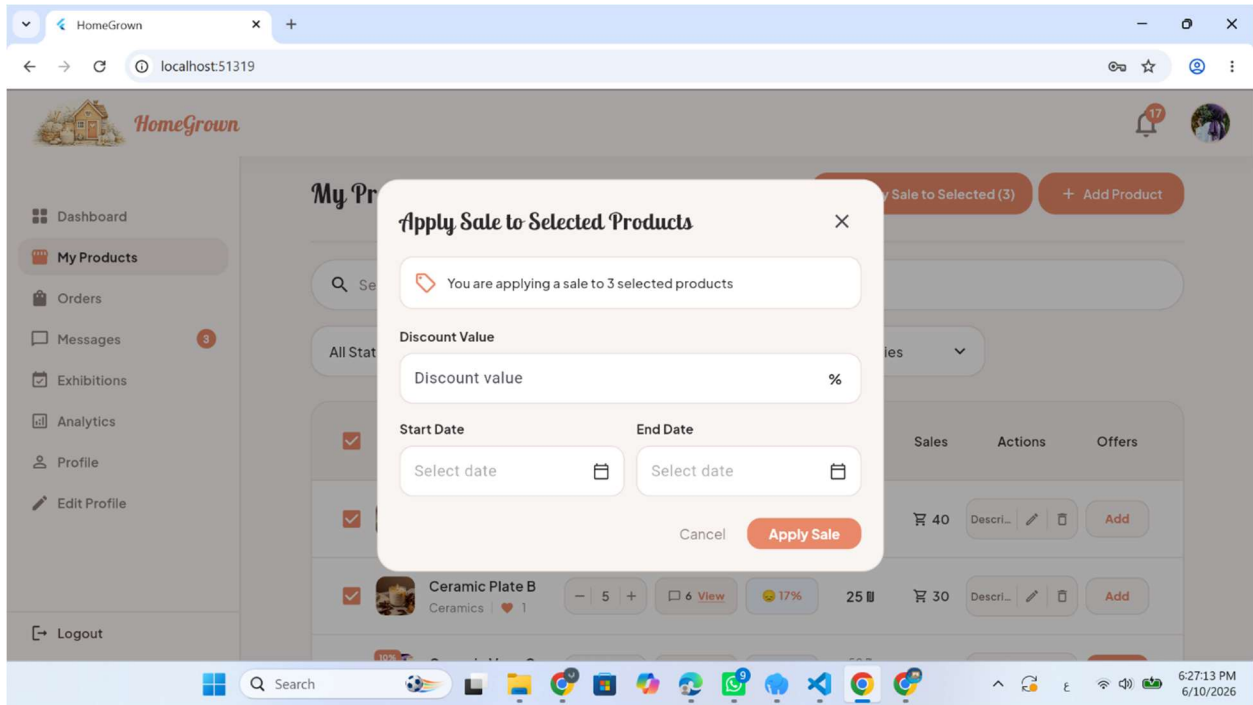


Figure 19 : Bulk Discount Application Interface

3.3.3.6 Order Management and Order Details Interface

The Order Management module enables artisans to efficiently monitor and process customer orders. The main orders page provides a comprehensive overview of all received orders, displaying order statistics categorized by status (New, Preparing, Ready, and Delivered), along with search, filtering, and sorting capabilities for quick access to specific orders. Each order can be opened to display a detailed view containing customer information, delivery details, ordered products, price summary, payment method, and order timeline. The artisan can update the order status throughout the preparation process, accept or reject incoming orders, and communicate directly with the customer through the integrated messaging feature, ensuring smooth order tracking and effective customer interaction.

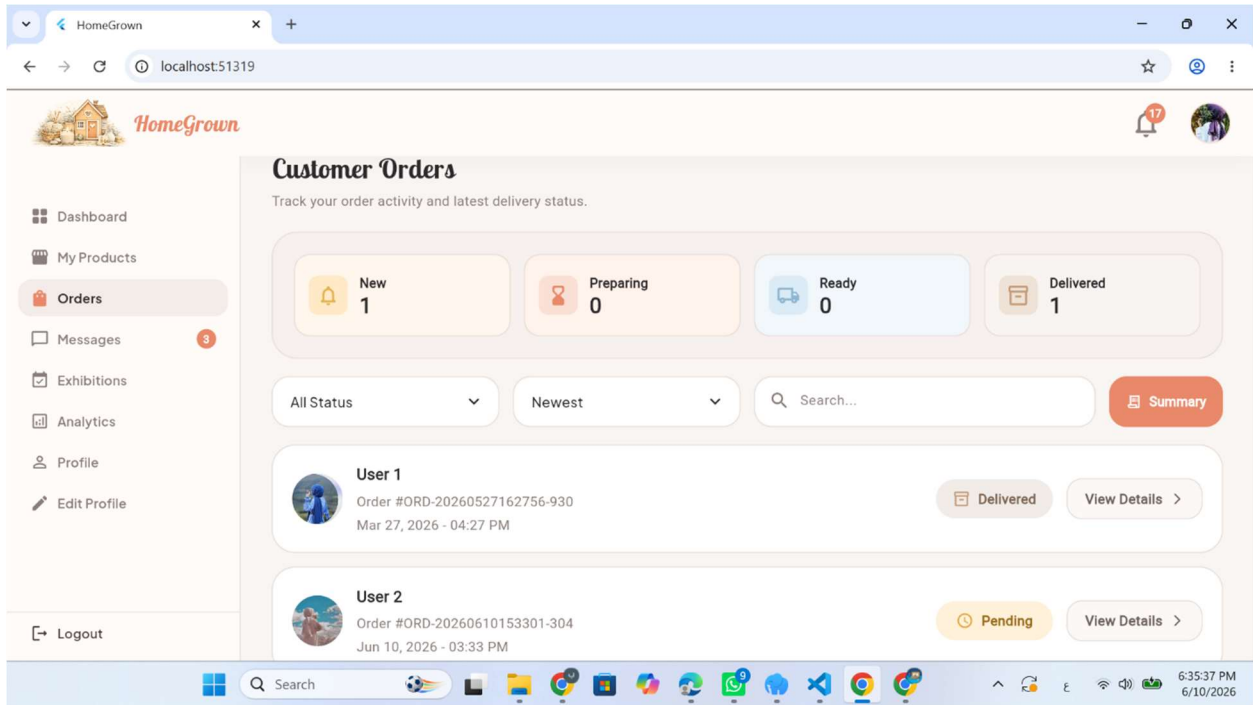


Figure 20 : Order Management Interface

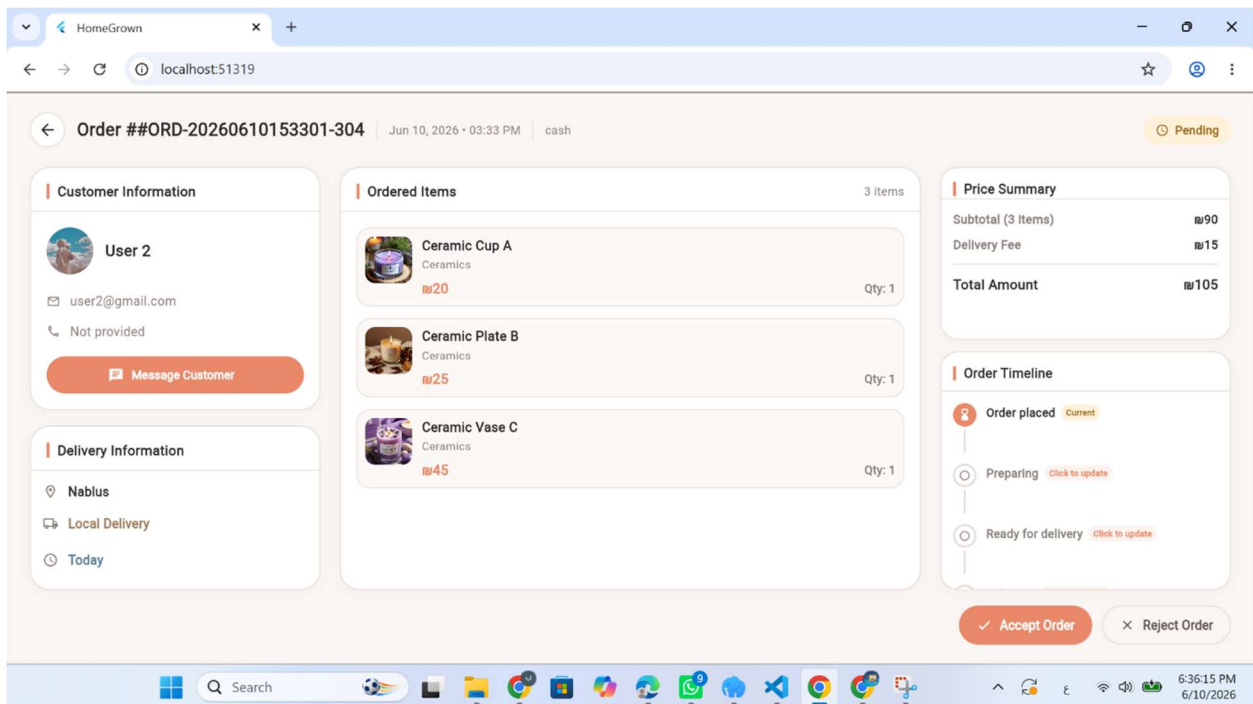


Figure 21 : Order Details Interface

3.3.3.6 Messaging Page :

The messaging system in HomeGrown is implemented using Firebase Realtime Database, enabling instant and synchronized communication between customers and artisans. Each conversation is stored as a dedicated chat node containing participant information and a collection of messages, allowing both users to exchange messages in real time without requiring page refreshes. Any newly sent message is immediately synchronized across all connected devices, with automatic updates to the latest message preview, timestamp, and unread message counter. The system also tracks read status, so once a conversation is opened and messages are viewed, they are automatically marked as read and the unread notification count is updated accordingly. This real-time architecture ensures a fast, responsive, and seamless messaging experience throughout the platform.

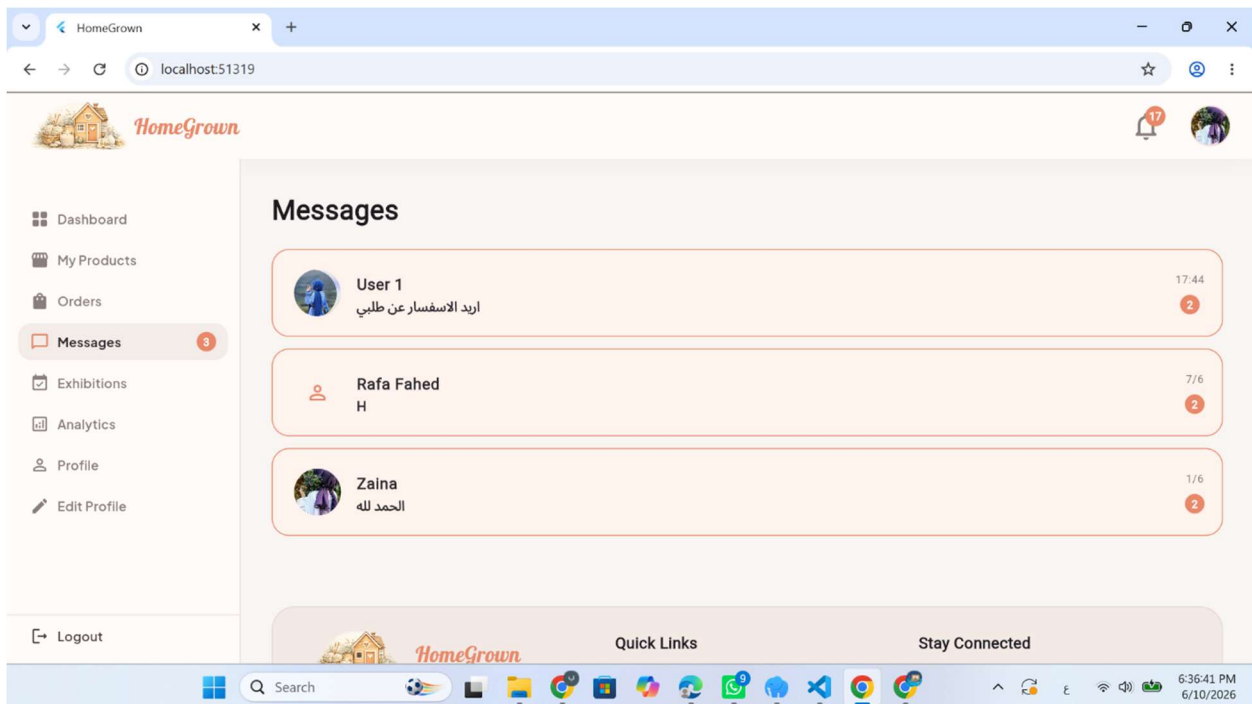


Figure 22 : Artisan Messaging Interface

3.3.3.7 Exhibitions Page

Public Exhibitions (Explore)

The Explore tab displays all publicly available exhibitions that artisans can browse and discover. Artisans can search for exhibitions, view their details, and submit participation requests. Once a request is submitted, it remains in a pending state until it is reviewed and either accepted or rejected by the exhibition owner.

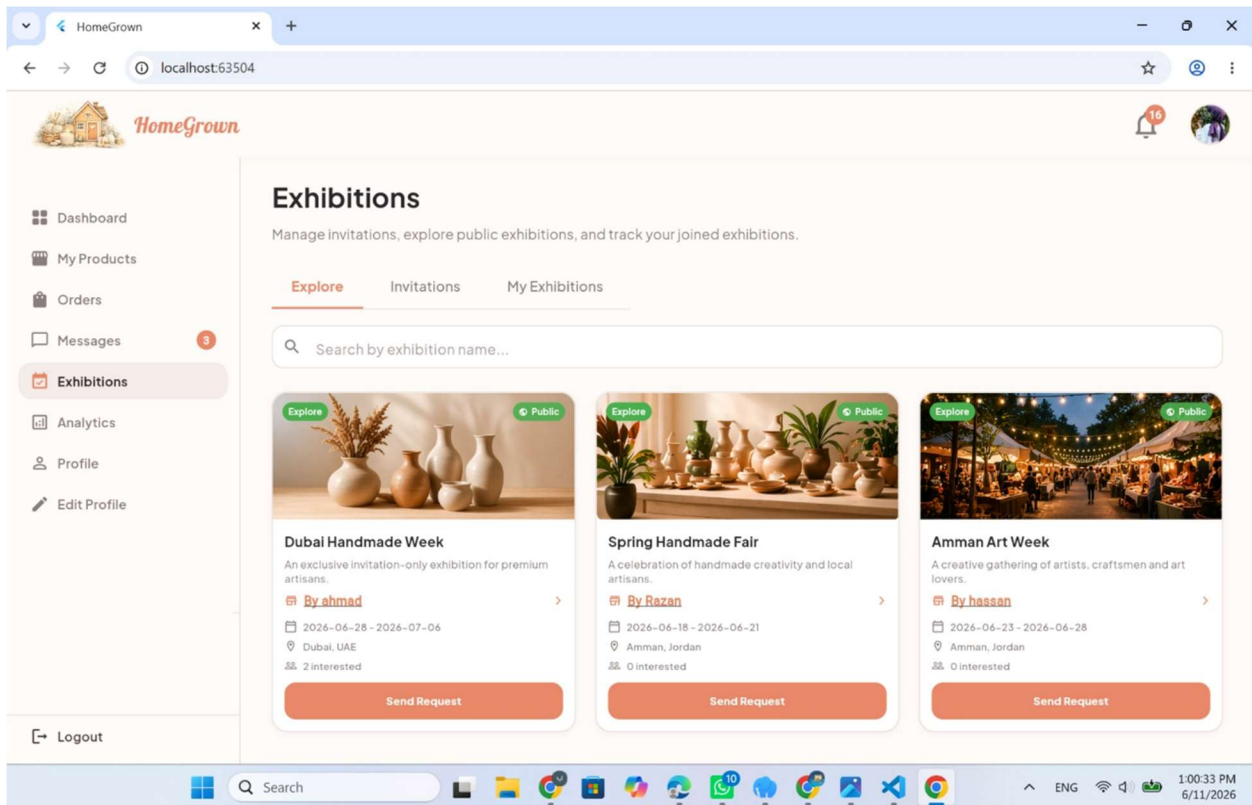


Figure 23 : Public Exhibitions (Explore) Interface

Exhibition Invitations

The Invitations tab displays invitations sent directly by exhibition owners to selected artisans for private exhibitions. Each invitation can be accepted or declined by the artisan, providing a controlled invitation-based participation mechanism for exclusive events.

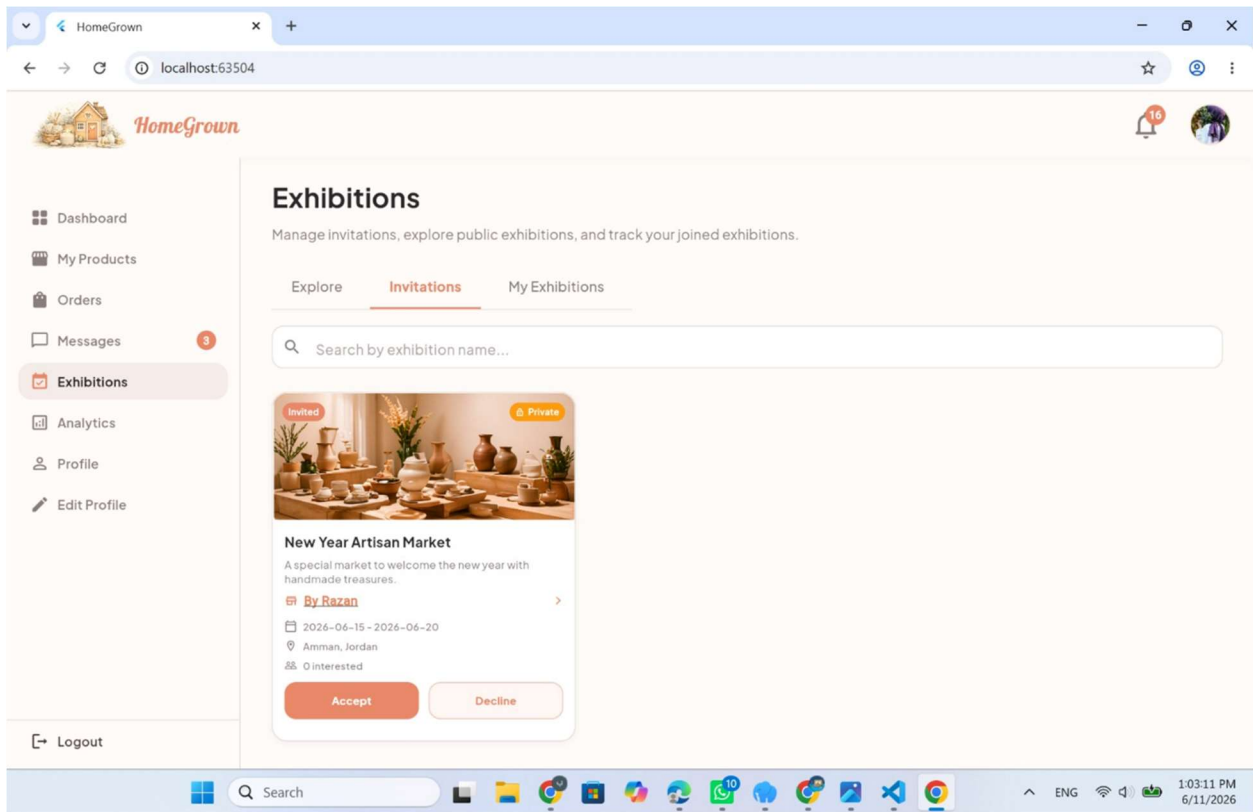


Figure 24 : Exhibition Invitations Interface

My Exhibitions:

The My Exhibitions tab provides a centralized view of all exhibition participation records associated with the artisan. It includes exhibitions with accepted participation requests, pending requests awaiting approval, rejected requests, and invitations that have been accepted or declined. The interface also supports searching and filtering by participation status, allowing artisans to efficiently track and manage all exhibition-related activities from a single page.

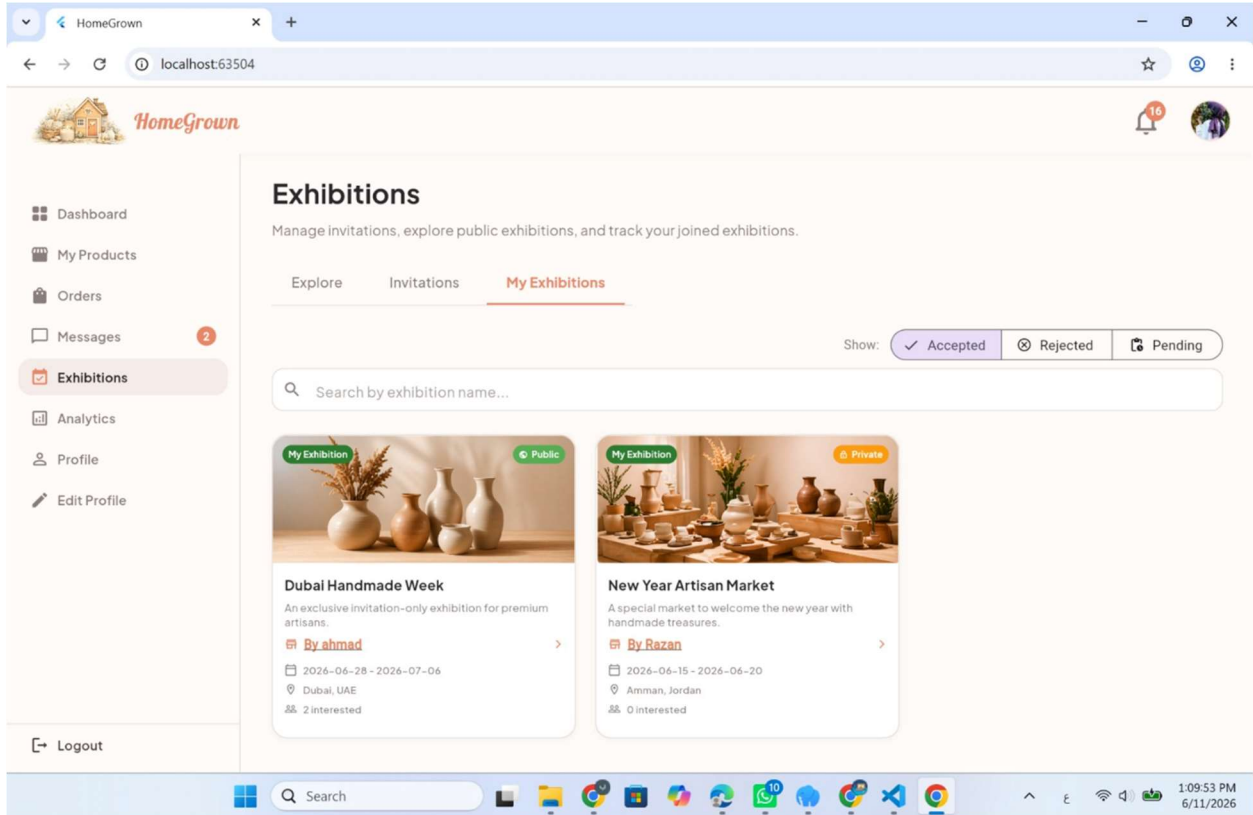


Figure 25 : My Exhibitions Interface

3.3.3.8 Analytics Dashboard

Figure X presents the Analytics Dashboard designed for artisan sellers within the HomeGrown platform. The dashboard provides a comprehensive overview of business performance by consolidating key metrics, visual analytics, and intelligent business recommendations into a single interface. At the top of the page, summary statistic cards display essential performance indicators, including total sales revenue, total orders, total product likes, and total followers, allowing sellers to quickly assess the overall status of their business.

The dashboard also includes a monthly sales trend visualization represented through a line chart, which illustrates sales performance over time and enables sellers to monitor revenue fluctuations, identify growth or decline patterns, and evaluate long-term business performance. Additionally, performance analytics are presented through a bar chart highlighting the top-selling products and a donut chart showing the distribution of orders across different statuses, including Pending, Preparing, Ready, and Delivered.

To support data-driven decision-making, the dashboard incorporates a Business Insights module that generates personalized recommendations using a rule-based algorithm. This module analyzes sales activity, inventory levels, customer engagement, and order statuses to provide actionable insights, such as identifying best-selling products, recommending promotional offers, suggesting inventory restocking, detecting sales trends, and alerting sellers about pending orders. Through these analytical features, the dashboard assists artisans in monitoring store performance and making informed business decisions.

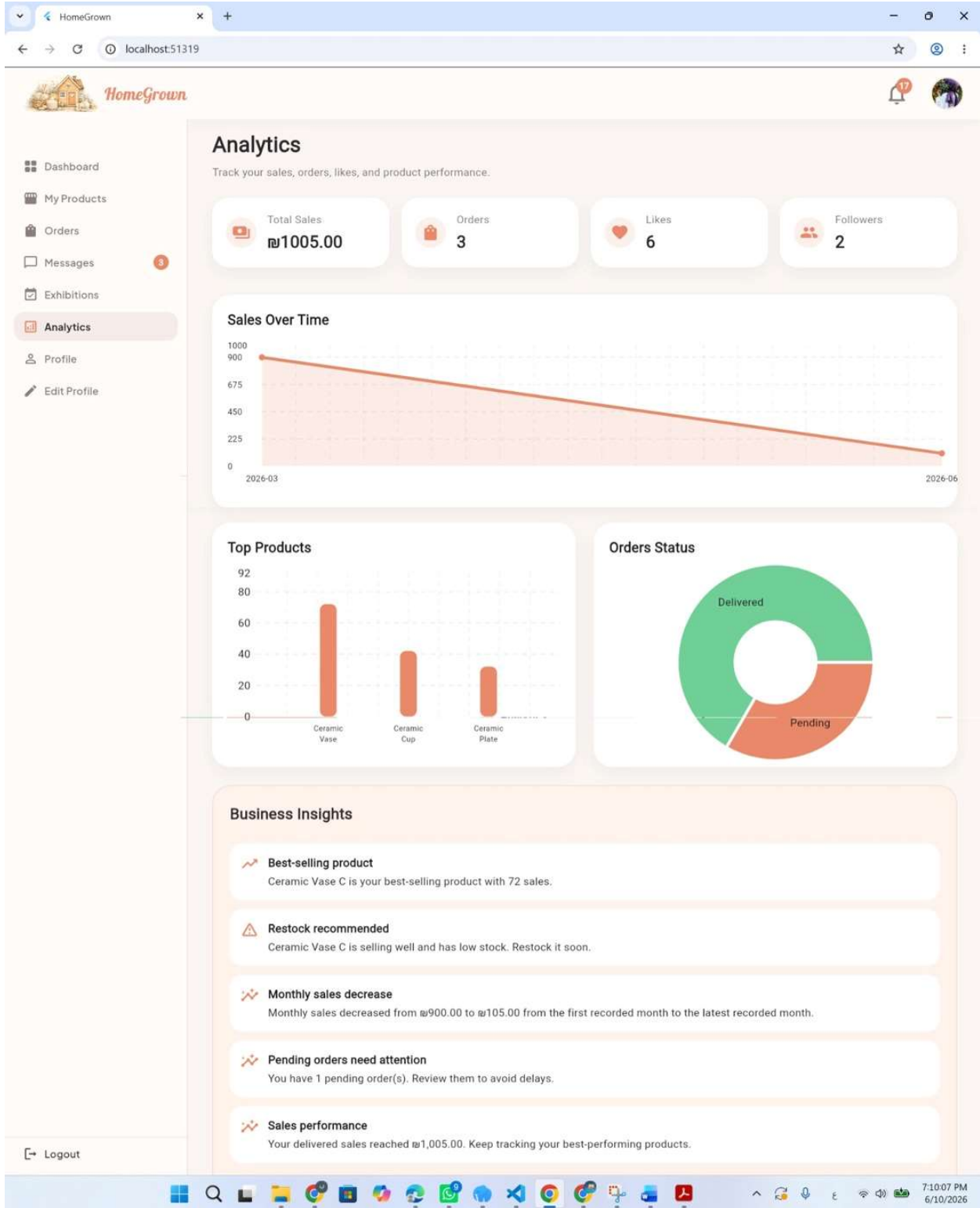


Figure 26 :Analytics Dashboard Page

3.3.3.9 Artisan Profile:

The Artisan Profile page presents comprehensive information about the artisan, including the profile picture, biography, location, username, total number of products, followers, following count, and the average rating received from customers. It also showcases the artisan's published products with their prices, likes, comments, and active promotional offers, providing customers with a complete overview of the artisan and their work.

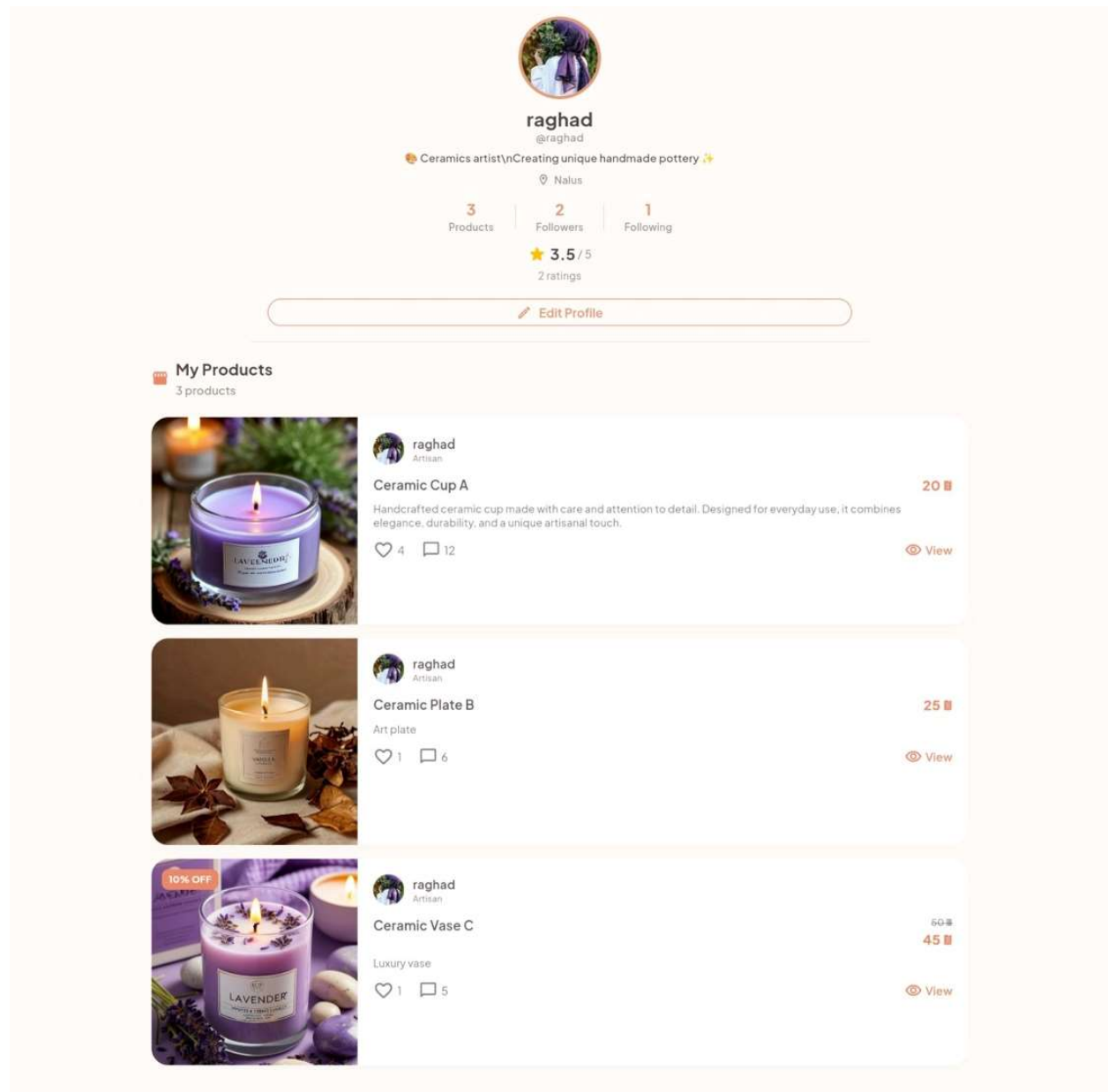


Figure 27 : Artisan Profile Page

3.3.3.10 Edit Artisan Profile:

The Edit Artisan Profile page enables artisans to manage and update their personal information through a dedicated editing interface. They can modify their profile picture, full name, phone number, location, biography, and username. These features allow artisans to keep their profiles accurate and up to date while maintaining a professional presence on the platform.

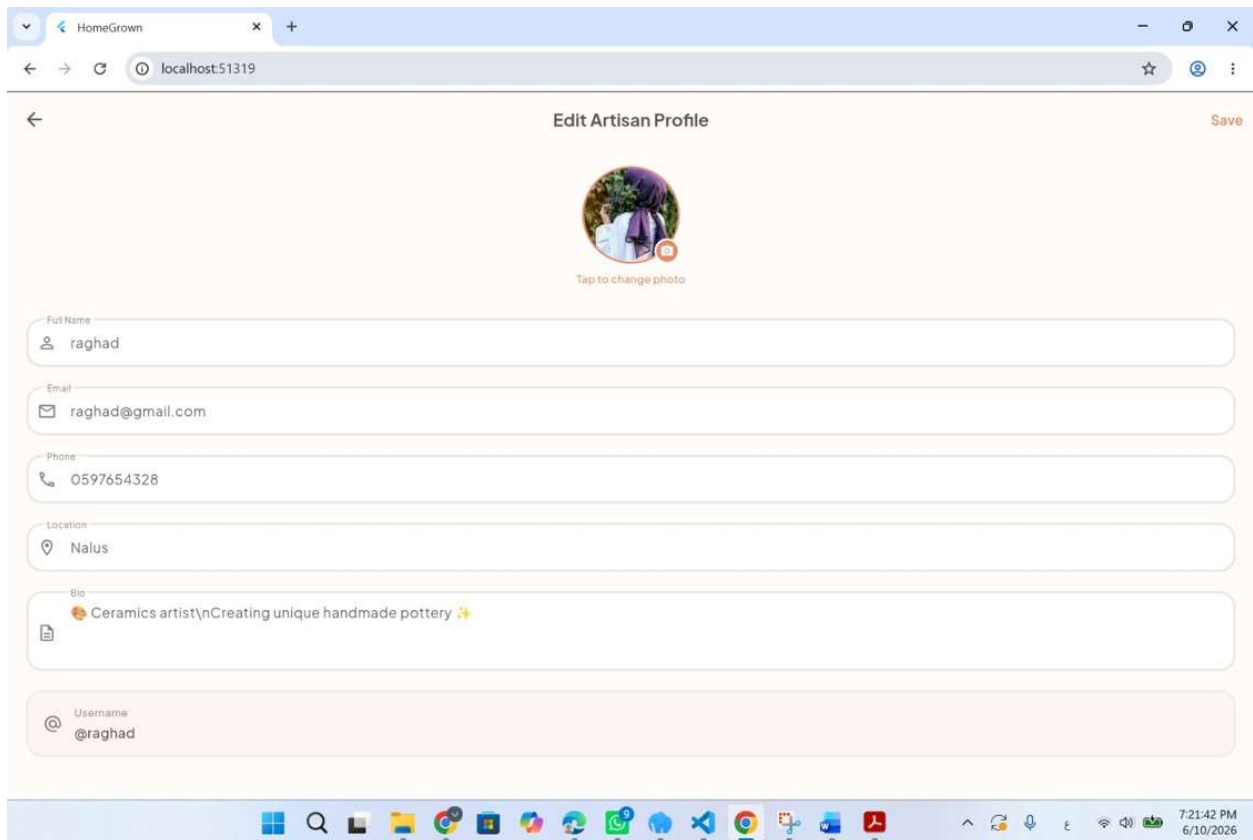


Figure 28 : Edit Artisan Profile Interface

3.3.4 Exhibition Owner

3.3.4.1 Exhibition Owner Dashboard

The Exhibition Owner Dashboard provides a centralized overview of exhibition management activities through an interactive and responsive interface. The top section presents summary statistics, including the number of active exhibitions, pending participation requests, invited artisans, and upcoming events. The dashboard also displays a preview of the owner's exhibitions with essential information such as exhibition dates, location, current status, and quick management actions. In addition, a dedicated panel highlights pending participation requests submitted by artisans, allowing exhibition owners to review applicant profiles and immediately accept or reject requests from the dashboard. This overview enables efficient monitoring and management of ongoing exhibition activities from a single interface.

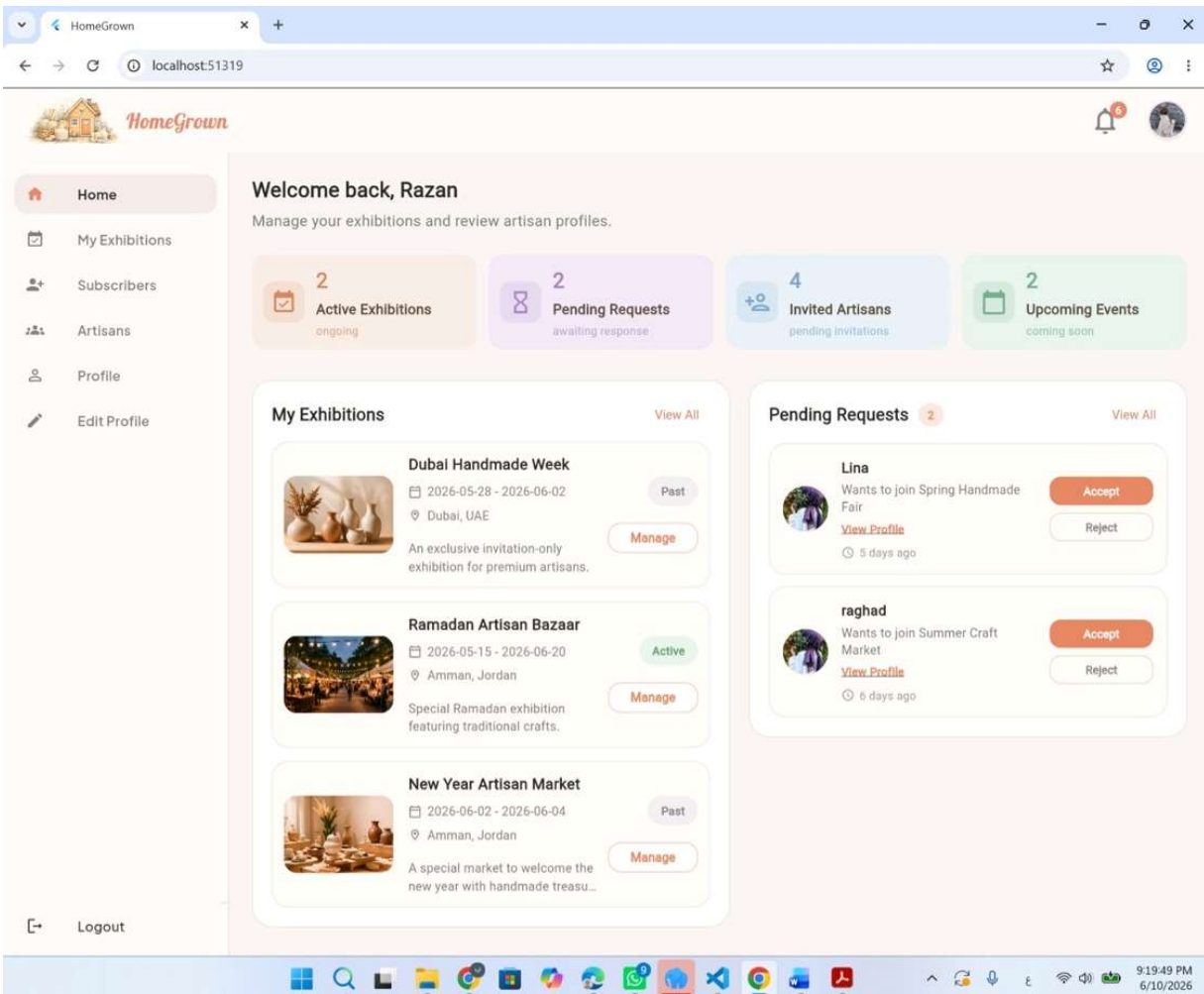


Figure 29 : Exhibition Owner Dashboard

3.3.4.2 My Exhibitions

The platform provides exhibition owners with a complete exhibition management interface that supports the full lifecycle of exhibition administration. Owners can create new exhibitions by uploading a cover image and specifying the exhibition title, description, location, schedule, and visibility type (public or private). Existing exhibitions can be modified at any time by updating their information, images, dates, or visibility settings through the edit dialog. To ensure data integrity and prevent accidental actions, deleting an exhibition requires explicit confirmation through a dedicated confirmation dialog. In addition, the management page supports searching and filtering exhibitions based on their status (All, Active, Upcoming, and Past), enabling owners to efficiently organize and manage their events from a centralized interface.

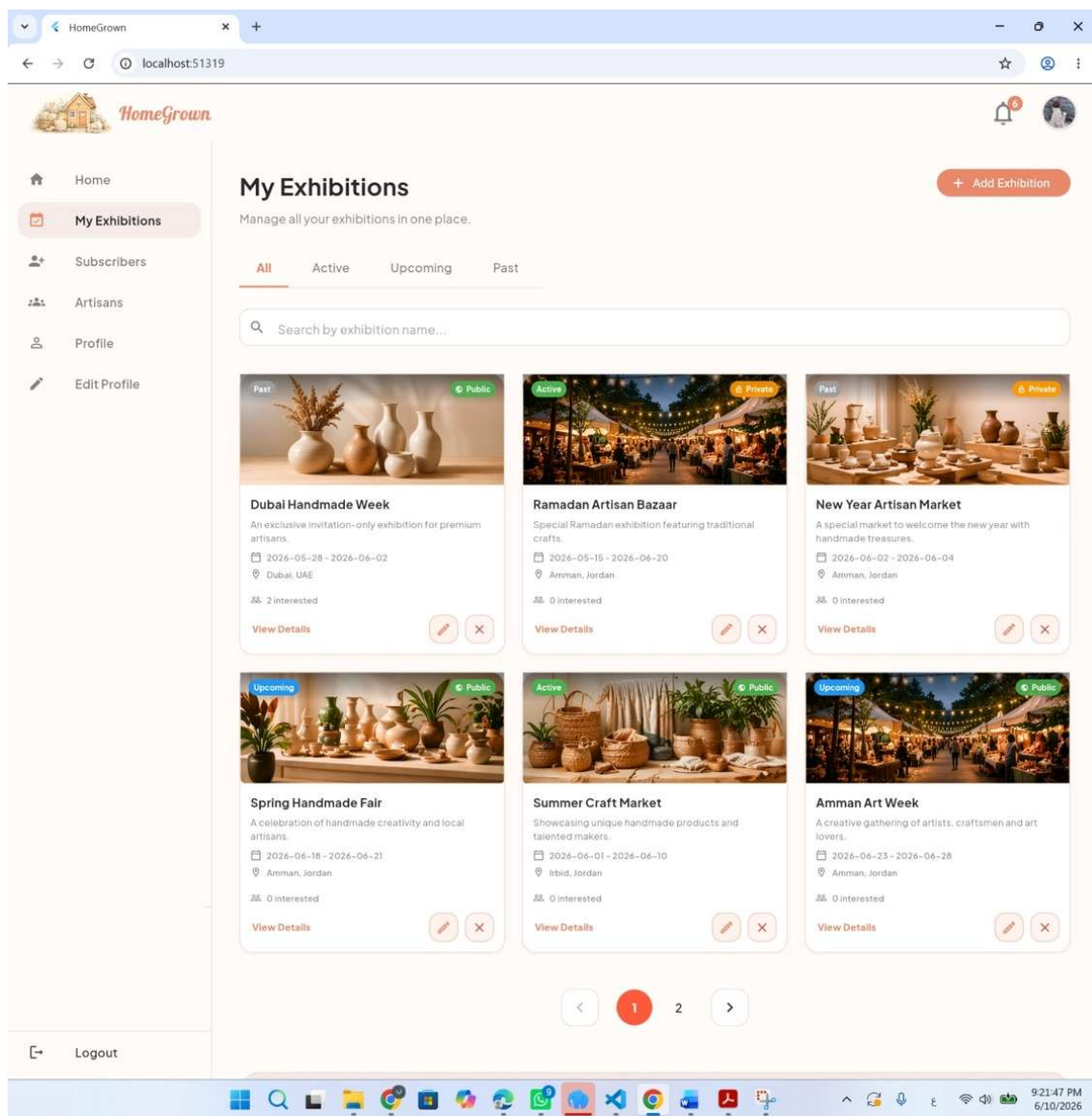


Figure 30 : My Exhibitions Management Interface

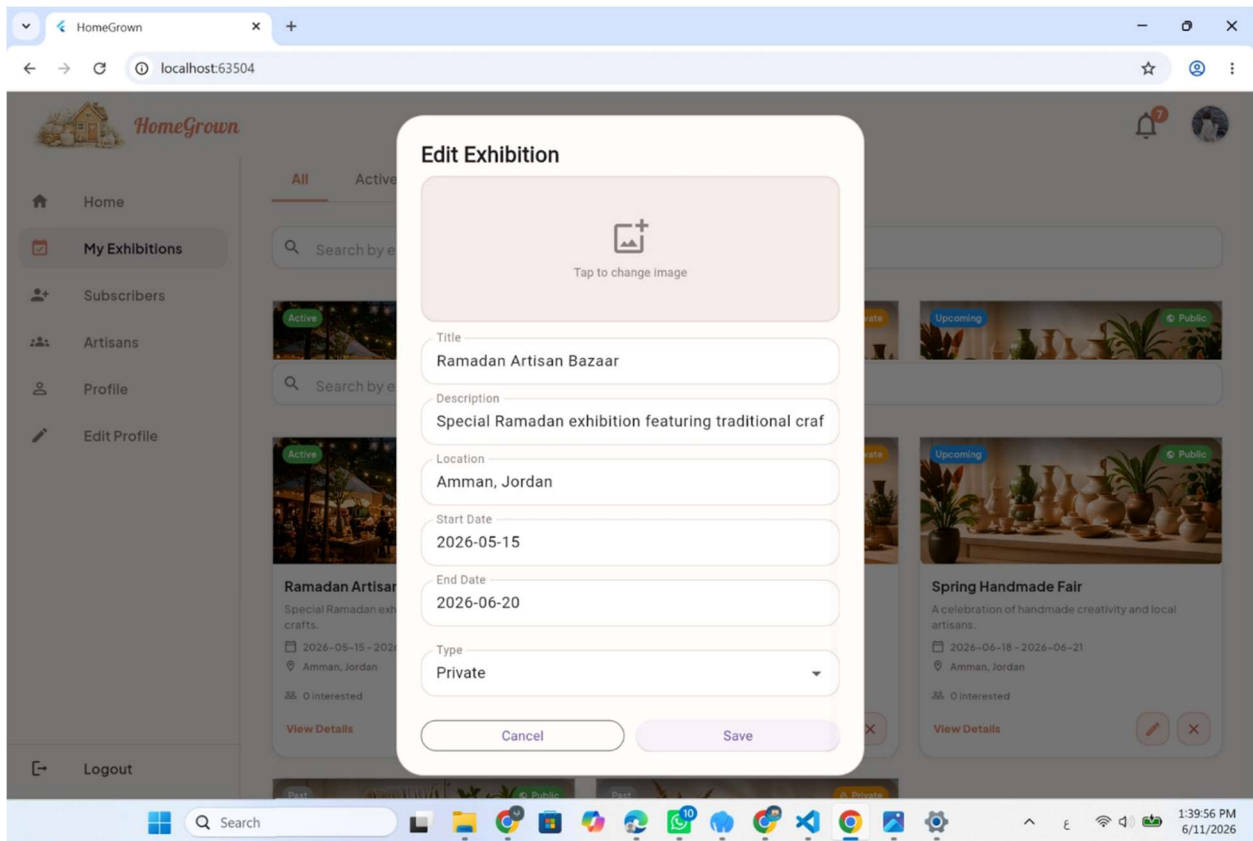


Figure 31 : Edit Exhibition interface

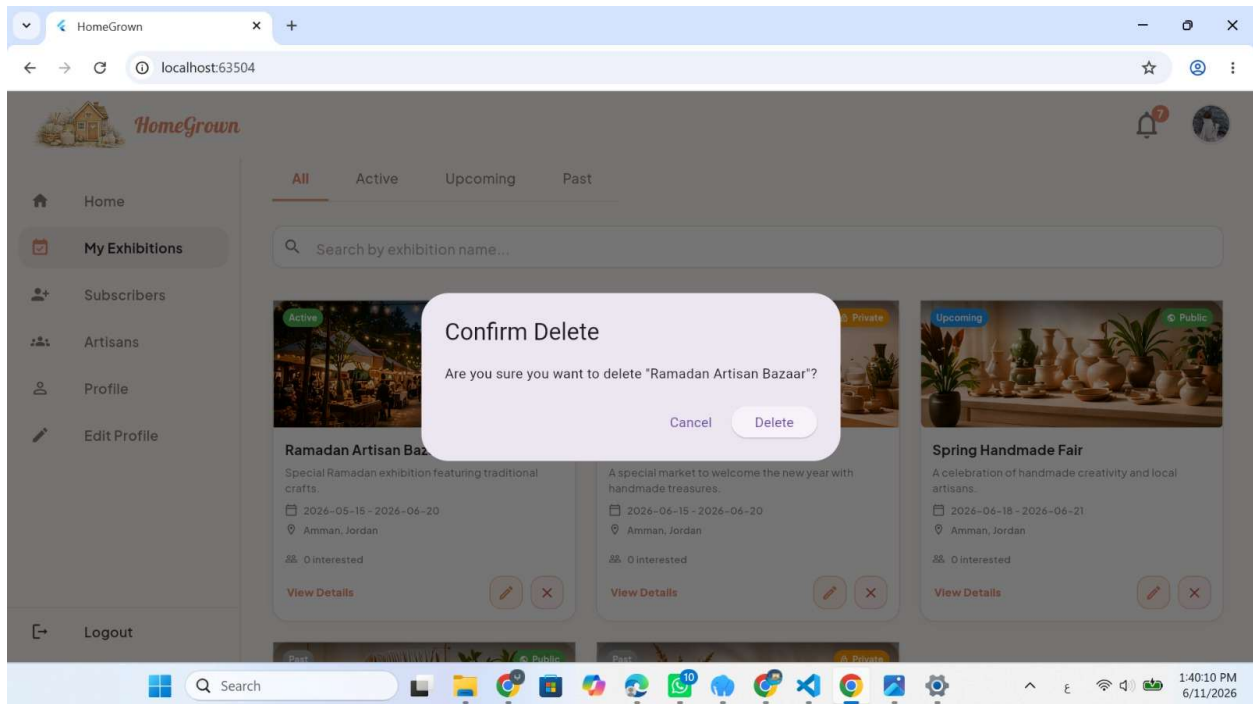


Figure 32 : Delete Exhibition Dialog

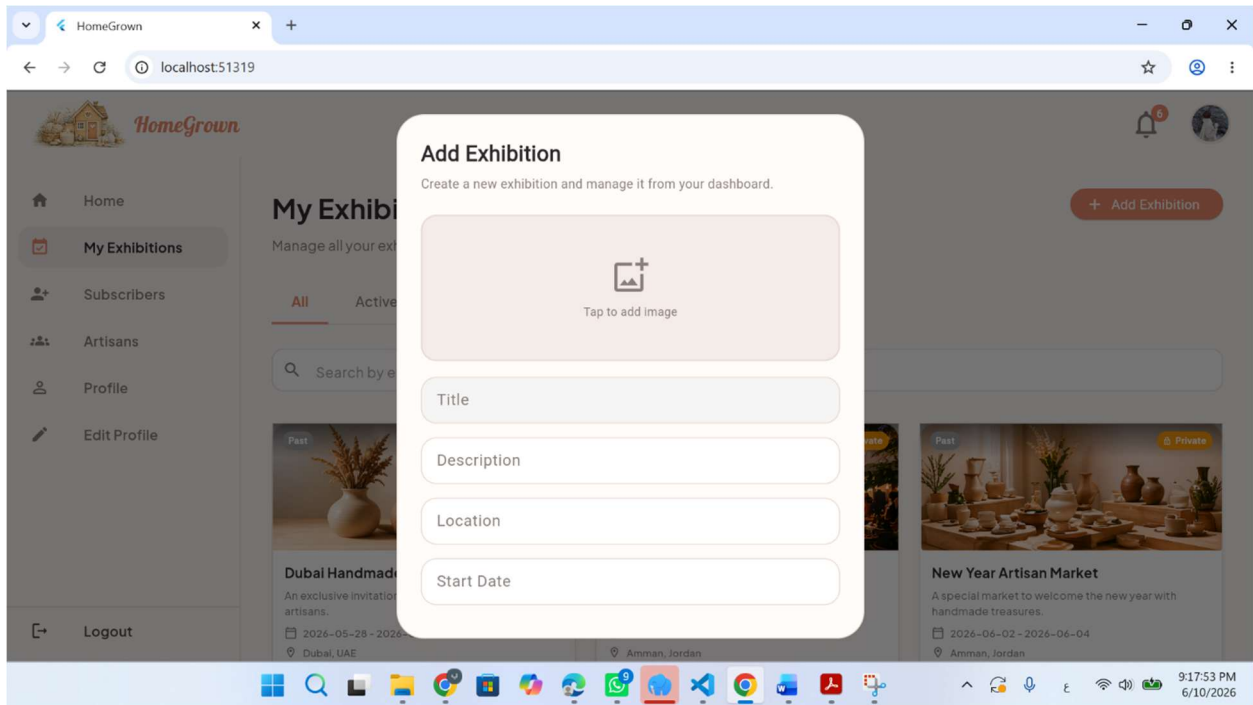


Figure 33 : Exhibition Creation Interface

3.3.4.3 Subscribers page

enables exhibition owners to monitor and manage all artisan participation records for a selected exhibition through a status-based filtering system. The interface organizes participants into four categories: Accepted, which displays artisans whose participation requests have been approved or whose invitations have been accepted; Rejected, which includes rejected participation requests as well as invitations declined by artisans; Waiting for Me, which lists pending participation requests submitted by artisans and awaiting the exhibition owner's approval or rejection; and Waiting for Artisan, which contains invitations sent by the exhibition owner that are still awaiting the artisan's acceptance or decline.

Each participant card displays the artisan's profile information, including profile image, rating, bio, follower count, product count, participation date, and a shortcut to view the full profile, providing exhibition owners with a comprehensive overview for efficient participant management.

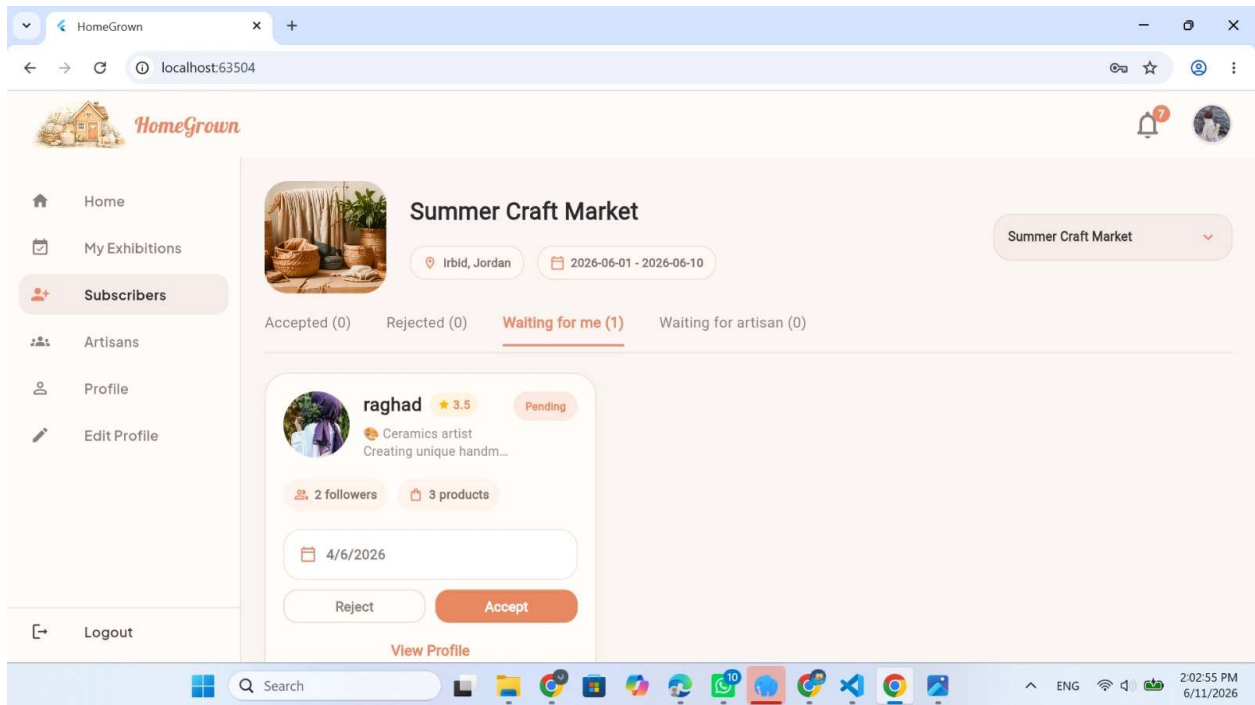


Figure 34 : Pending Participation Requests

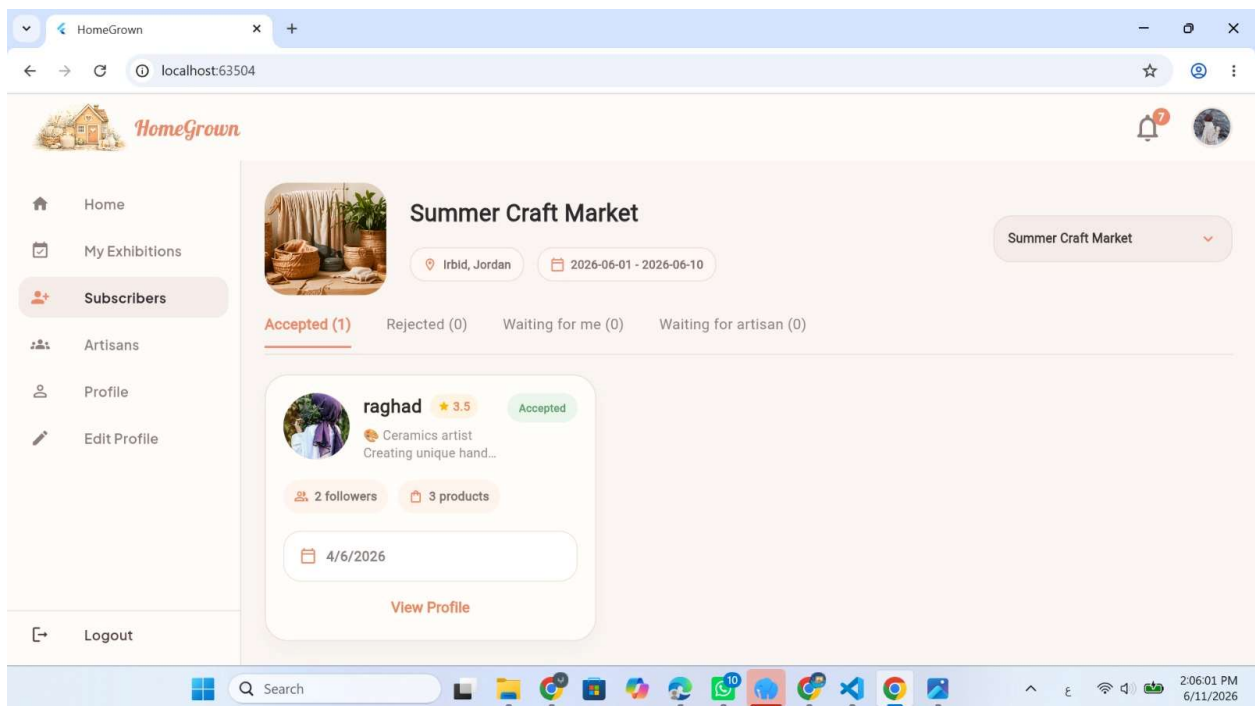


Figure 35 : Accepted Participants

3.3.4.4 Artisan Discovery and Favorite Artisans Management

The Artisan Discovery page enables exhibition owners to browse and discover artisans for participation in their exhibitions through a searchable and filterable interface. The page provides status-based filters such as All Artisans, Not Invited, Invitation Sent, Accepted, and Declined, along with a search bar that allows filtering artisans by name or product. The exhibition owner can first select one of their exhibitions from the exhibition selector, after which all invitation-related actions are associated with the selected exhibition.

Each artisan card displays key information, including the profile image, artisan name, biography, product name, category, location, average rating, and total sales count, allowing exhibition owners to quickly evaluate potential participants. From this page, the exhibition owner can view the artisan's complete profile and products, send an invitation directly to the selected exhibition, or add the artisan to the Favorite Artisans list for future reference.

The Favorite Artisans dialog provides a centralized list of saved artisans and supports multi-selection with a Select All option. After choosing one or more favorite artisans, the exhibition owner can send invitations to all selected artisans simultaneously, and each invitation is automatically associated with the currently selected exhibition, simplifying the invitation process and improving exhibition management efficiency.

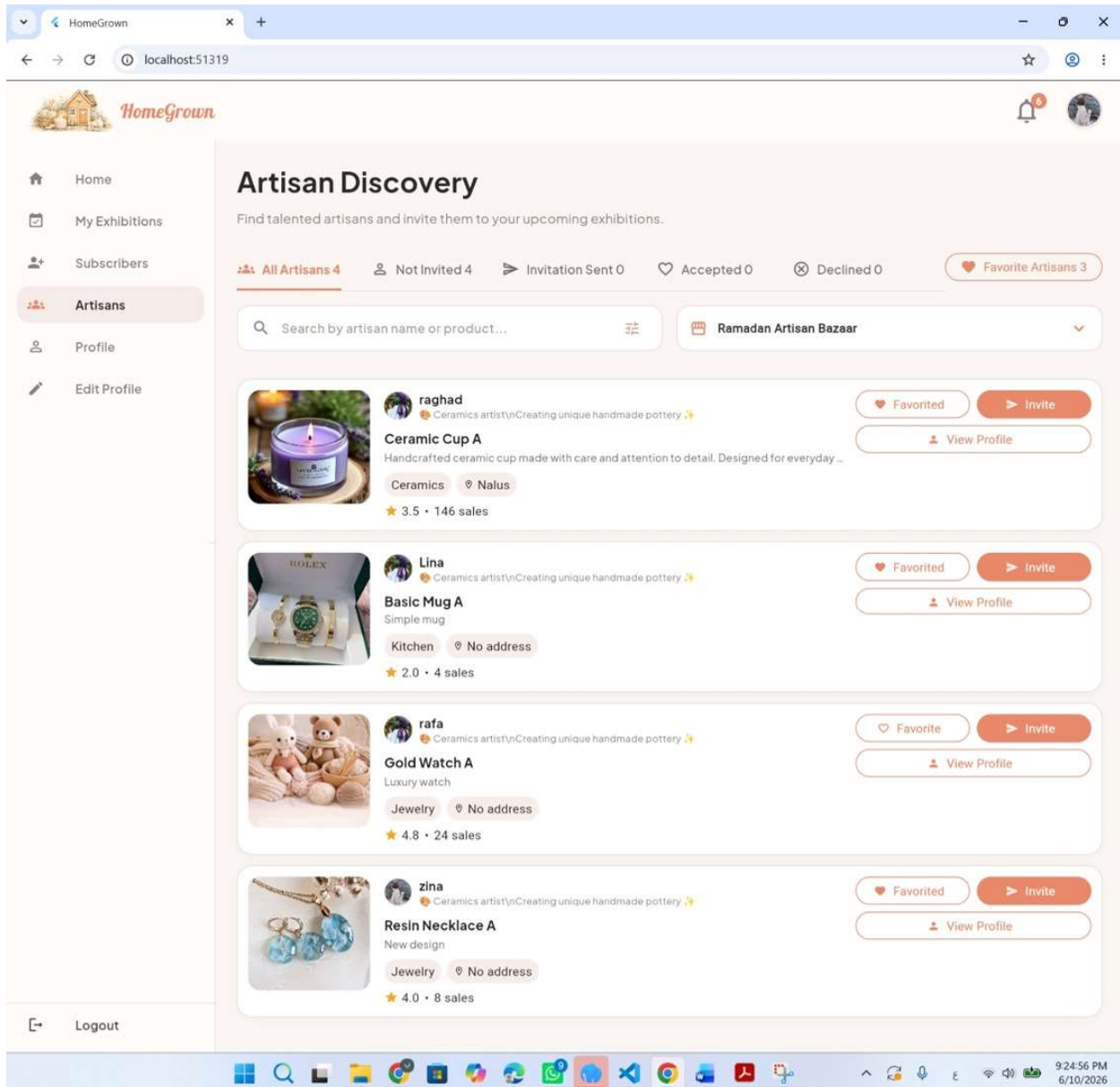


Figure 36 : Artisan Management Interface

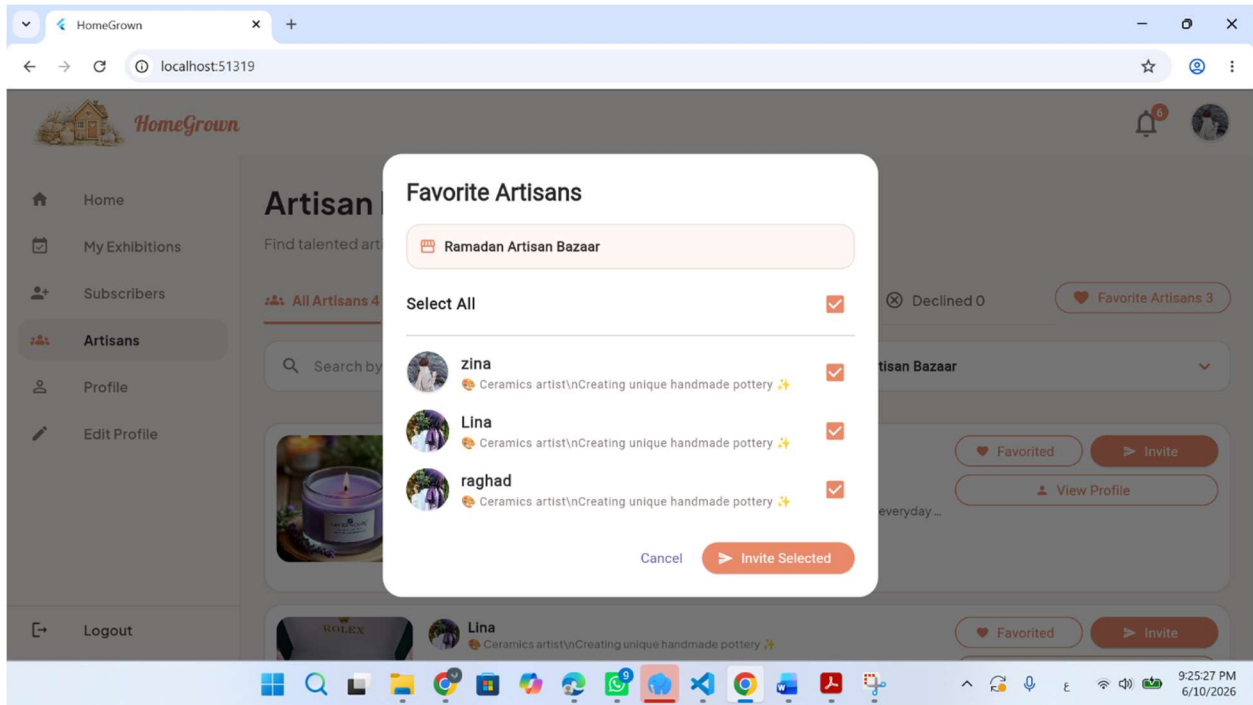


Figure 37 : Favorite Artisans Management

3.3.4.5 Real-Time Notification System

The Notification System is implemented using Firebase Cloud Messaging (FCM) and Firebase to provide real-time push notifications for exhibition owners. Each user device is assigned a unique FCM token, which is securely generated and stored in the backend after authentication. This token enables the server to identify the target device and deliver notifications directly to the appropriate user.

Whenever an important event occurs—such as an artisan submitting a participation request, accepting or rejecting an invitation, or any other exhibition-related activity—the backend automatically triggers a push notification through Firebase Cloud Messaging. The notification is instantly delivered to the user's device in real time and is simultaneously stored in the database for future retrieval.

The notification icon in the top navigation bar displays a dynamic badge indicating the number of unread notifications. When opened, the notification panel presents a chronological list containing the artisan's profile image, name, related exhibition, notification message, and the elapsed time since the event occurred. The unread notification count is automatically synchronized with the backend and updated immediately whenever new notifications are received or marked as read, providing a seamless real-time user experience across the platform.

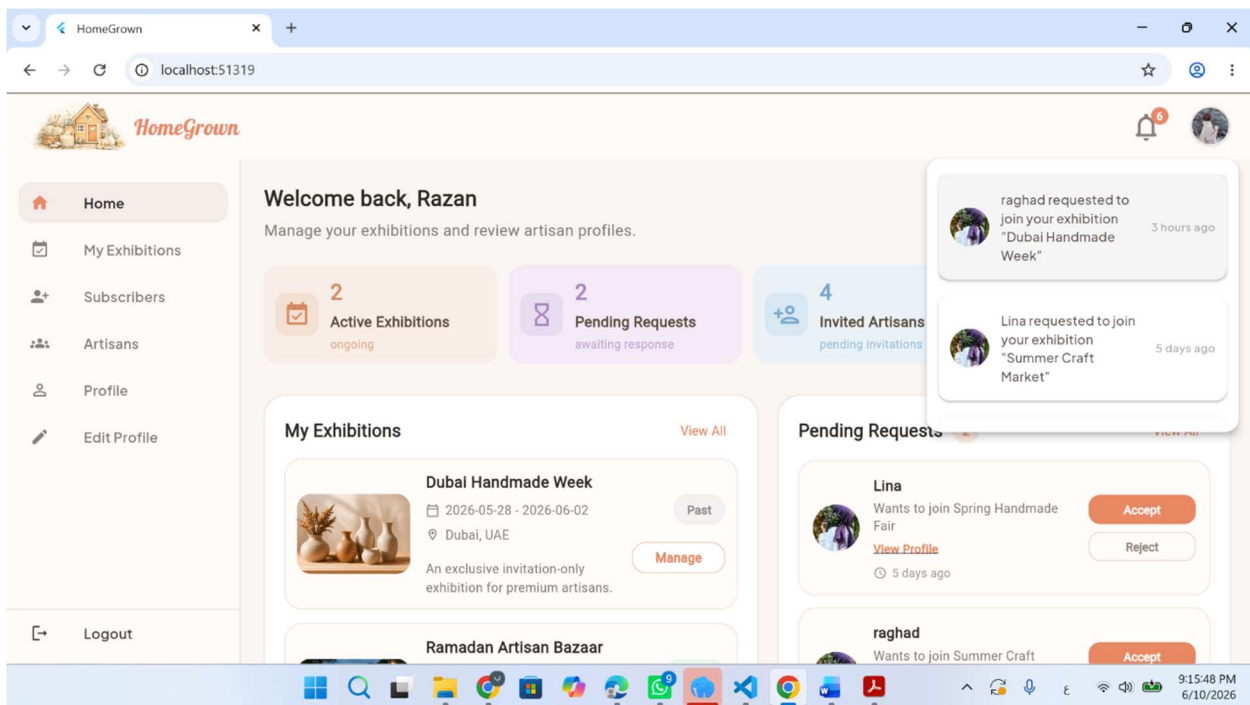


Figure 38 : Owner Exhibition Notifications

3.3.4.6 Exhibition Owner Profile, Edit Profile, and Exhibition Calendar

The Exhibition Owner Profile page provides a centralized overview of the owner's personal information and exhibition activities. The profile section displays the profile picture, name, username, biography, total number of exhibitions, followers, and following statistics. The Edit Profile page allows the exhibition owner to update personal information, including the profile image, full name, email address, phone number, location, biography, and username, ensuring that the profile remains accurate and up to date. A key component of the profile page is the Exhibitions Calendar, implemented using the Table Calendar Flutter package. It provides an interactive monthly view of all

exhibitions managed by the owner, with color-coded indicators representing exhibition statuses: green for active exhibitions, blue for upcoming exhibitions, and red for ended exhibitions. The calendar also displays summary statistics for each category and allows the owner to view exhibitions scheduled on selected dates, supporting efficient schedule monitoring and future event planning.

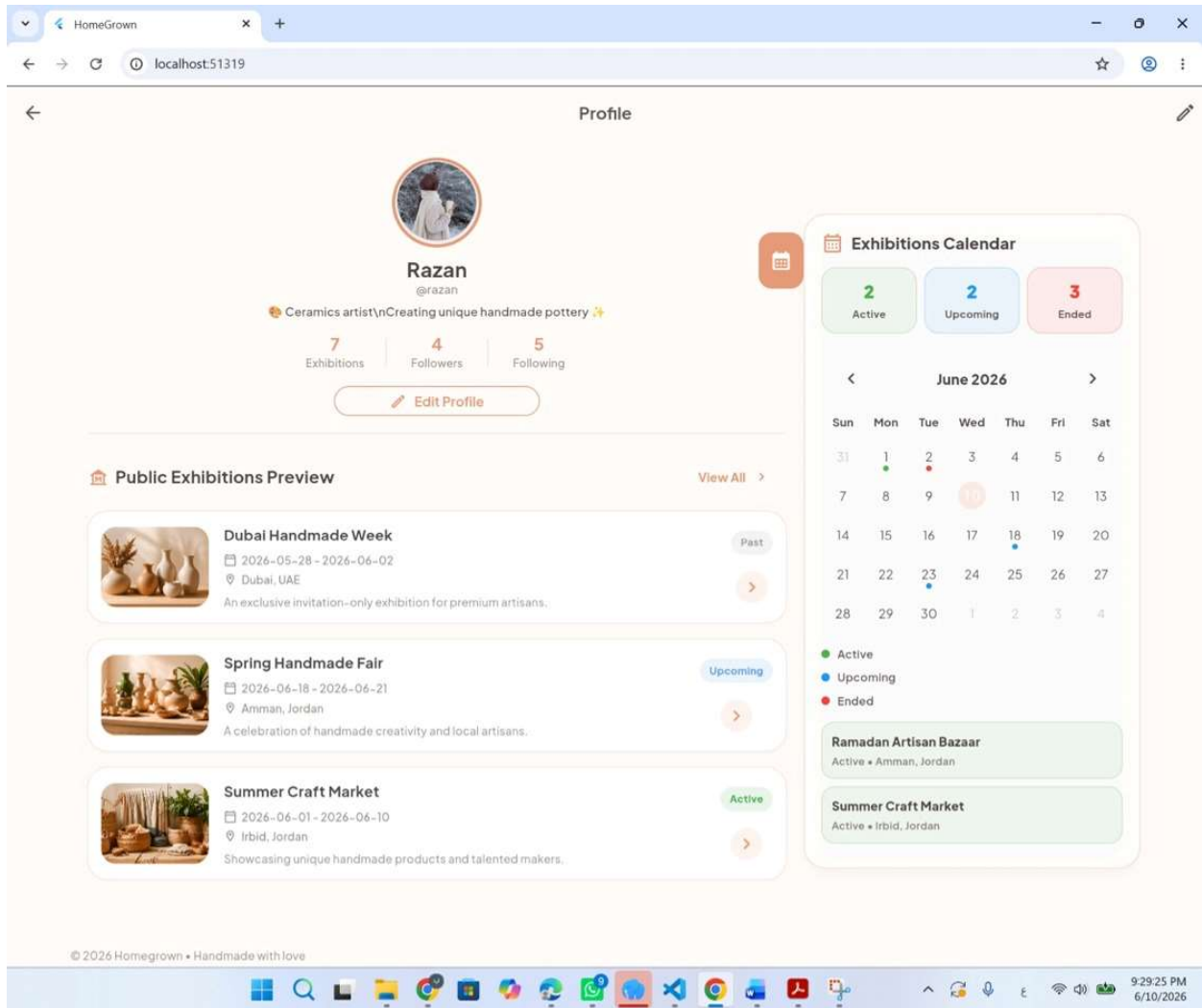


Figure 39 : Owner Exhibition Profile

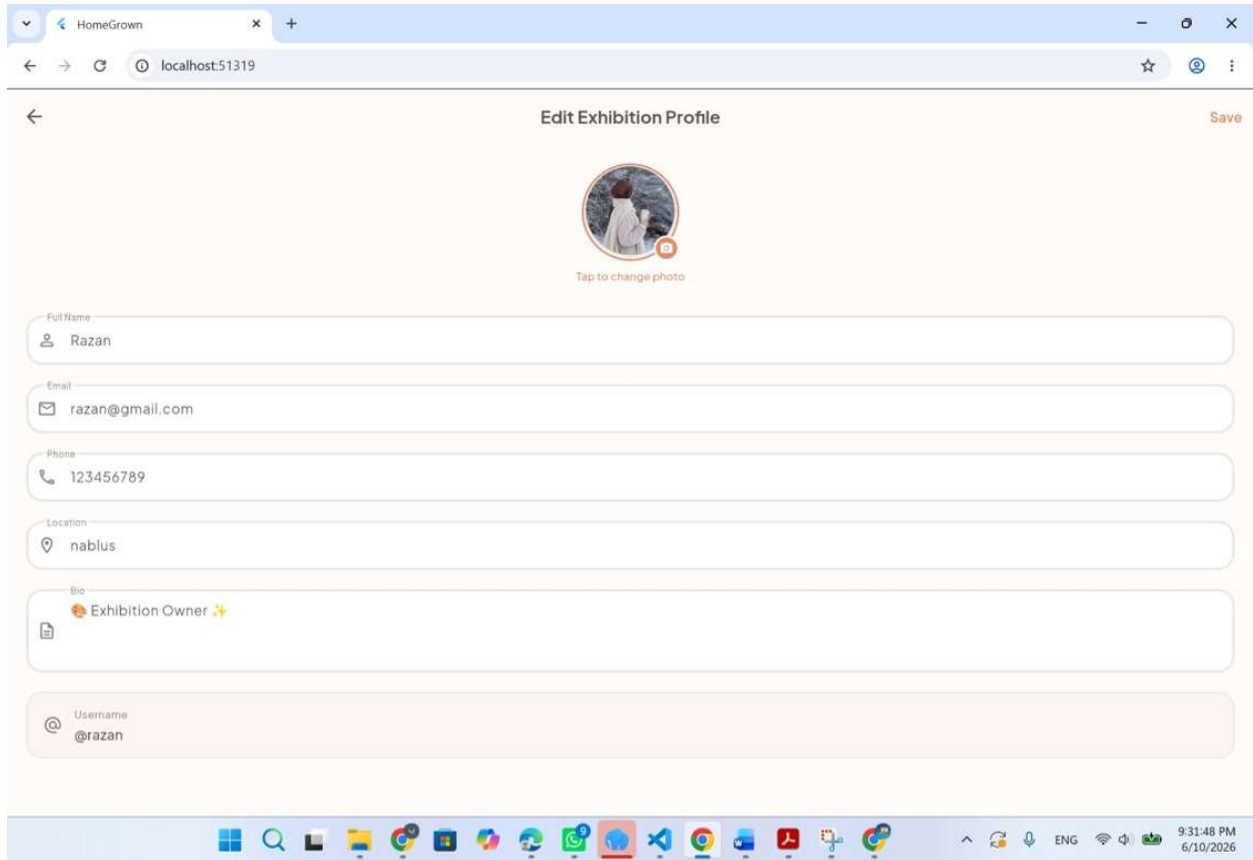


Figure 40: Edit Owner Exhibition Profile

3.3.5 Customer Pages

3.3.5.1 Customer Home Page and Product Discovery

The Customer Home Page provides an interactive environment for discovering and exploring handmade products from different artisans. At the top of the page, users can access the navigation menu, search bar, shopping cart, notifications, and personal profile. The Stories section allows users to publish temporary stories featuring products they have purchased from artisans, accompanied by personal feedback, reviews, or recommendations based on their own experience. These stories encourage community interaction and help other customers make informed purchasing decisions. Users can also access My Stories to view or manage their own published stories.

The page includes several filtering options to simplify product discovery. The Explore tab displays AI-personalized recommendations based on the user's interactions and preferences, while the New tab highlights recently added products. The Most Liked tab presents products with the highest user engagement, the Offer tab displays products that currently have active discounts and promotional offers.

Each product card displays essential information such as the artisan's profile image and name, product image, title, description, likes, comments, pricing details, and active discount information when applicable. Users can directly add products to their shopping cart, save products, express their appreciation by liking products, and write comments to share their opinions or ask questions. In addition, by tapping on the artisan's profile, users can navigate to the artisan's public page to browse the artisan's information and explore all of their available handmade products.

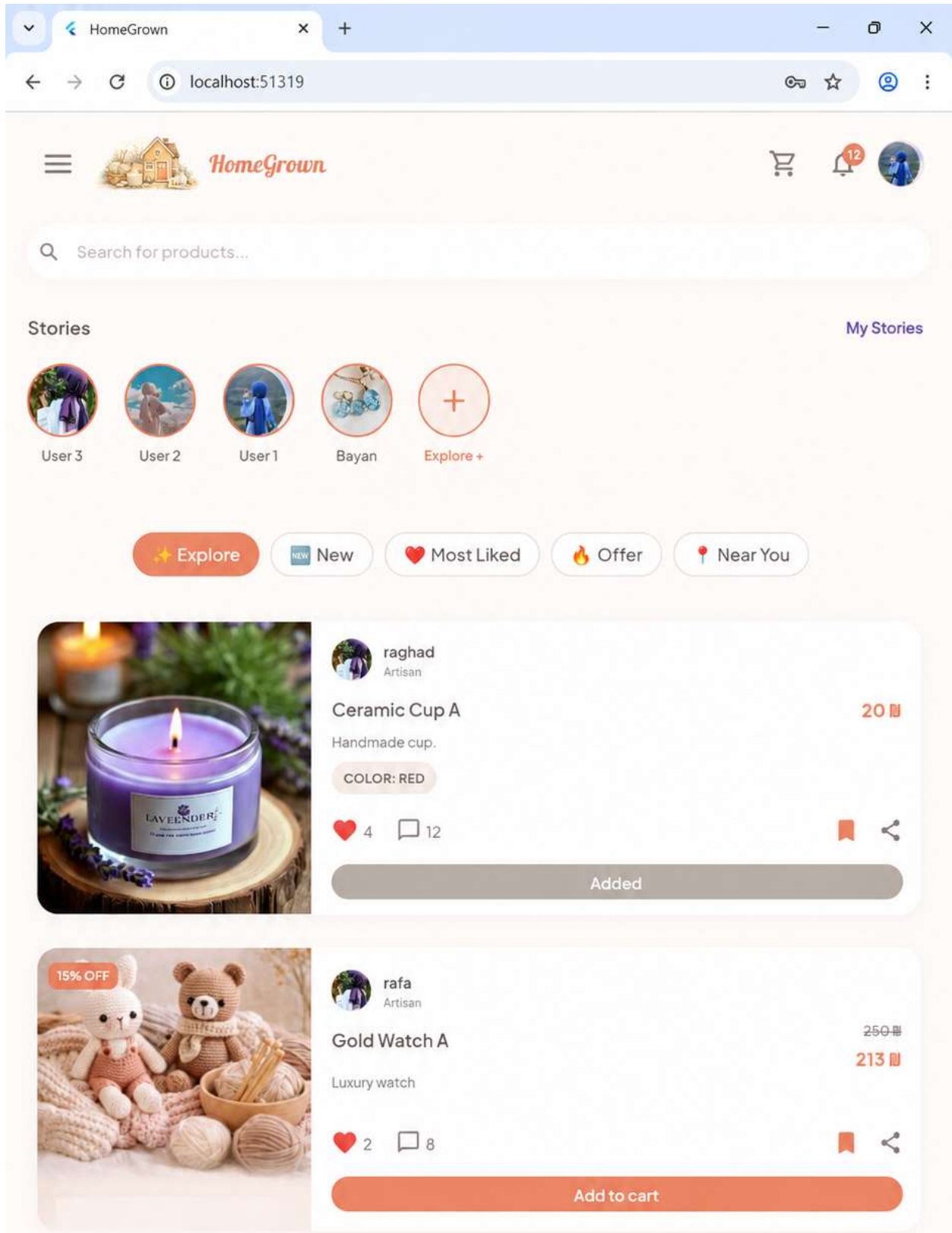


Figure 41 : Customer Home Page

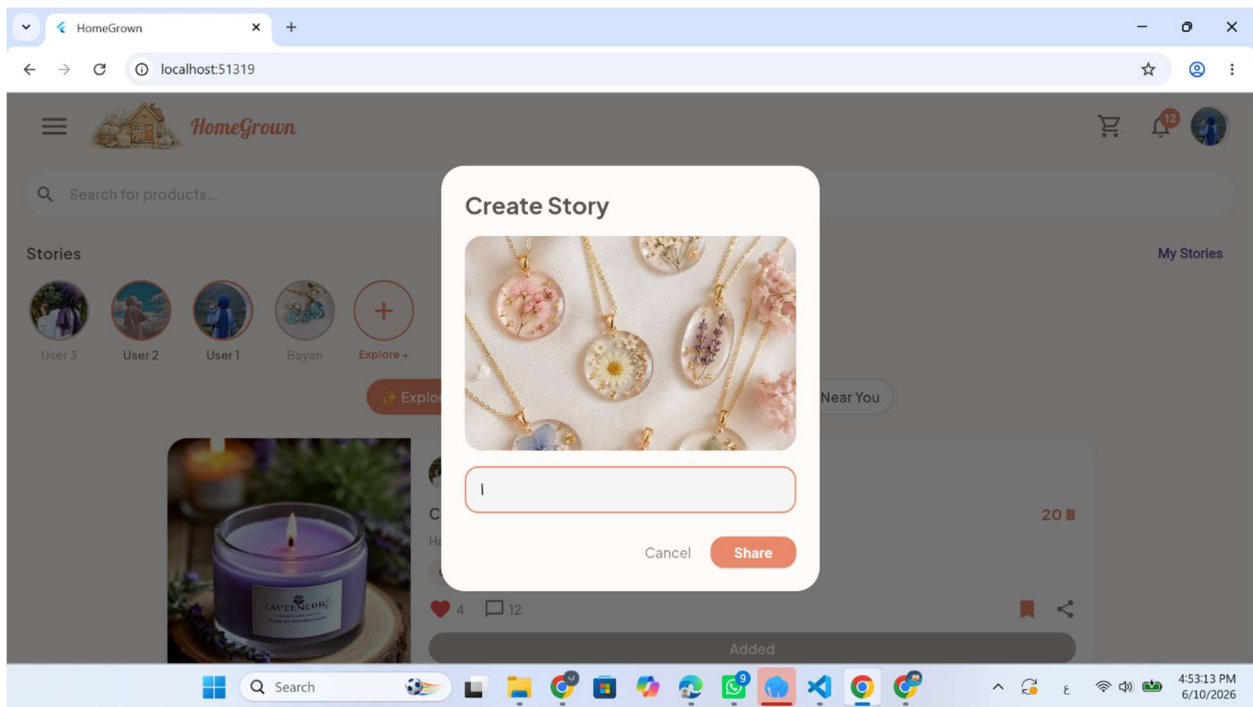


Figure 42 : Insert New Story

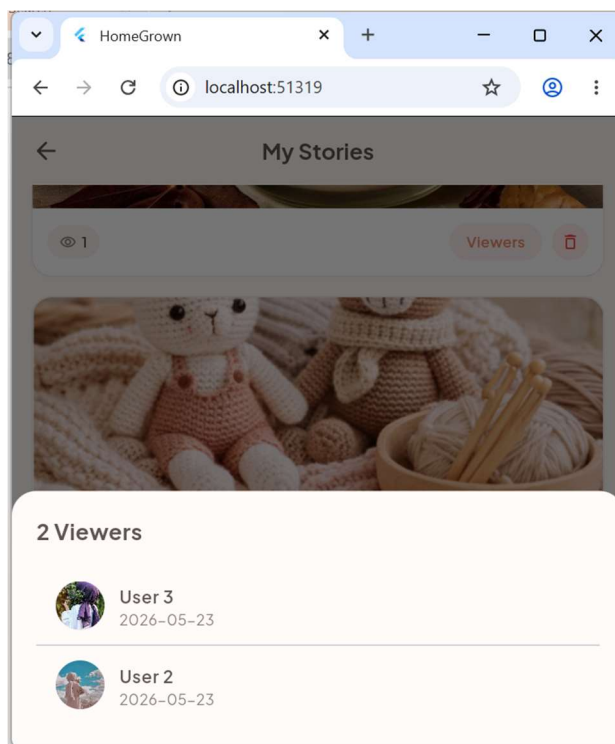


Figure 43 : Story Viewers List

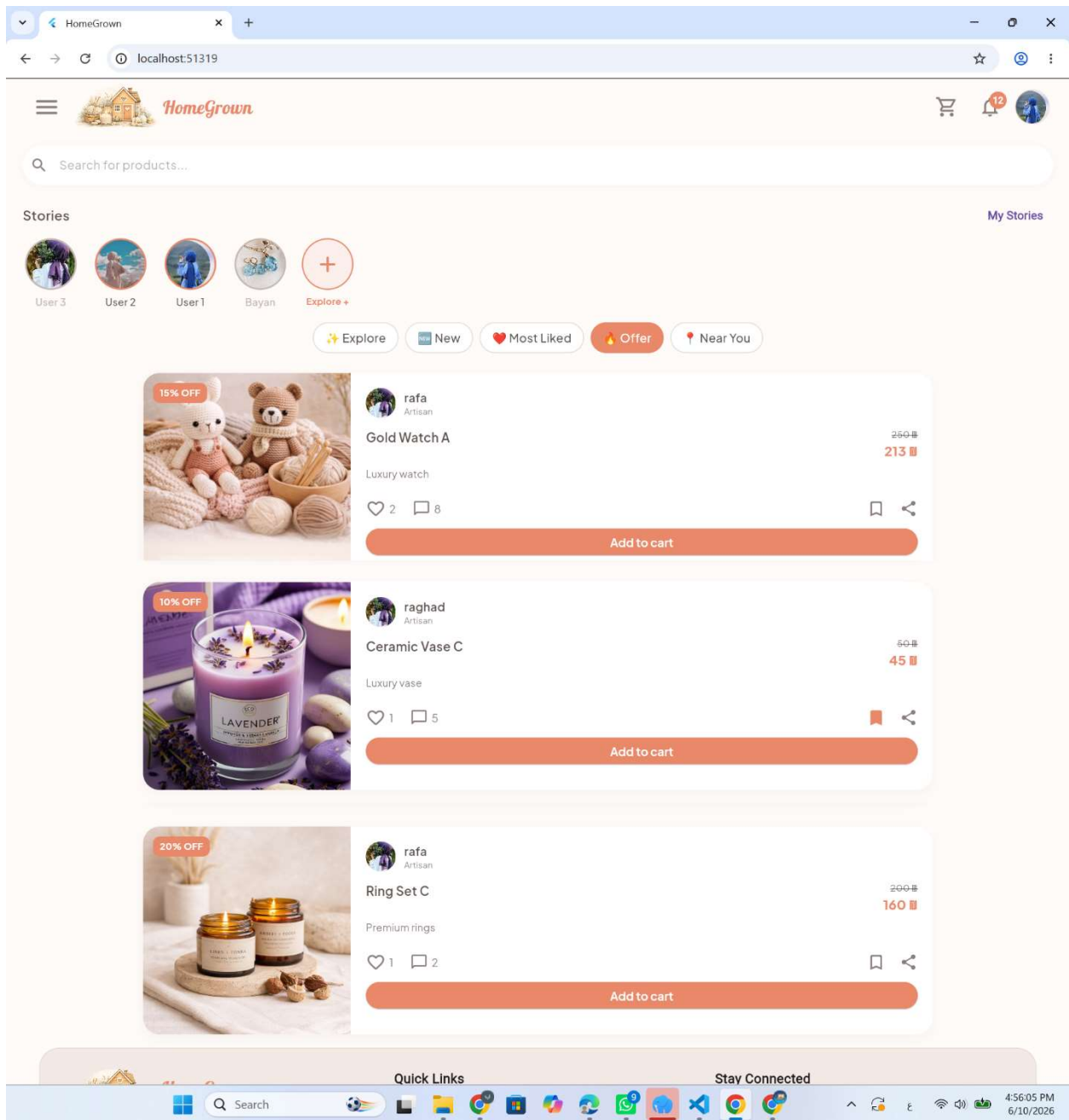


Figure 44 : Product Discount Filters

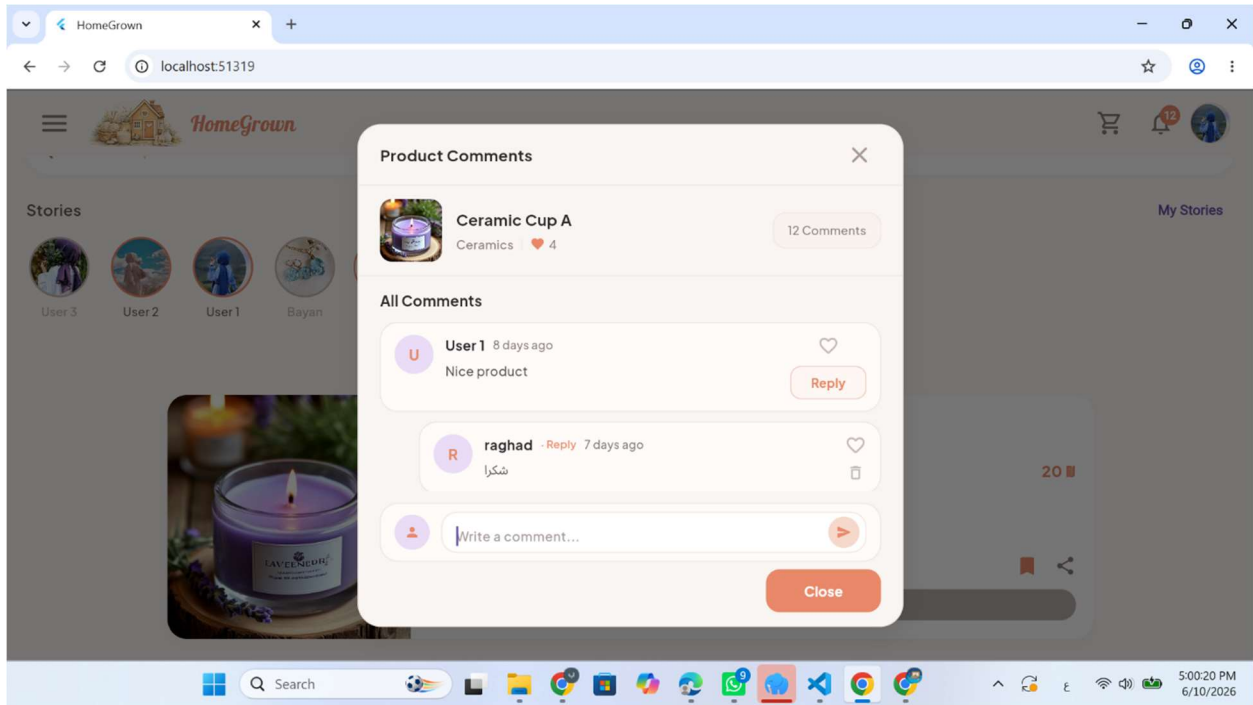


Figure 45 : Add New Comment

3.3.5.2 Search and Artisan Profile

The platform provides an integrated search feature that enables users to quickly find artisans by entering their names in the search bar. Matching results are displayed instantly, allowing users to navigate directly to the selected artisan's profile. The artisan profile presents key information such as the profile picture, biography, total number of products, followers, and following count, in addition to displaying all published products in a structured and user-friendly layout. From this page, users can follow the artisan to receive future updates, communicate with them through the messaging feature, and submit a rating on a five-star scale based on their personal experience. This functionality enhances user engagement, supports trust-based interactions, and encourages continuous communication between customers and artisans within the platform.

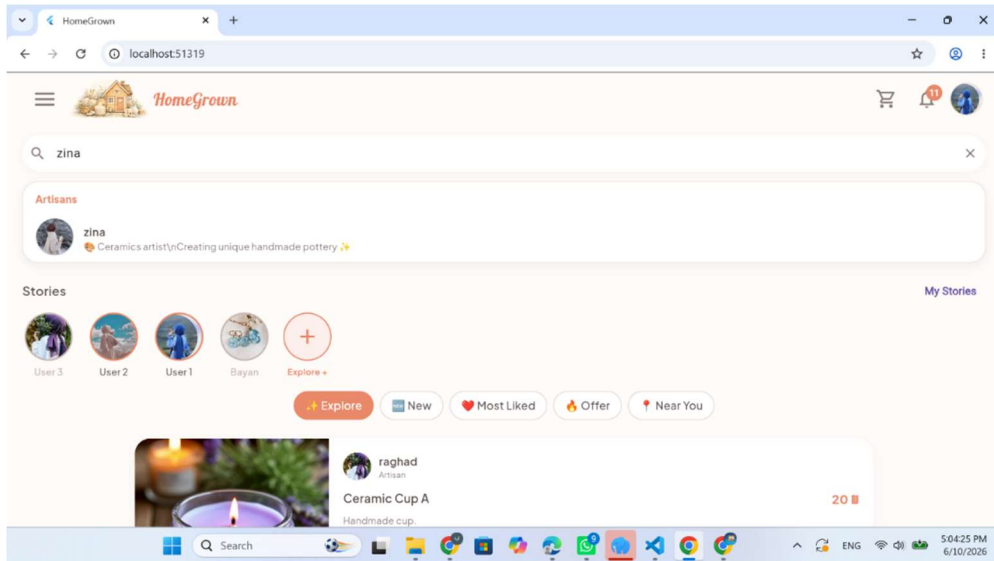


Figure 46 : Artisan Search and Discovery Interface

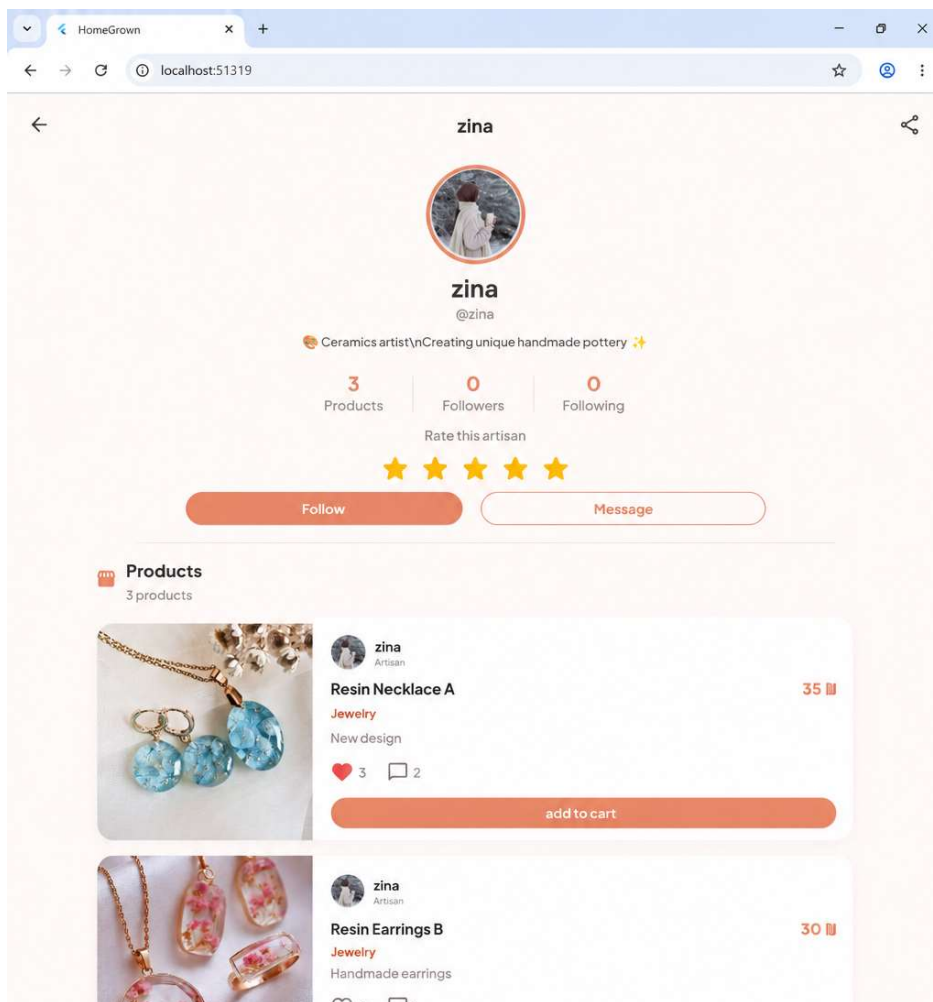


Figure 47 : Visiting an Artisan Profile and Product Catalog

3.3.5.3 Shopping Cart and Order Placement

The Shopping Cart page organizes selected products by artisan, allowing users to clearly view items purchased from each seller separately while also displaying an overall order summary. Each artisan section includes the selected products, individual prices, quantities, and a subtotal, with options to select or deselect all products from a specific artisan or the entire cart. Users can easily increase or decrease product quantities, remove items from the cart, and review the updated totals in real time.

On the right side of the page, an order summary displays the subtotal for each artisan and the overall products total before checkout. When the user clicks Make Order, the system automatically validates, and immediately sends the order to the respective artisan for processing. At the same time, the order is added to the user's My Orders section, where the customer can continuously track the complete order status and monitor every stage of the purchasing process until delivery.

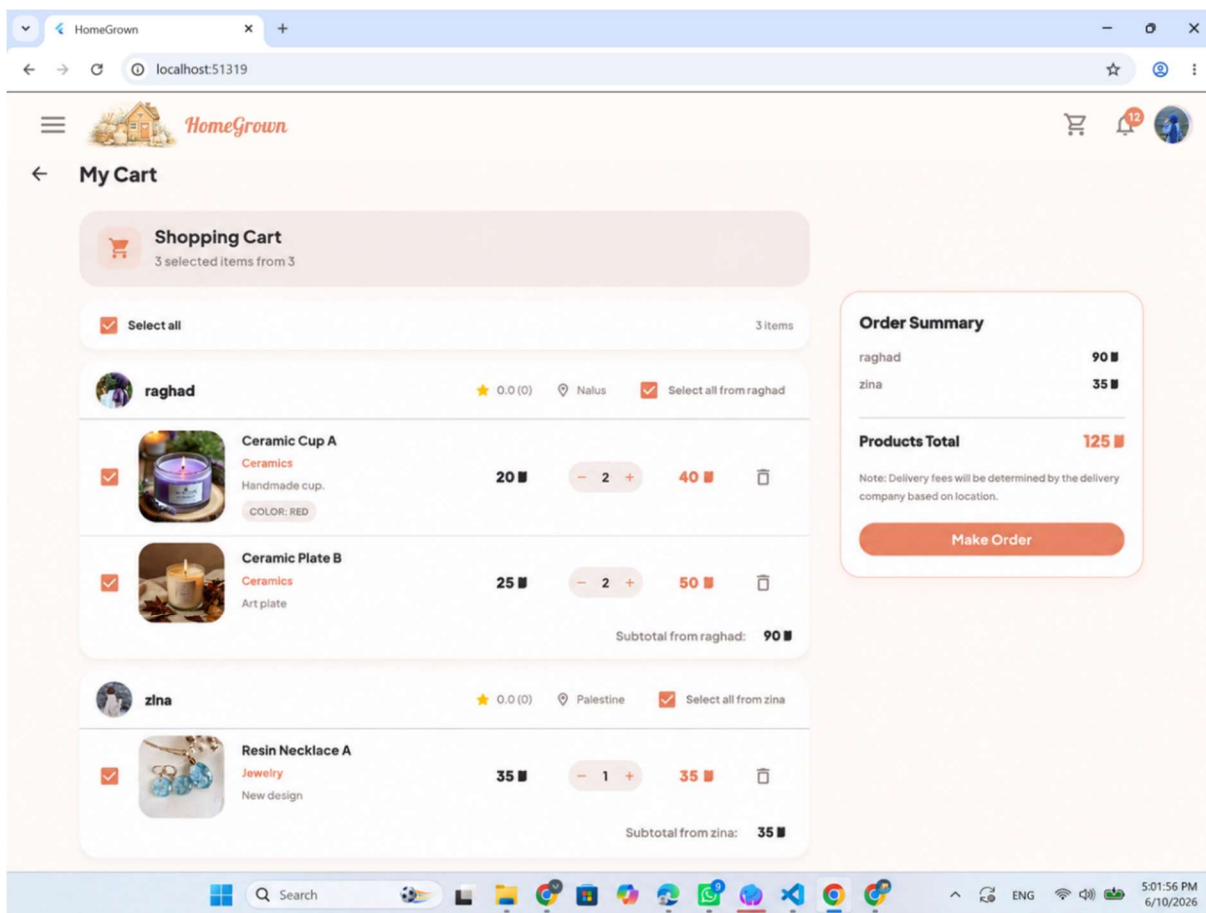


Figure 48 : Shopping Cart Page

3.3.5.4 User Notifications and Navigation Sidebar

as shown in the interface, users receive real-time notifications through Firebase Cloud Messaging (FCM), allowing them to stay updated with important platform activities. Notifications may include new products added by followed artisans, replies to their comments, interactions with their posts, order status updates, and other relevant activities. Each notification is displayed instantly and can be accessed directly from the notification panel.

The side navigation menu provides quick access to the platform's main sections, including Home, Explore, Messages, Activity, My Orders, Exhibitions, Profile, and Edit Profile, in addition to the Logout option. This centralized navigation structure enables users to move efficiently between different features and manage their activities from a single, easily accessible interface.

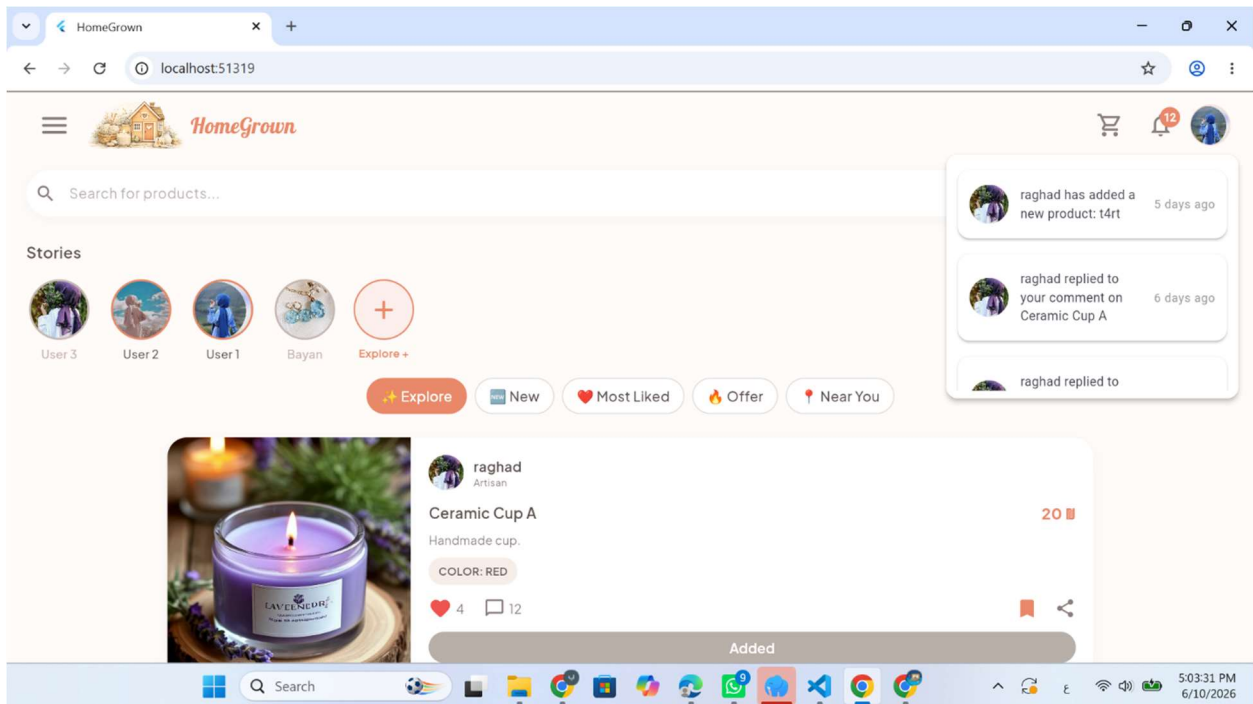


Figure 49 : Customer Notifications

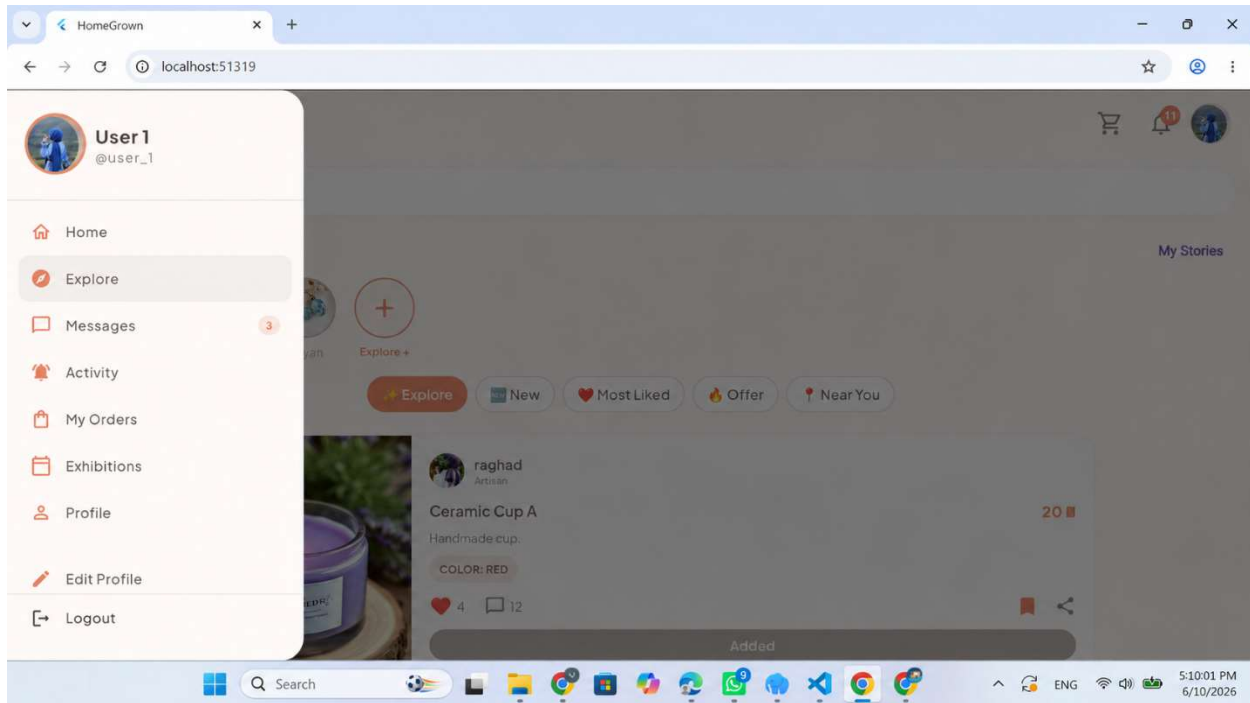


Figure 50 : Customer Side Navigation Menu

3.3.5.5 Community Explore Posts and User Interaction

The Community Explore page provides a social space where users can share experiences, ask questions, and exchange ideas related to handmade products and gift suggestions. Users can create new posts by writing content and selecting a related occasion category, such as wedding, engagement, Eid gifts, birthday, Mother's Day, graduation, new baby, or Quran celebration. This allows users to ask for recommendations, share product experiences, or discuss suitable handmade gift ideas with the community.

The page includes a search bar and category filters that help users browse posts based on specific topics or occasions. Each post displays the user's profile information, occasion category, post content, number of likes, number of comments, posting time, and sharing option. Users can interact with posts by liking them, writing comments, replying to discussions, saving posts for later, and sharing them with others. These features support community engagement and allow customers to benefit from real experiences and recommendations shared by other platform users.

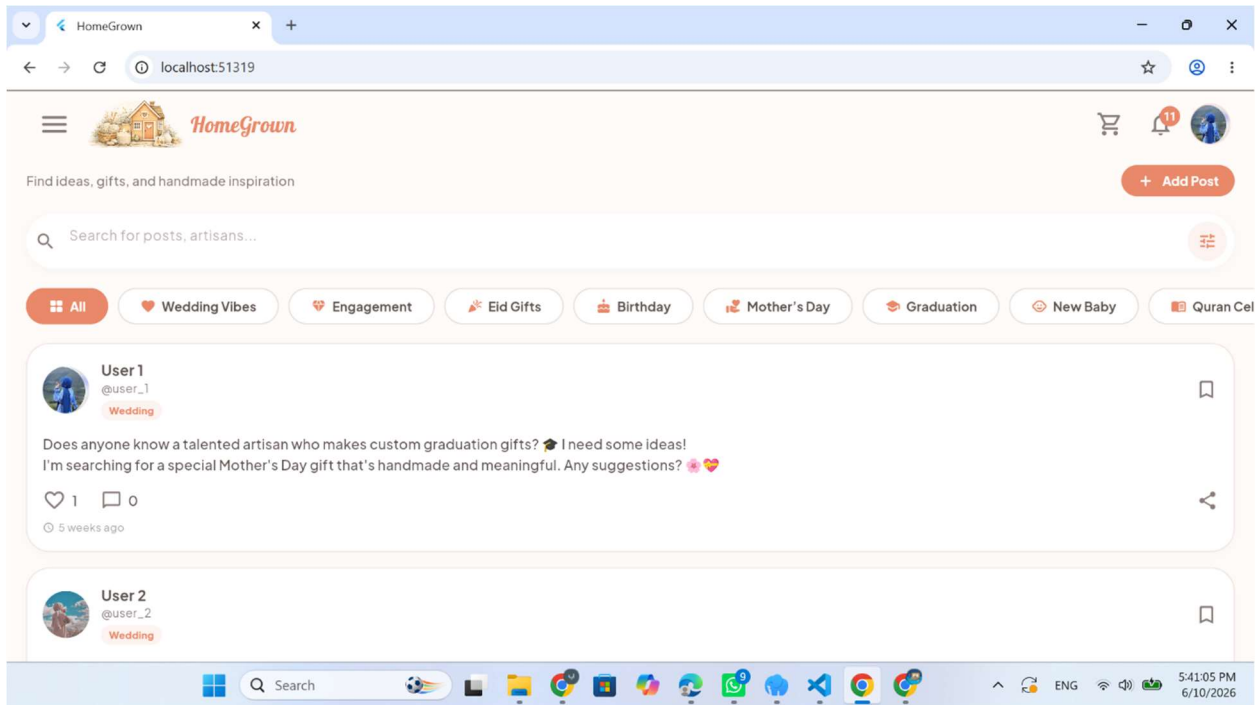


Figure 51 : Explore Community Feed Interface

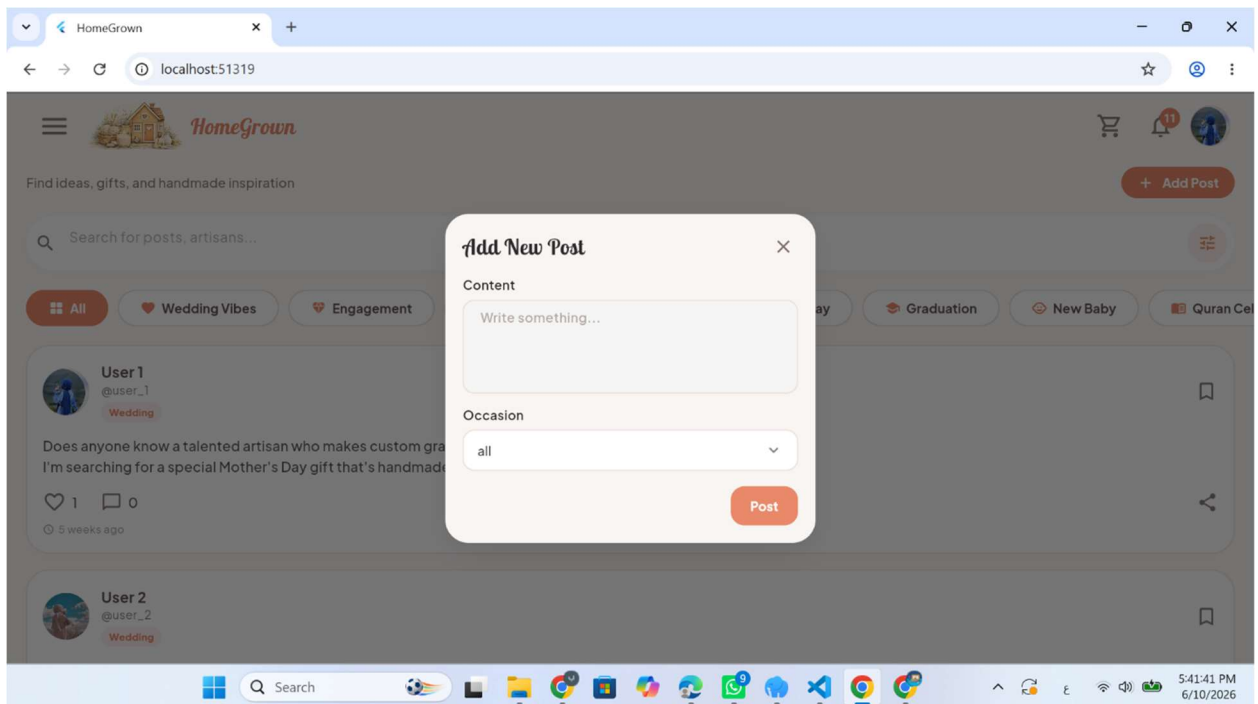


Figure 52 : Add New Community Post Dialog

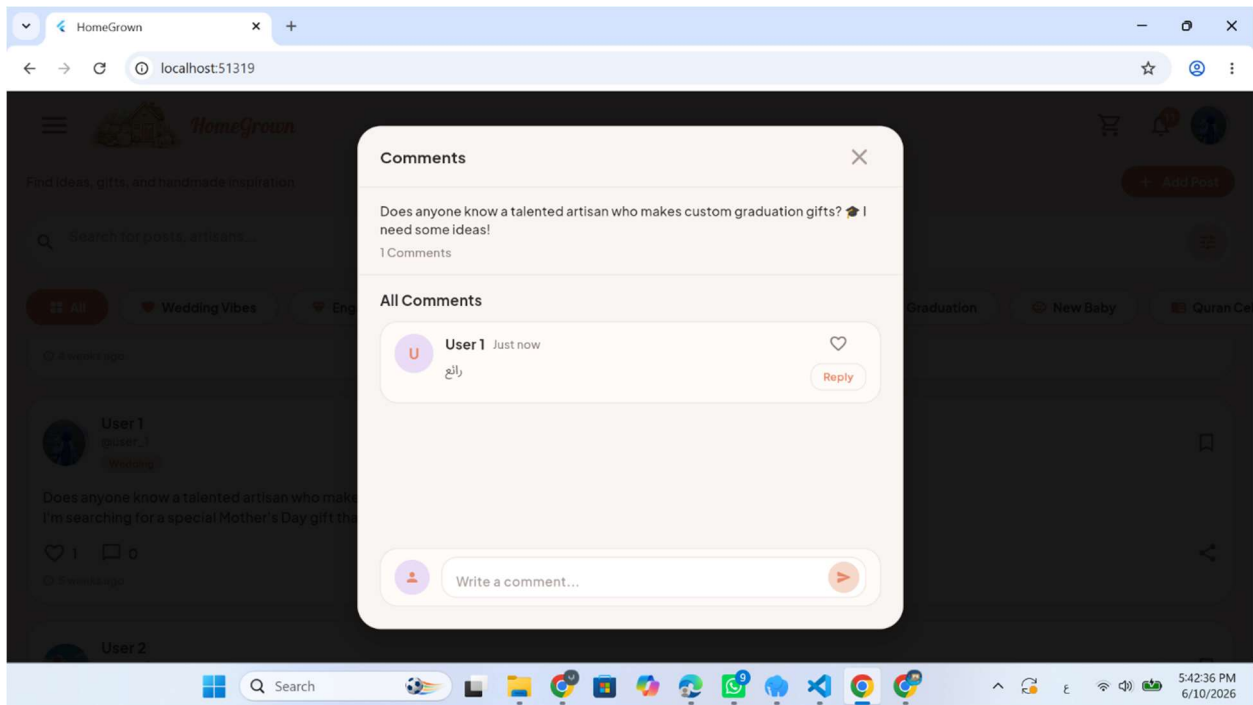


Figure 53 : Post Comments and Reply Interface

3.3.5.5 Activity page

provides users with a centralized view of their recent interactions and saved content within the platform. It organizes activities into categories such as follows, likes, comments, saved posts, and saved products, allowing users to easily review their engagement history and quickly access content they have previously saved or interacted with.

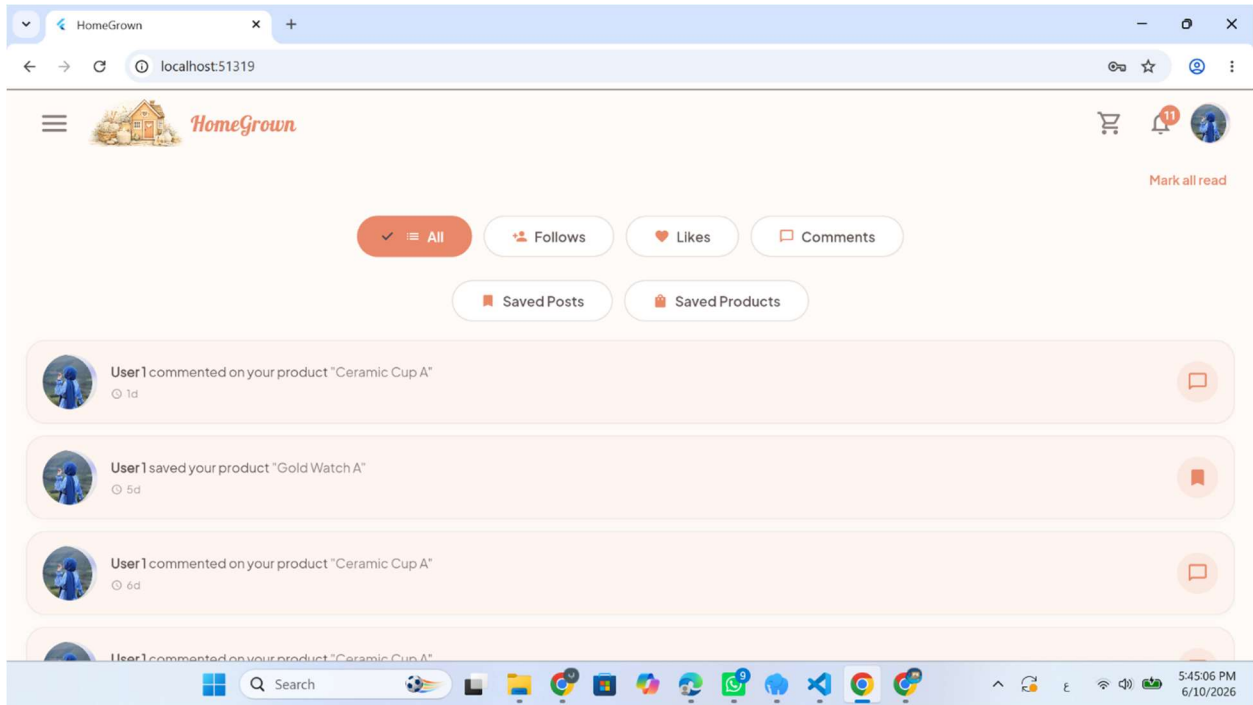


Figure 54 : User Activity and Saved Product

3.3.5.6 My Orders page

enables users to track all their orders from the moment they are placed until final delivery. Orders are organized into categories such as All Orders, Active Orders, Completed Orders, and Cancelled Orders, allowing users to easily monitor their purchase history. Each order displays key information including the artisan, ordered products, total cost, and a visual status timeline that reflects the current stage of the order (Order Placed, Preparing, Ready for Delivery, and Delivered). Once an order is successfully placed, the purchased quantities are automatically deducted from the artisan's available stock, the order is sent directly to the corresponding artisan, and it immediately appears in the user's My Orders section for real-time status tracking.

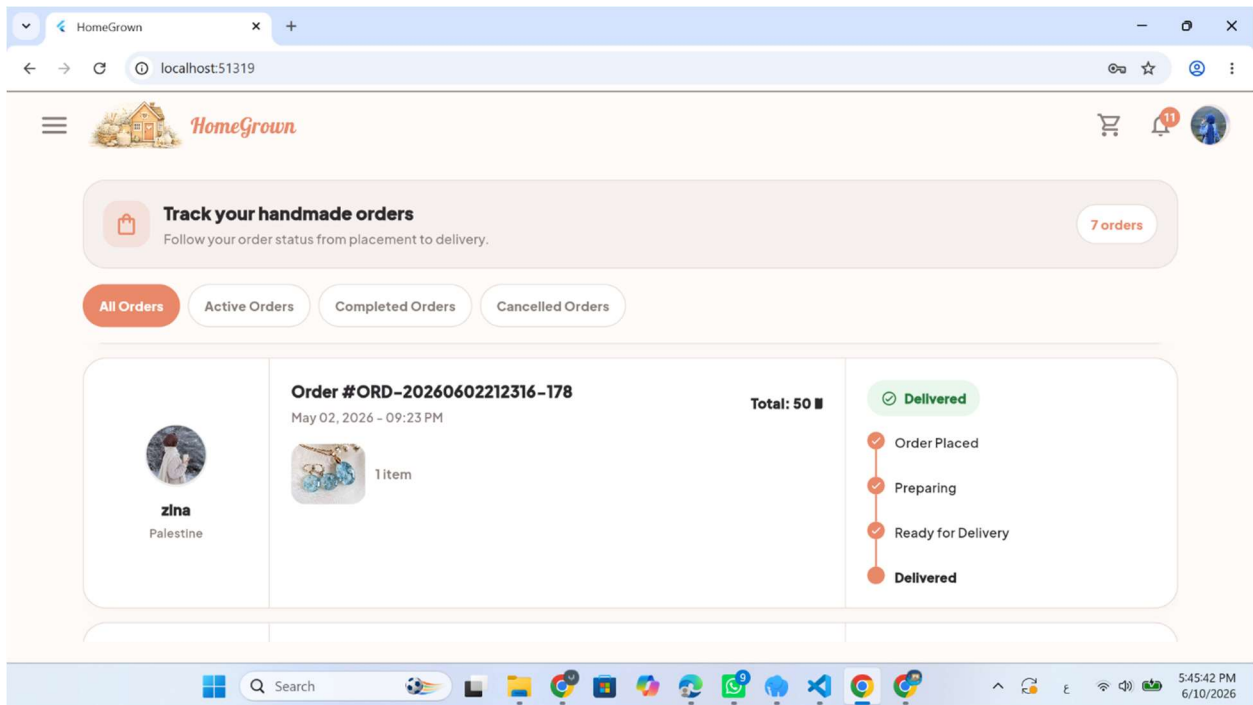


Figure 55 : Customer Order Tracking Interface

3.3.5.7 Exhibitions page

enables users to browse available exhibitions, search by name, and mark any exhibition as Interested. All selected exhibitions are automatically saved in the My Interests section, allowing users to easily keep track of events they are interested in.

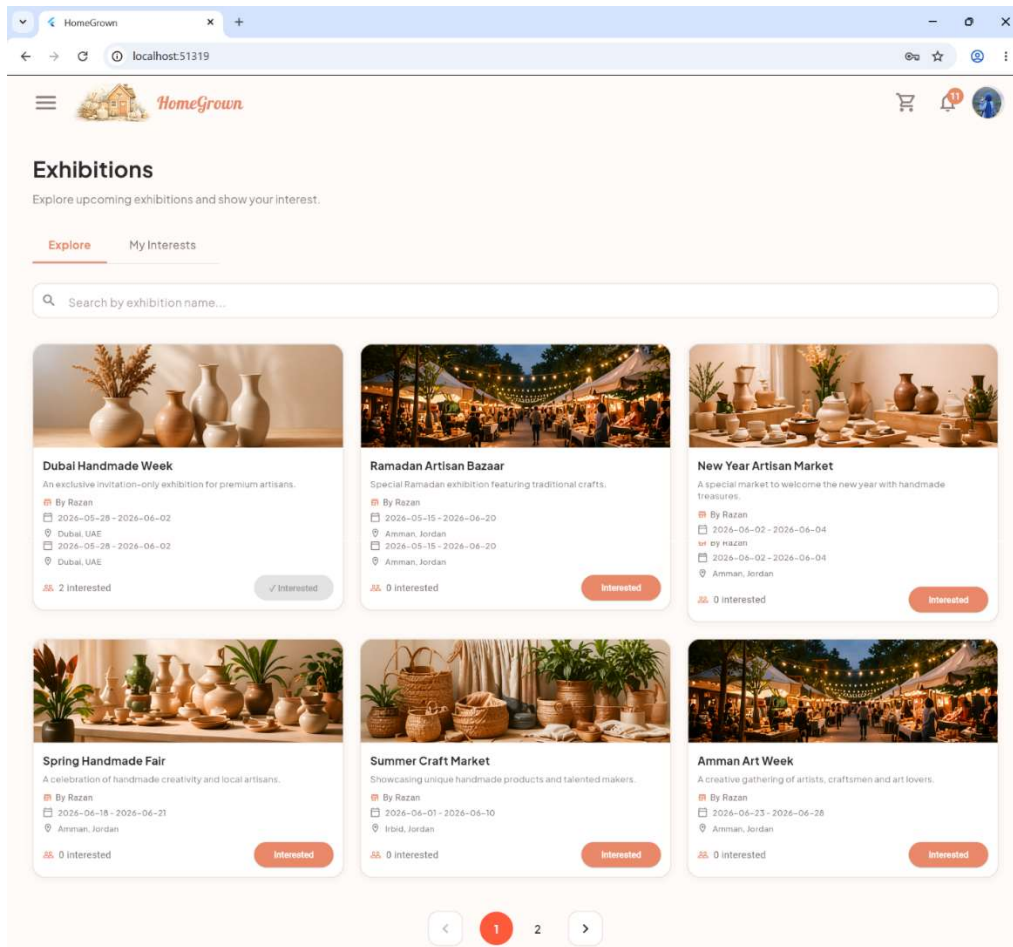


Figure 56 : Explore Exhibition

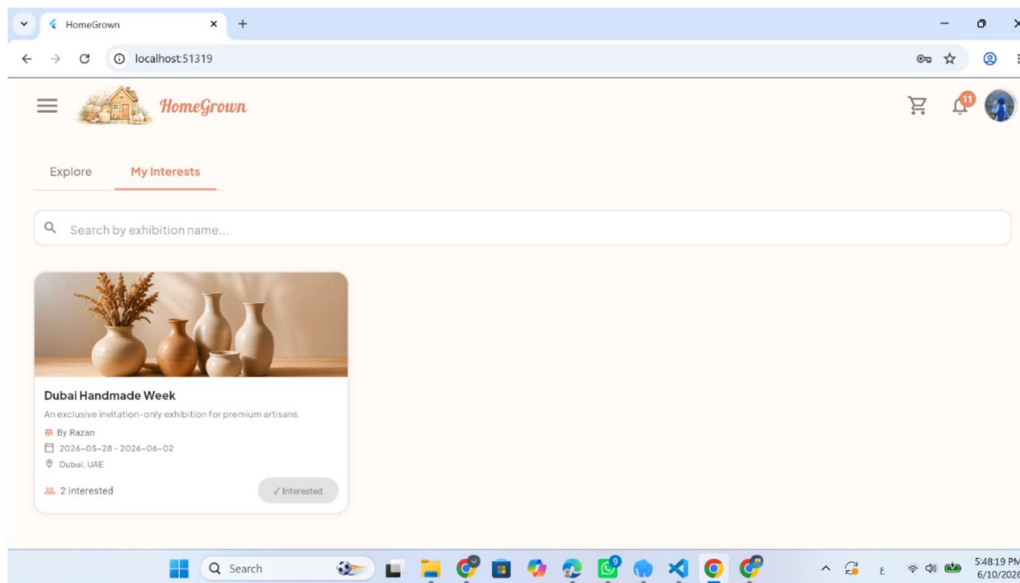


Figure 57 : User Interested Exhibitions Interface

3.3.5.8 Profile page

allows users to view and manage their personal information, including their profile picture, name, contact details, location, and bio. It also displays basic account statistics and the user's published posts, with options to edit or delete them. Through the Edit Profile screen, users can update their personal information and change their profile picture, while the Edit Post feature enables them to modify the content or category of previously published posts.

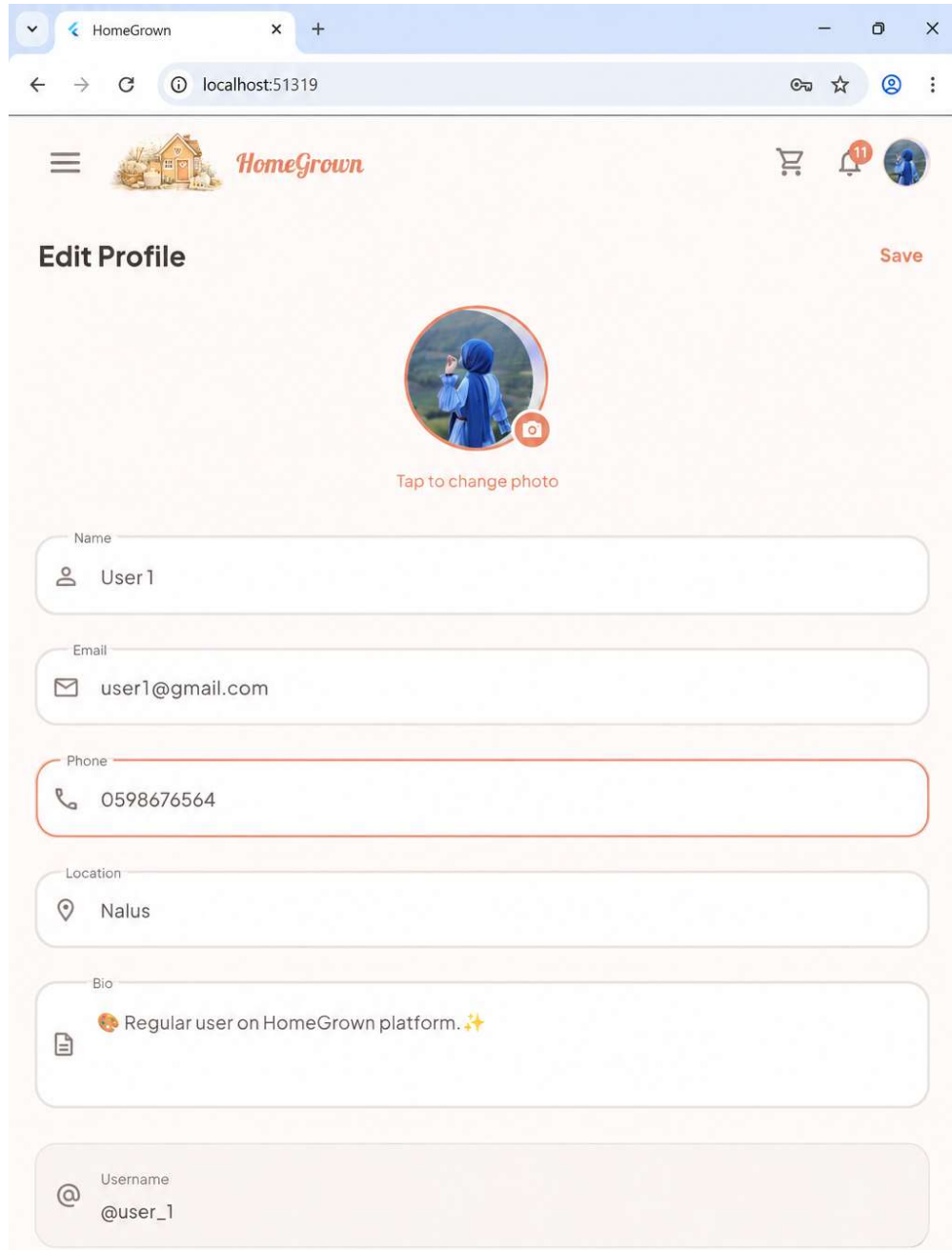


Figure 58 : User Profile Editing Interface

The screenshot shows a web browser window with the URL localhost:51319. The website header features the HomeGrown logo and navigation icons. The user profile for 'User 1' (@user_1) is displayed, including a bio 'Ceramics artist \ Creating unique handmade pottery ✨' and location 'Nalus'. Statistics show 4 posts, 5 followers, and 5 following. The 'My Posts' section contains four posts, each with a 'Wedding Vibes' tag, a description, engagement metrics (likes and comments), and a timestamp of '4 weeks ago'.

Post Content	Likes	Comments	Timestamp
I just received the handmade ceramic vase I ordered from @RaghadArt and it's even more beautiful than the photos! Highly recommend it. 💕💡	1	0	4 weeks ago
Looking for a thoughtful wedding gift that's unique and handmade. Any artisan recommendations? 🎁✨	5	0	4 weeks ago
I recently bought these gorgeous resin earrings from @ZinaStudio and I'm absolutely in love with them! 😍	3	0	4 weeks ago
(Post content partially obscured)	(Likes partially obscured)	(Comments partially obscured)	(Timestamp partially obscured)

Figure 59 : Customer Profile

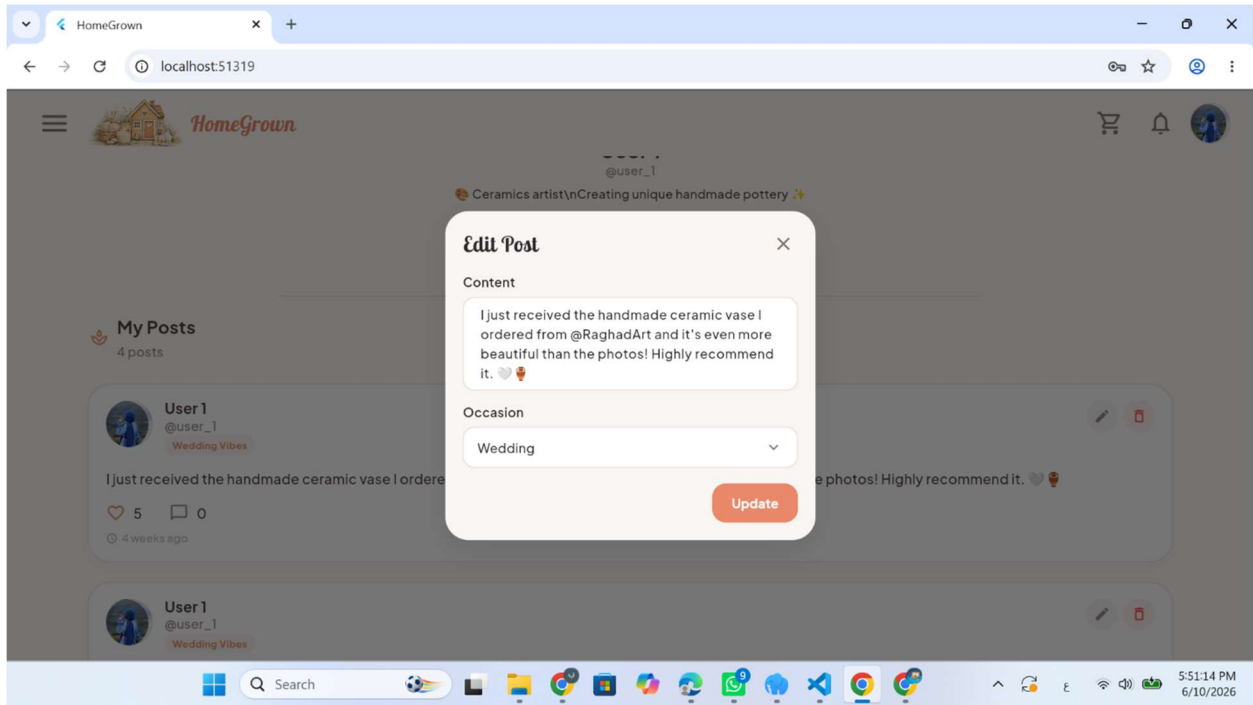


Figure 60 : Edit Community Post Interface

3.3.5.9 The profile menu

provides quick access to the user's profile, profile editing, and logout functionality. When the user logs out, the authentication token is securely removed from local storage, effectively ending the current session and preventing unauthorized access until the user signs in again.

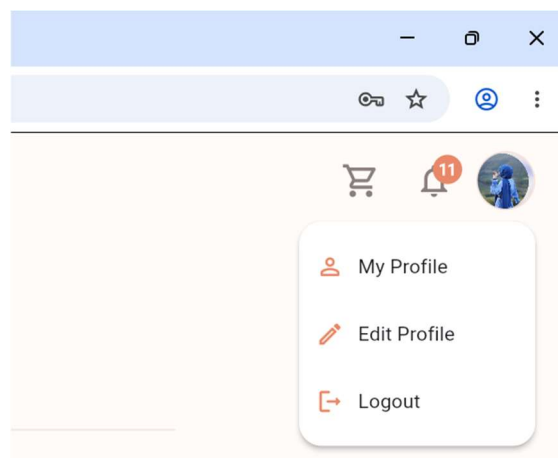


Figure 61 : User Account Menu and Logout Interface

3.3.5.10 Recommendation system

is based on a hierarchical scoring algorithm that first calculates a score for each artisan and then displays their products accordingly. Each artisan's score is determined using multiple factors, including the total number of likes, saves, comments, cart additions, followers, average ratings, recently added products, and category relevance. In addition, artisans with whom the user has previously interacted receive an extra score boost, while newly joined artisans receive a small bonus to improve their visibility and provide fair exposure. After calculating and sorting artisan scores, the system displays products in a hierarchical manner by prioritizing higher-scoring artisans and then presenting their products in sequence. Since the algorithm relies on each user's personal interactions and interests, the displayed products and their ordering differ from one user to another, resulting in a personalized feed tailored to each user's preferences and engagement history rather than a fixed ordering shared by all users.

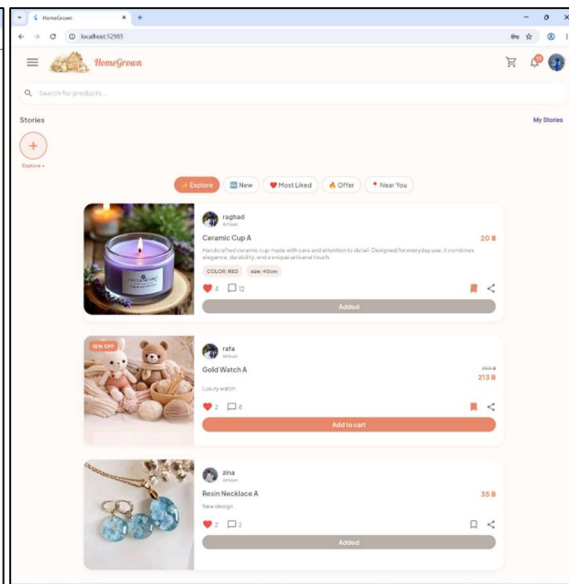
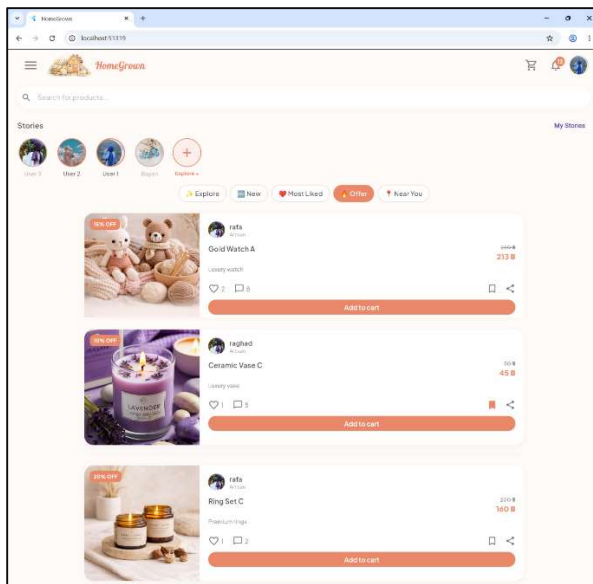


Figure 62 : Personalized Product Feed for Customer 2

Figure 63 : Personalized Product Feed for Customer 1

3.3.6 Admin

3.3.6.1 Admin Dashboard Overview

The Admin Dashboard provides a comprehensive overview of the platform by displaying key statistics, including the total number of customers, artisans, exhibition owners, newly registered users, products, orders, and exhibitions. This enables administrators to quickly monitor the overall status of the platform.

The Growth Analytics section presents visual charts illustrating the monthly growth of users, products, orders, and exhibitions. These analytics help administrators track platform performance and identify trends over time.

This section displays ranking lists for the platform's top-performing entities, including top products, top artisans, and top exhibitions, based on sales and user engagement metrics. It provides valuable insights into the most successful content on the platform.

The Monthly Platform Report feature allows administrators to generate and download a PDF report containing a summary of the platform's monthly performance, including key statistics, rankings, and important insights, supporting data-driven monitoring and decision-making.

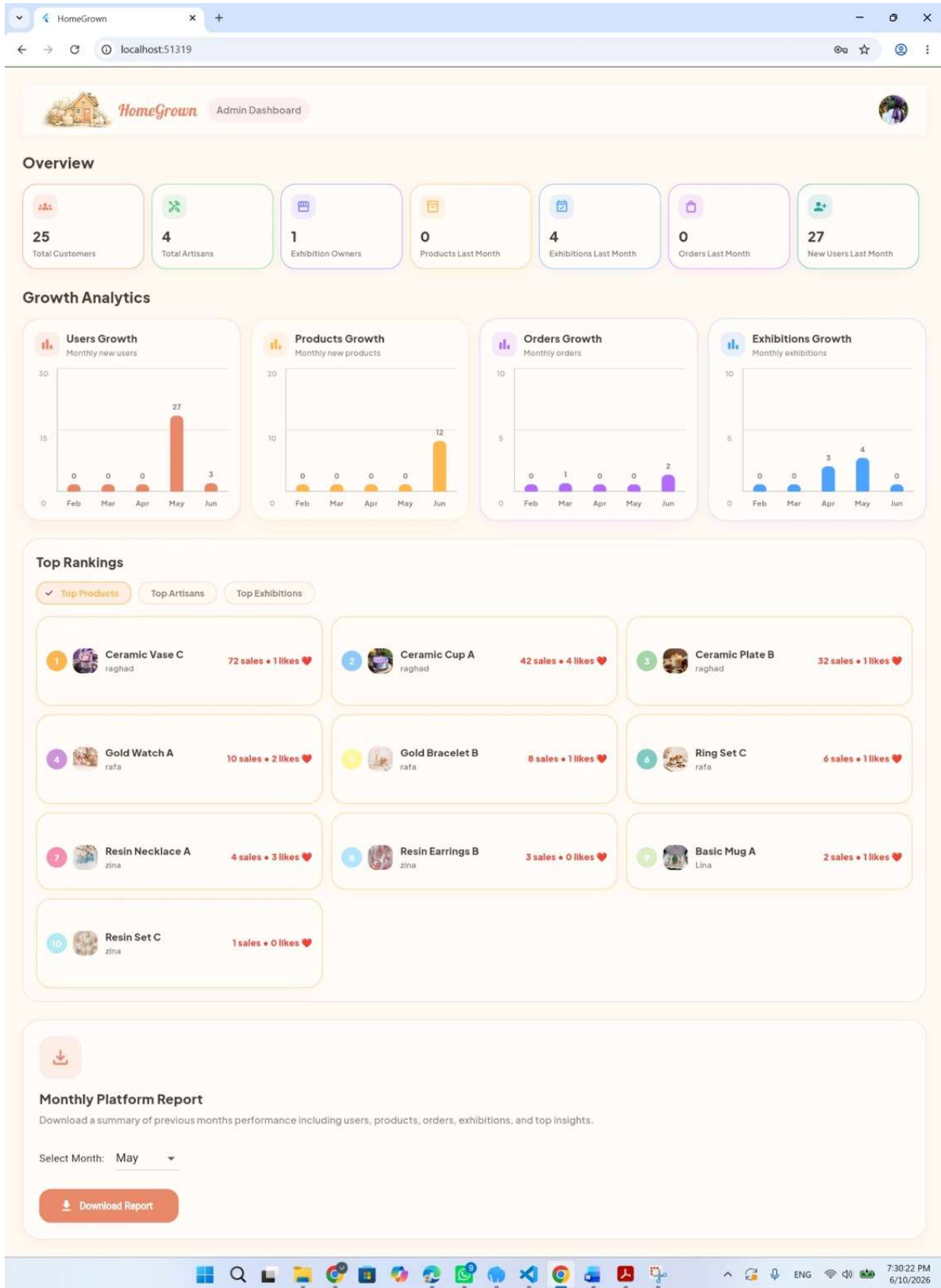


Figure 64 : Admin Page

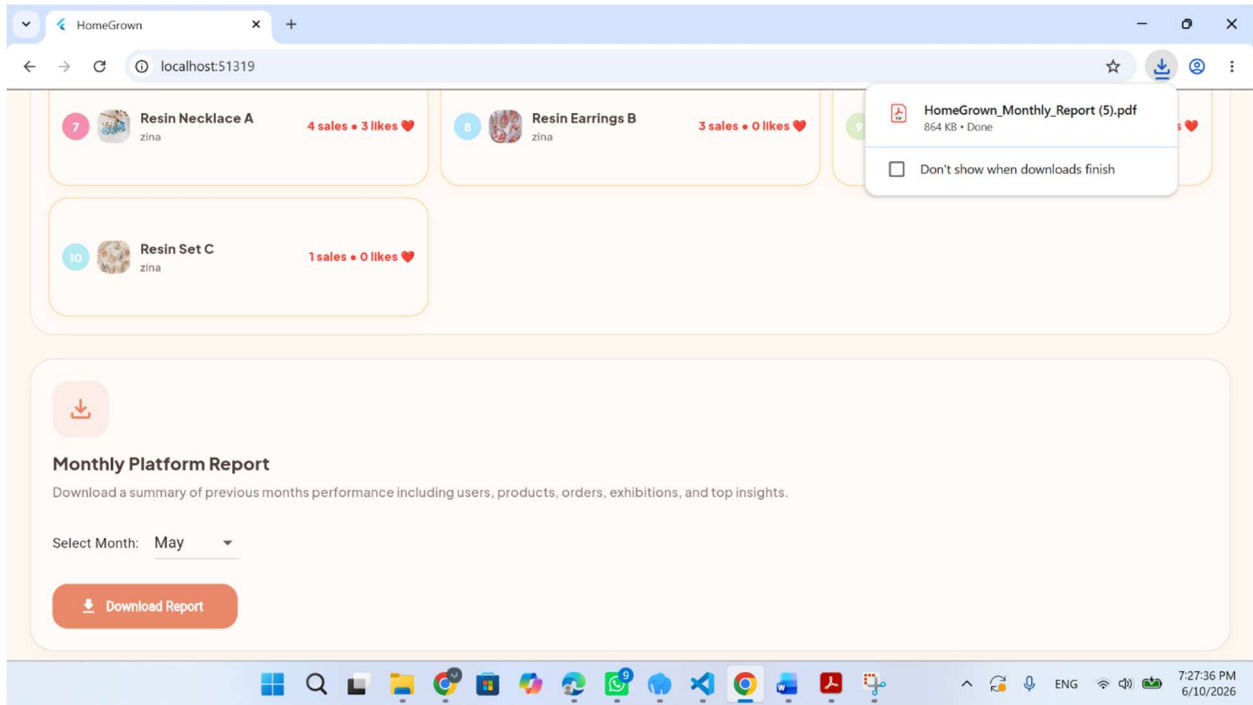


Figure 65 : Download Report

HomeGrown Monthly Report

Date: May 2026

Platform Summary

Total Customers: 25

Total Artisans: 4

Total Exhibition Owners: 1

Products Last Month: 0

Exhibitions Last Month: 4

Orders Last Month: 0

New Users Last Month: 27

Monthly Growth

Month	Jan	Feb	Mar	Apr	May
Users	0	0	0	0	27
Products	0	0	0	0	0
Orders	0	0	1	0	0
Exhibitions	0	0	0	3	4

Figure 66 : Report Page 1

Top Rankings

Top Products

#	Name	Artisan	Sales	Likes
---	------	---------	-------	-------

Top Artisans

#	Name	Followers	Rating	Products	Sales
1	raghad	2	3.5	3	146
2	rafa	2	4.8	3	24
3	zina	0	4	3	8
4	Lina	0	2	3	4

Top Exhibitions

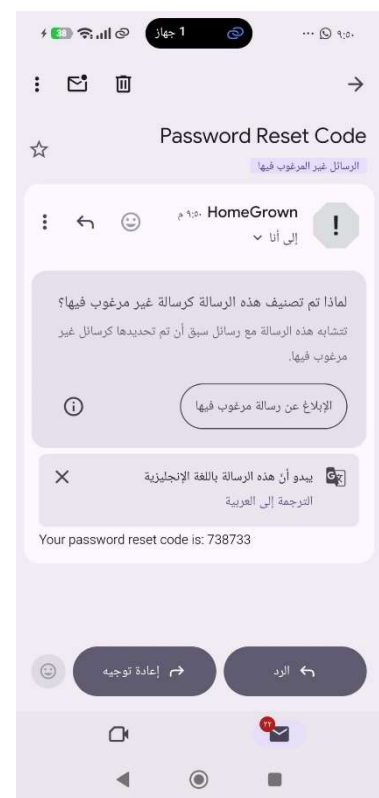
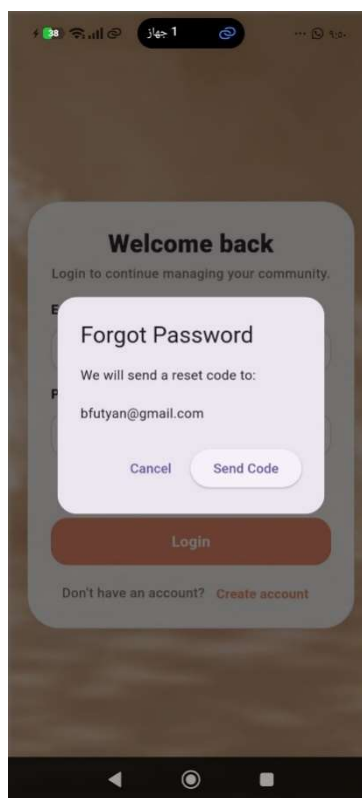
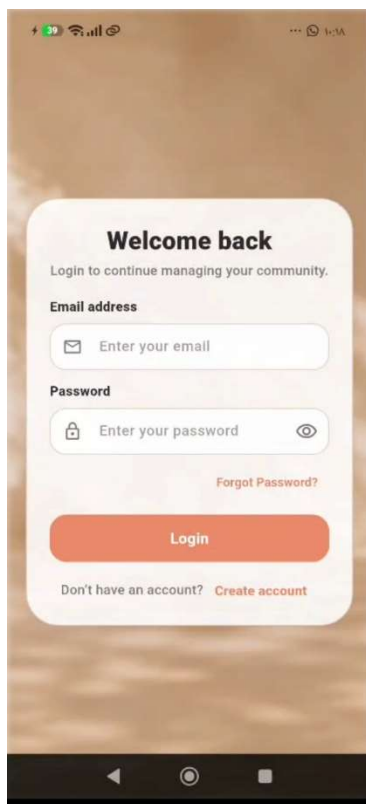
#	Owner	Title	Interested Users
1	Razan	Dubai Handmade Week	2
2	Razan	Spring Handmade Fair	0
3	Razan	New Year Artisan Market	0
4	Razan	Ramadan Artisan Bazaar	0

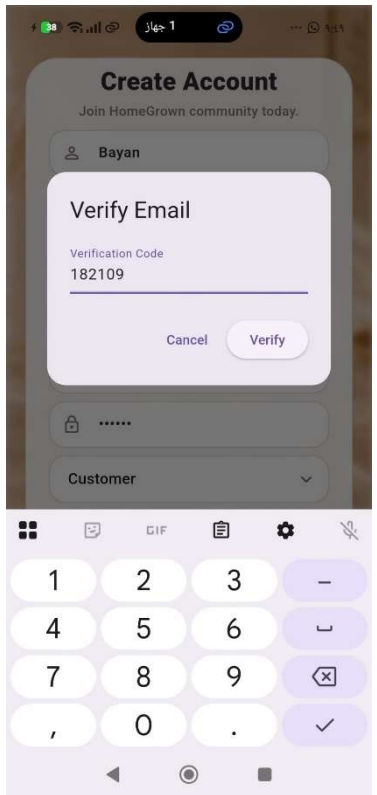
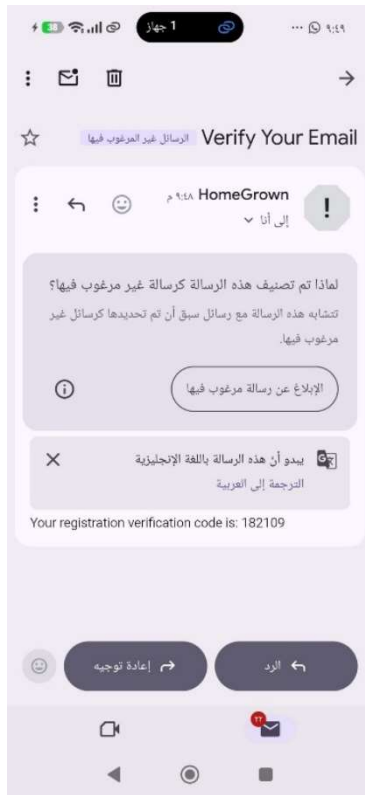
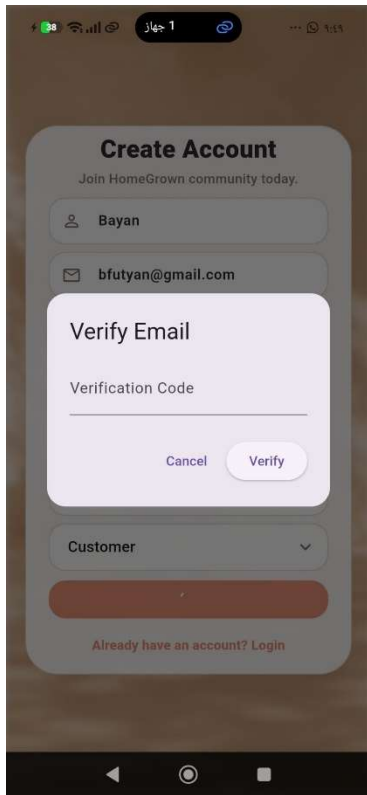
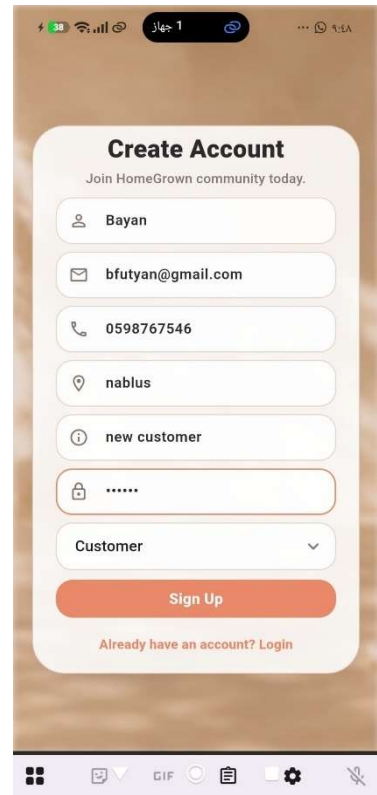
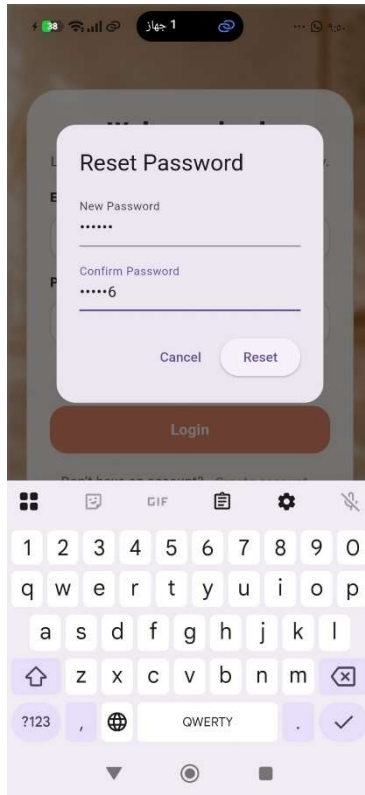
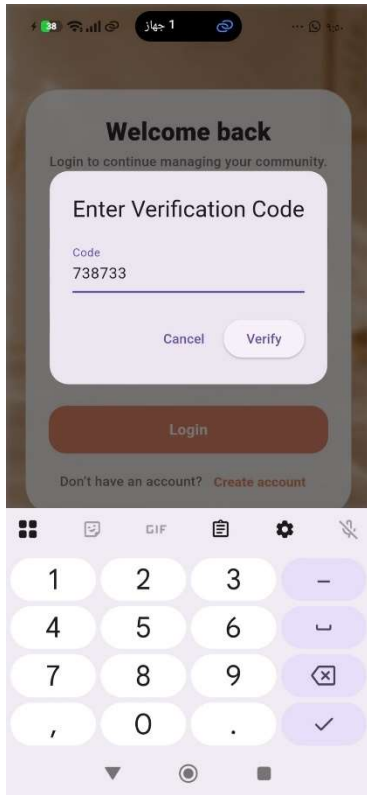
Generated by HomeGrown Admin Dashboard

Figure 67 : Report Page 2

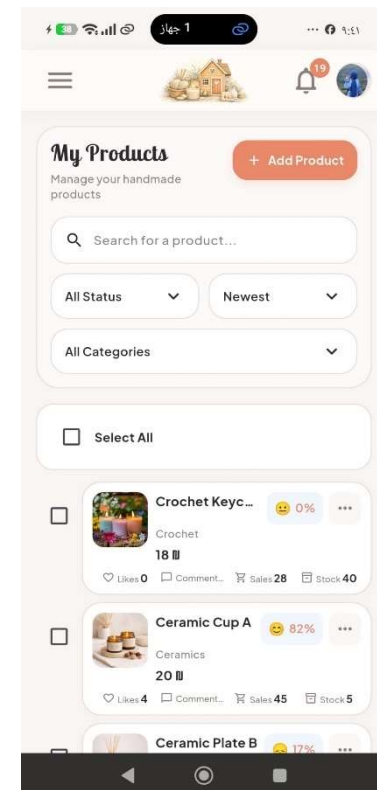
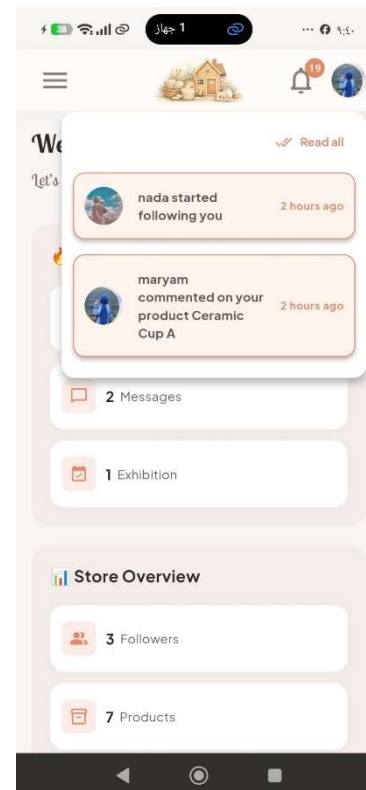
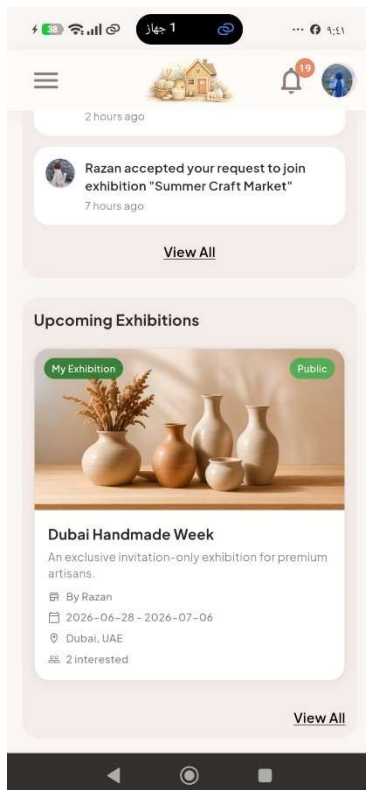
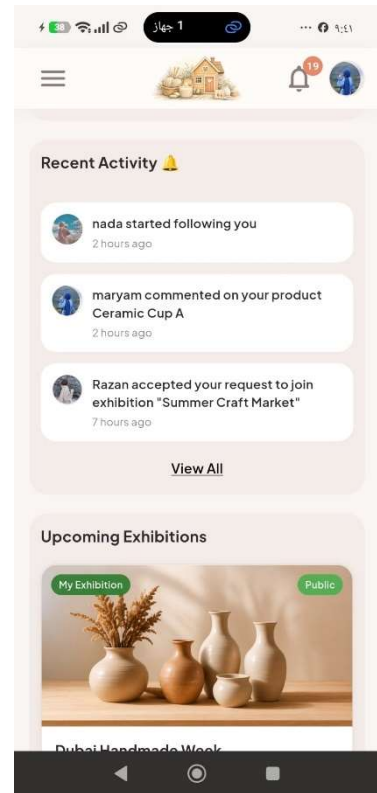
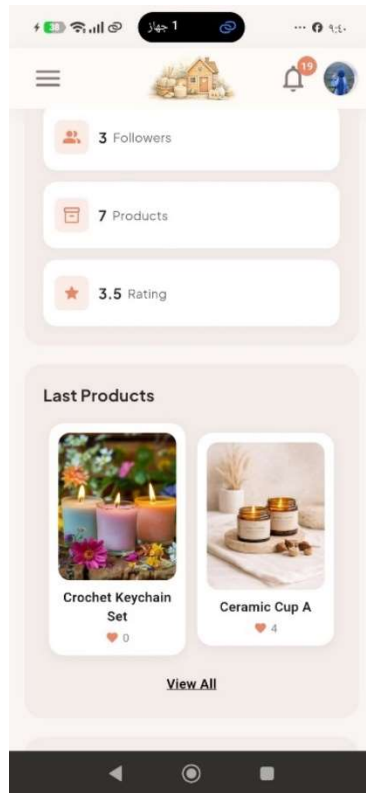
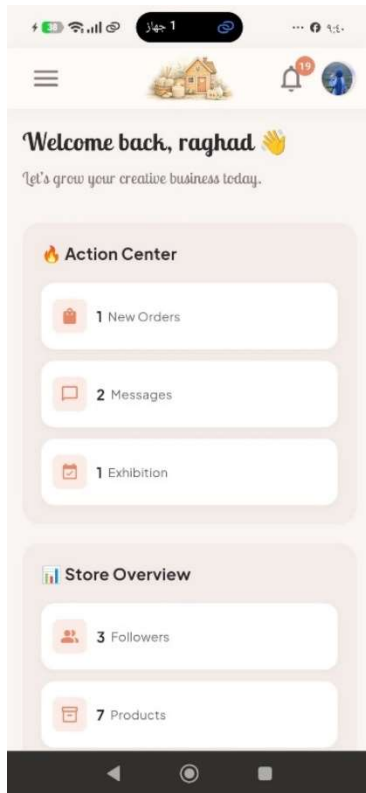
3.4 Mobile Application Interface

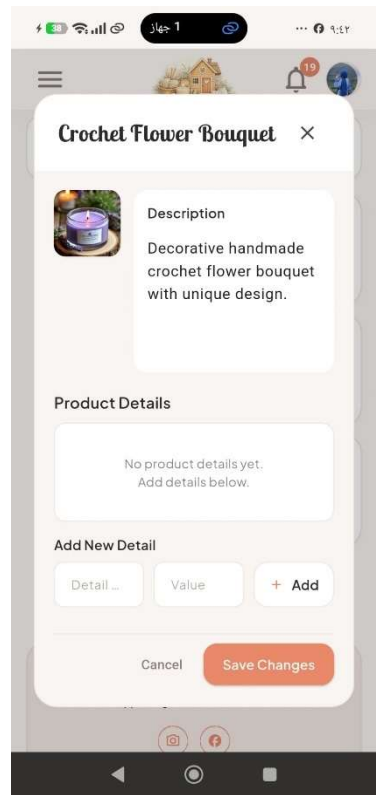
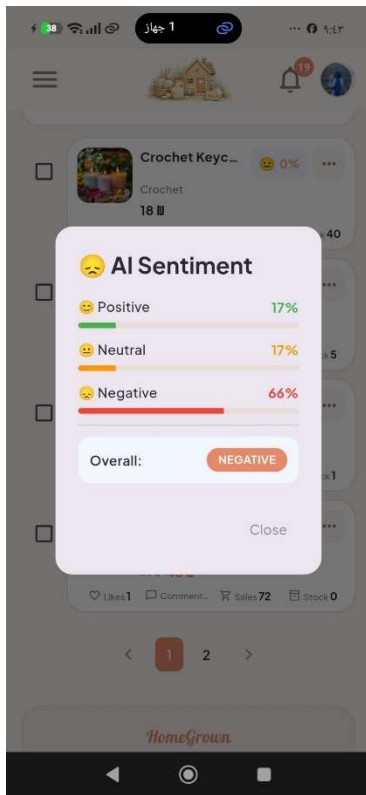
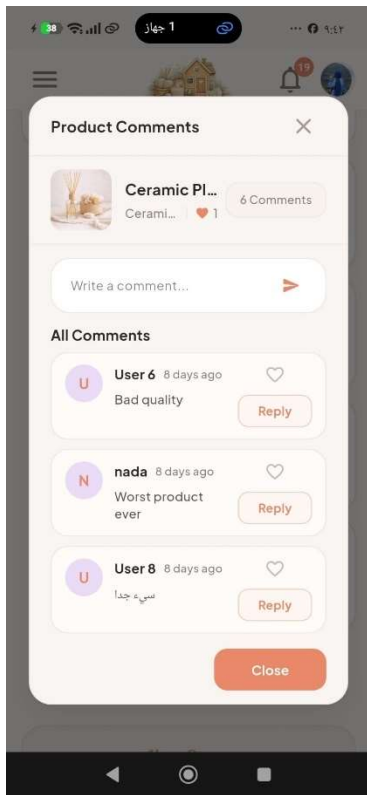
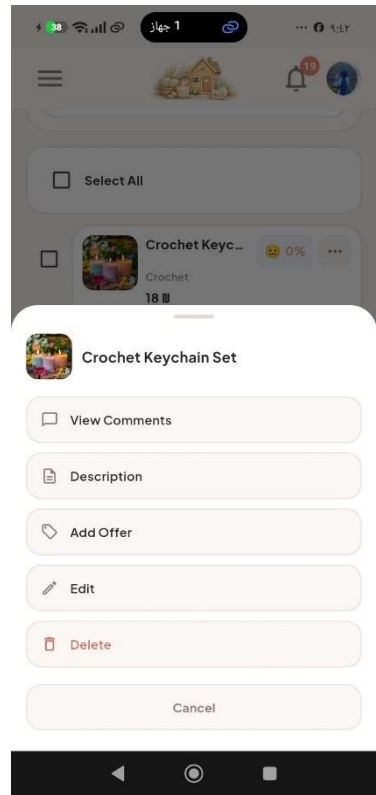
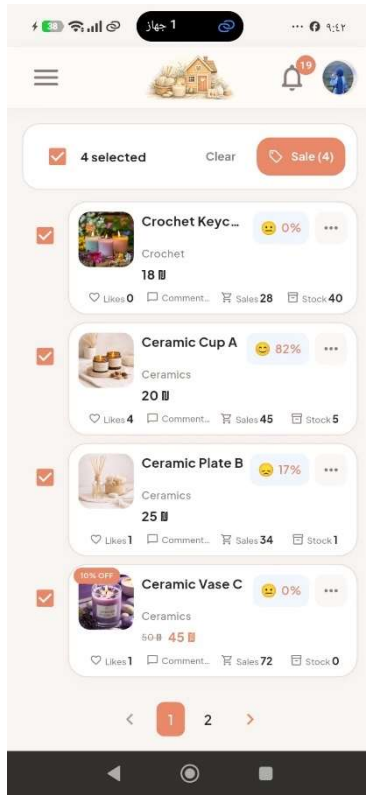
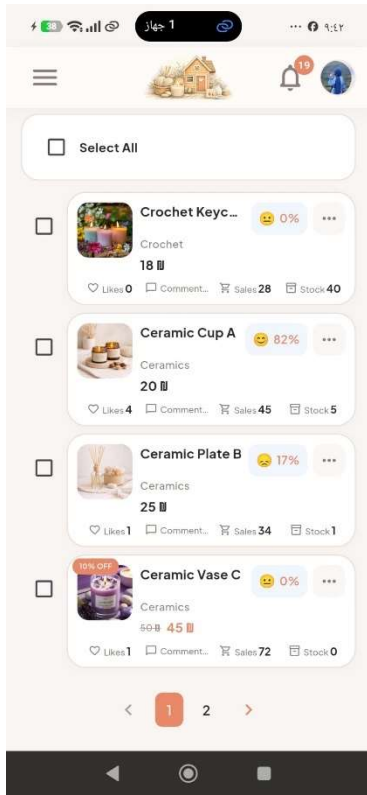
3.4.1 Responsive Authentication Module

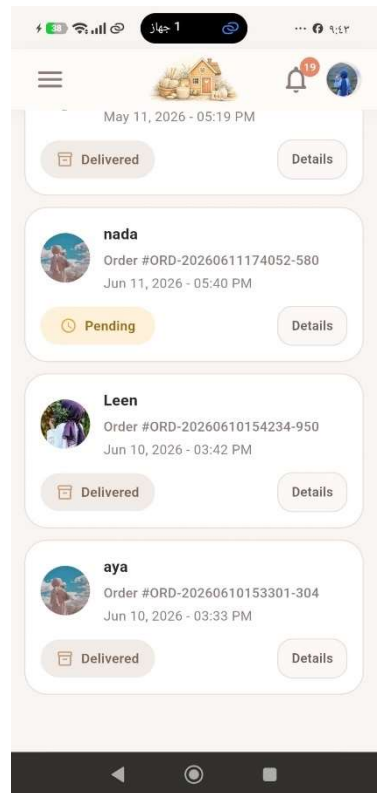
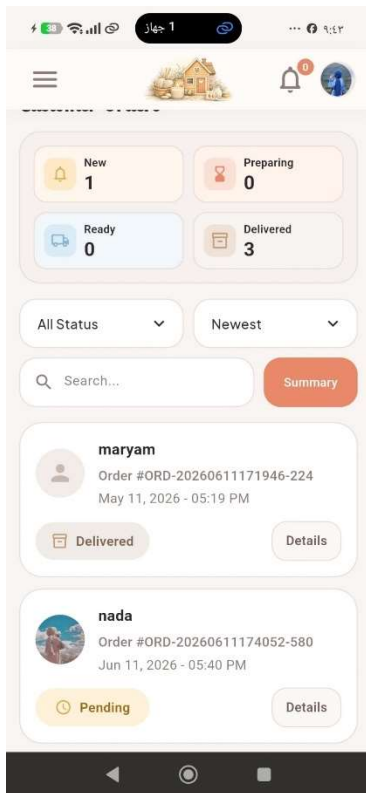
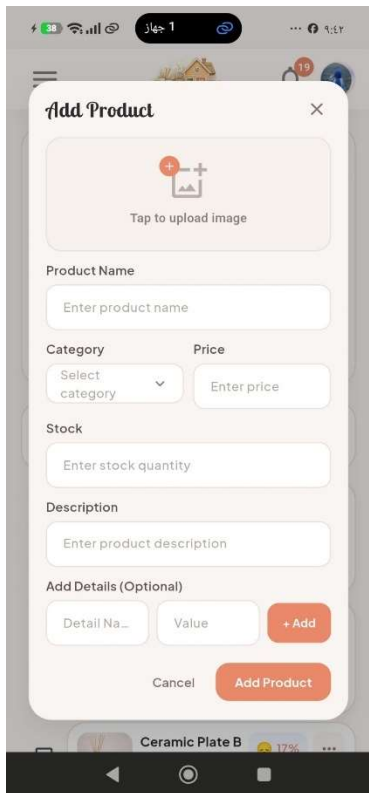
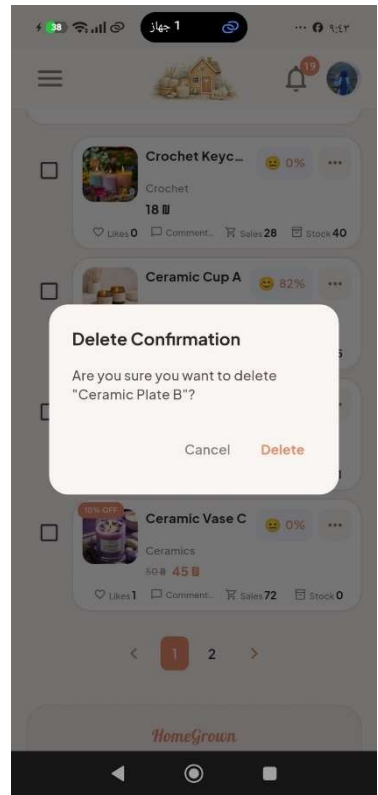
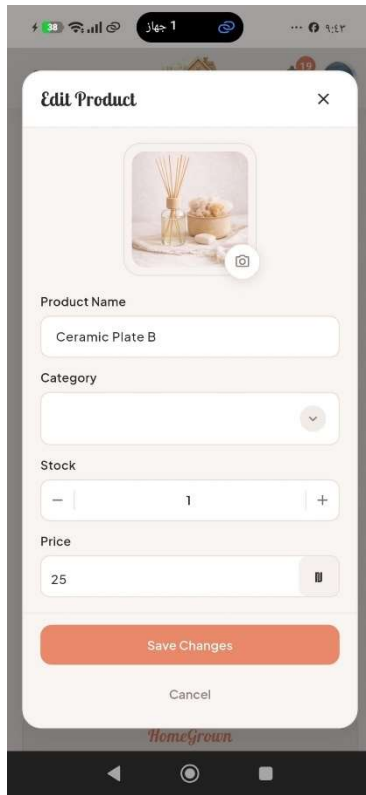
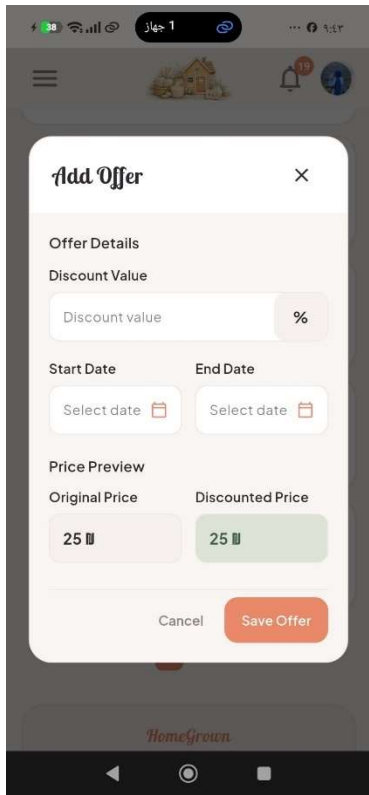


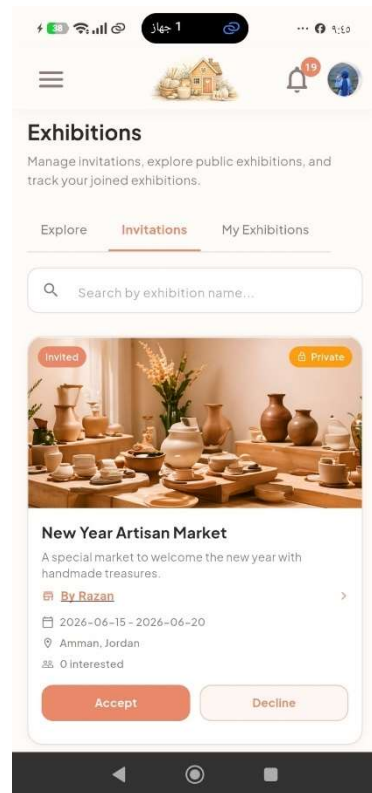
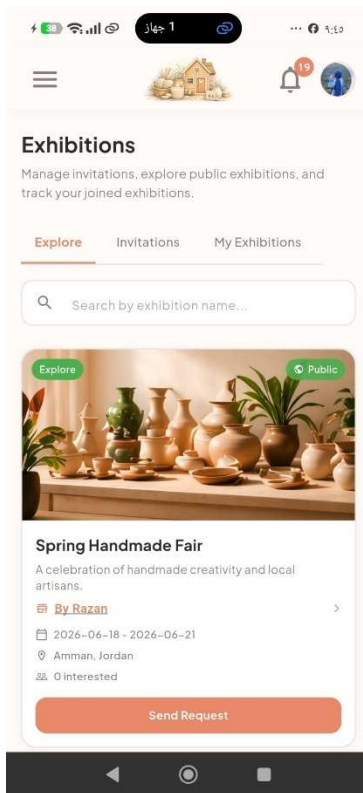
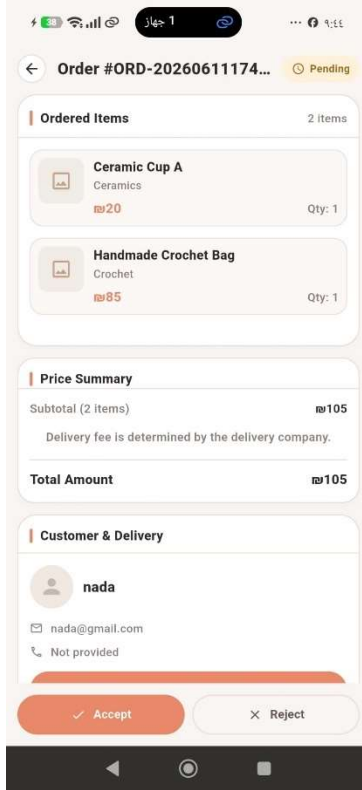
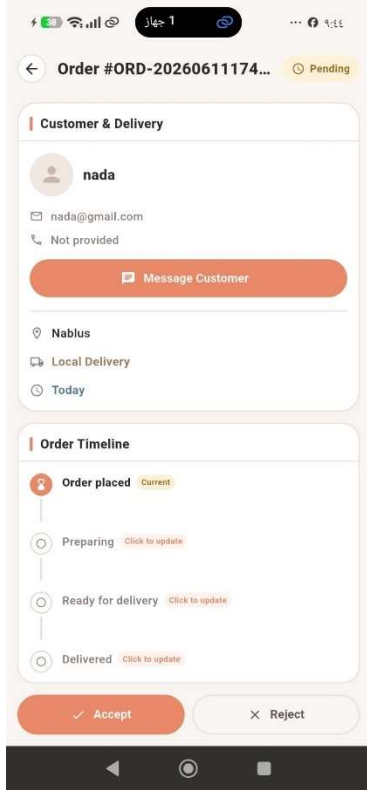


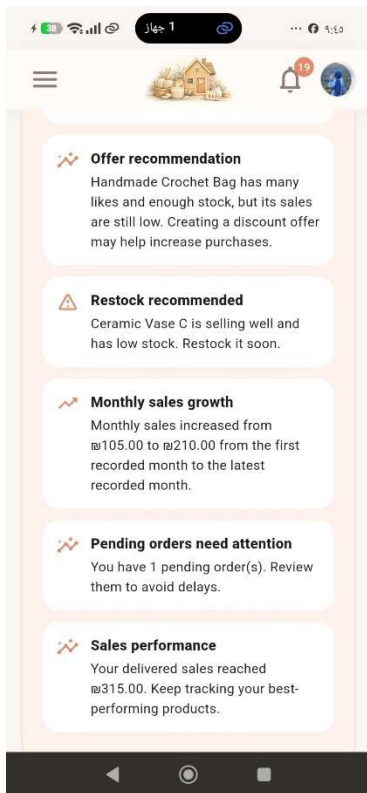
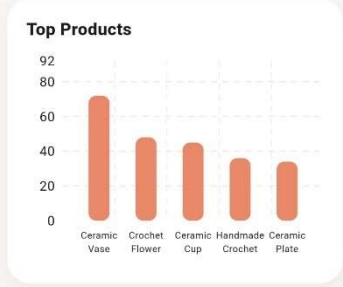
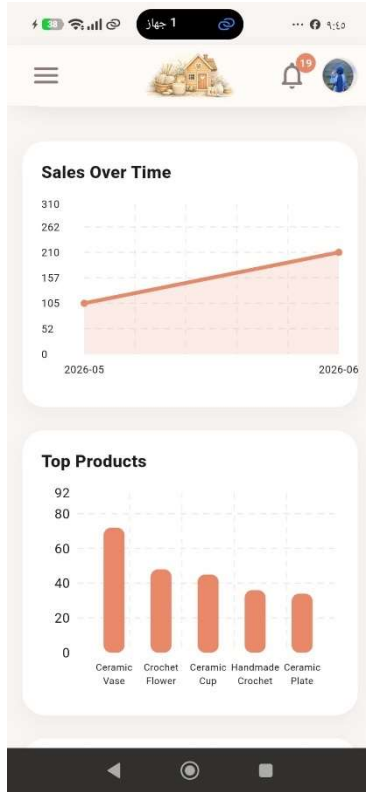
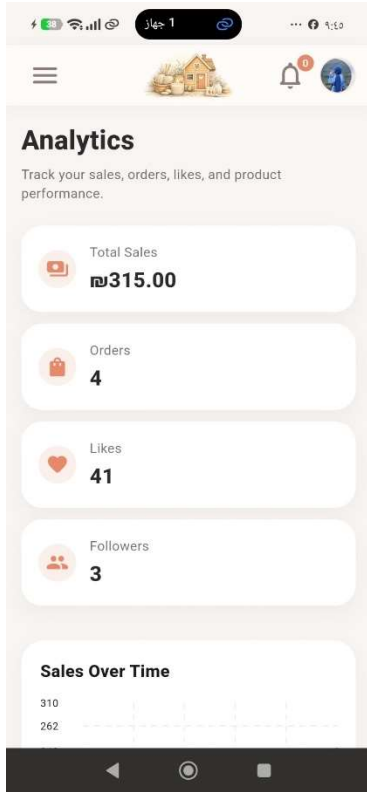
3.4.2 Responsive Artisan Module











raghad
@raghad

Ceramics artist
Creating unique handmade pottery

Nalus

7 Products | 3 Followers | 1 Following

3.5 / 5
2 ratings

Edit Profile

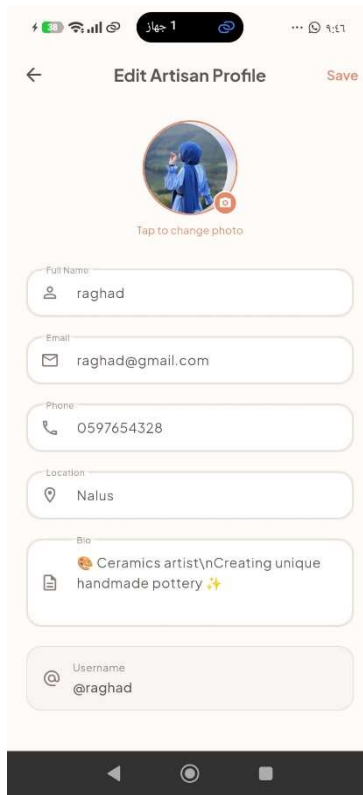
My Products
7 products

raghad
Artisan

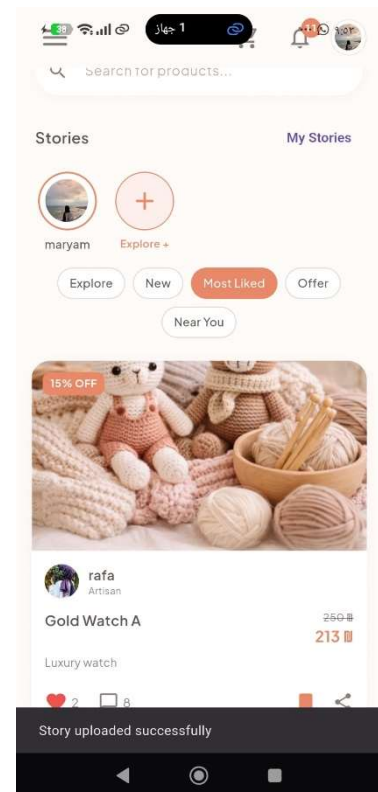
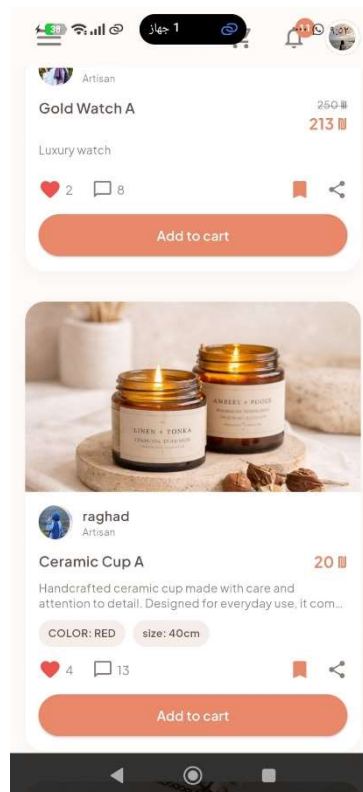
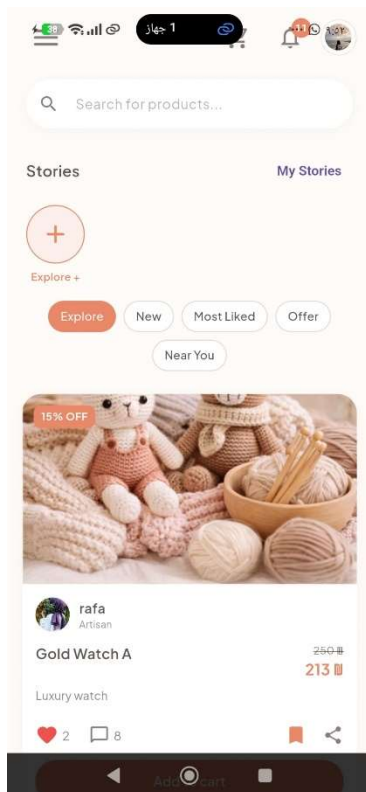
Ceramic Plate B 25 sales
Art plate
1 likes | 6 comments | View

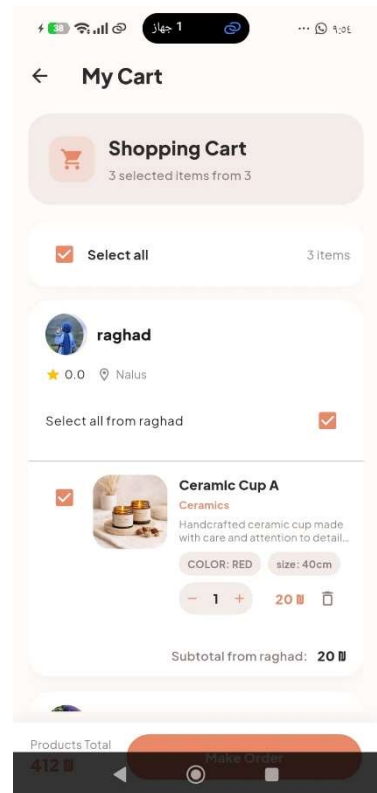
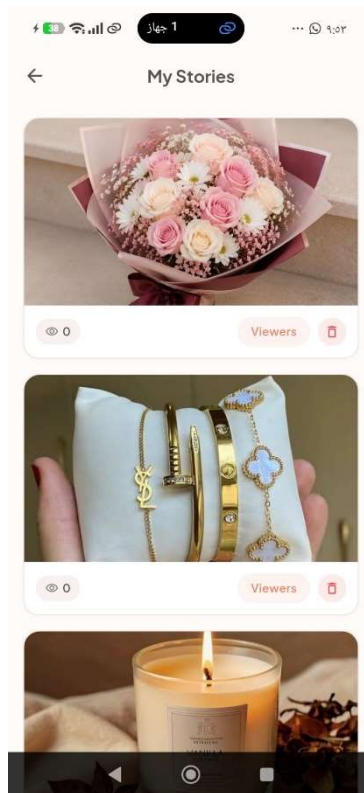
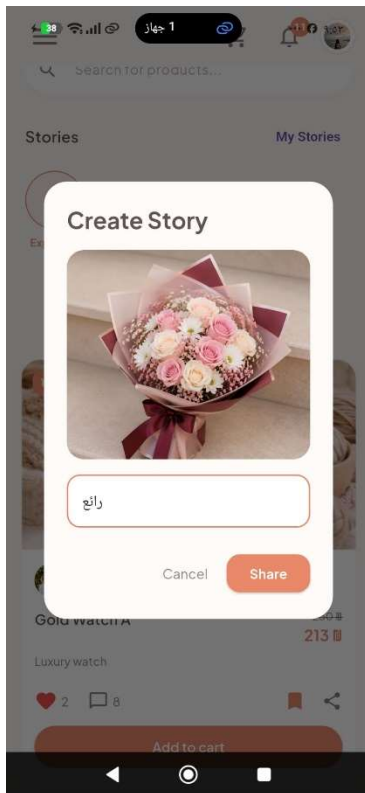
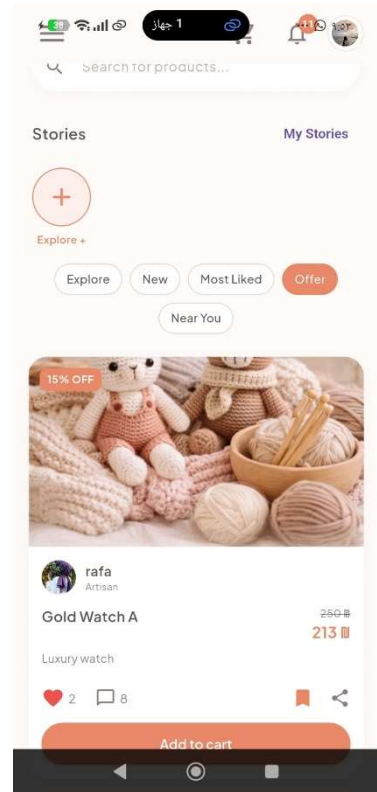
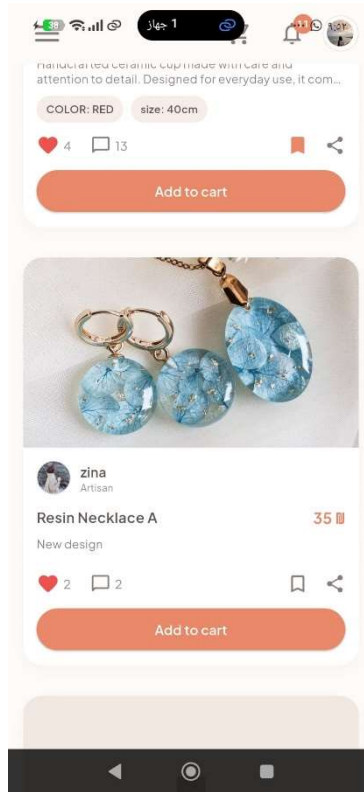
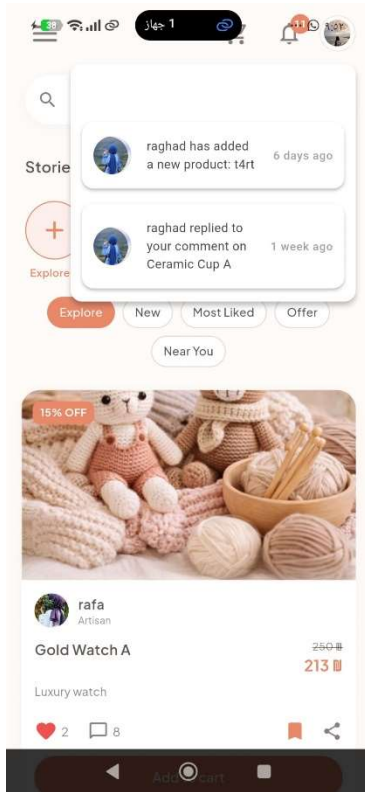
10% OFF

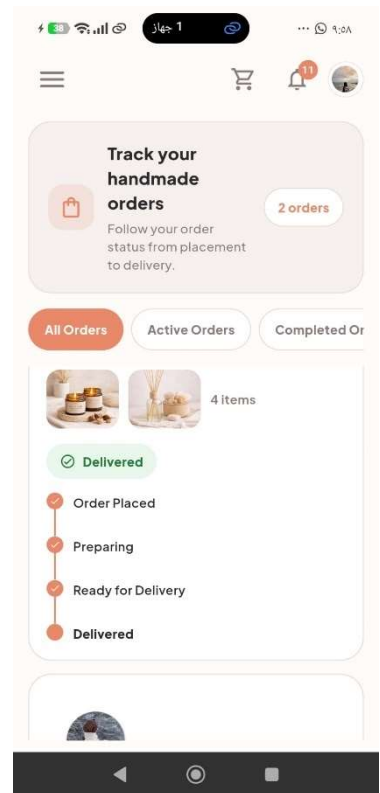
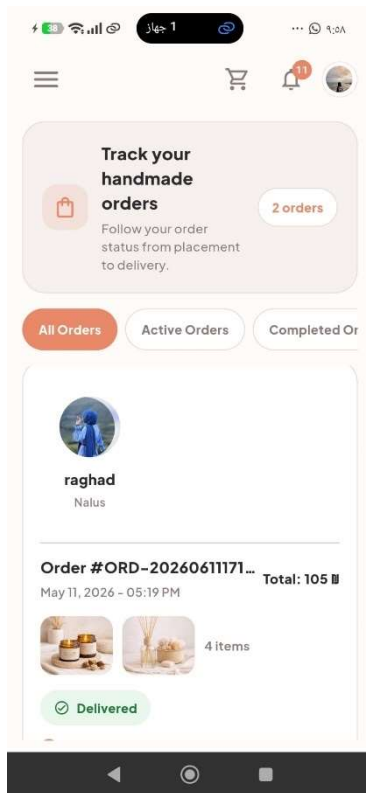
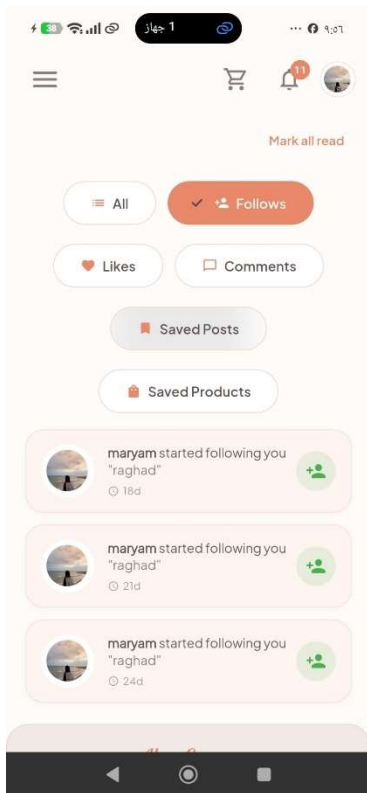
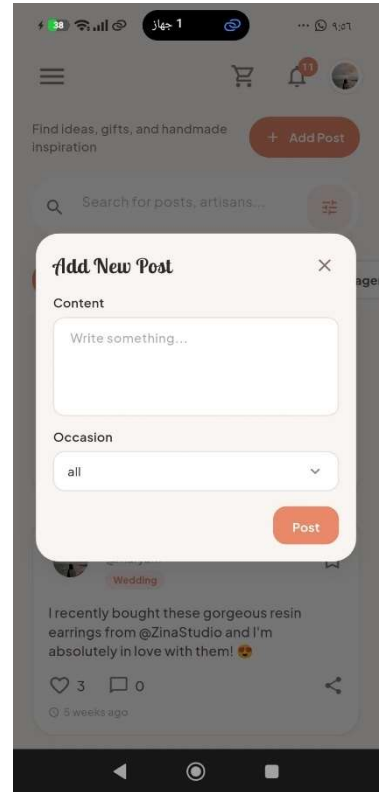
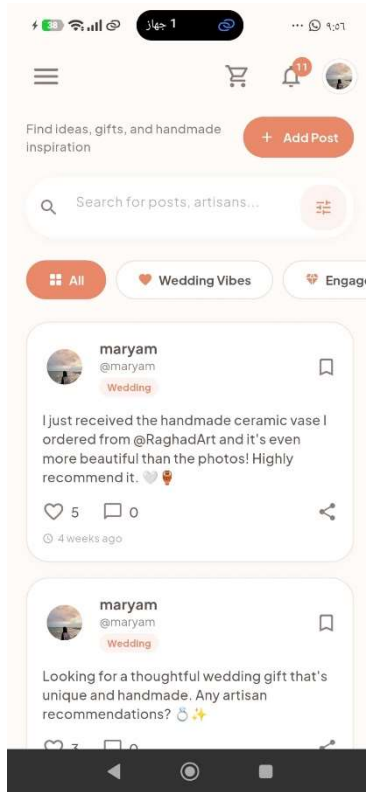
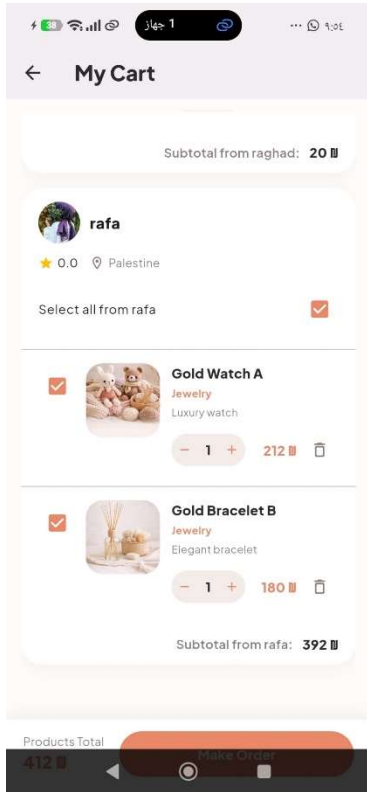
Ceramic Vase C 45 sales
66 likes

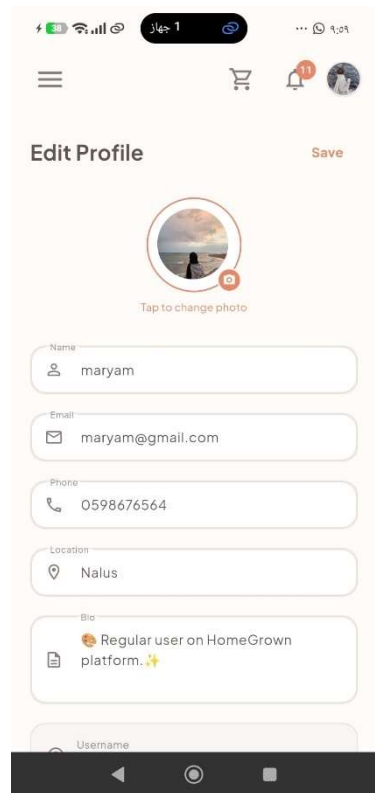
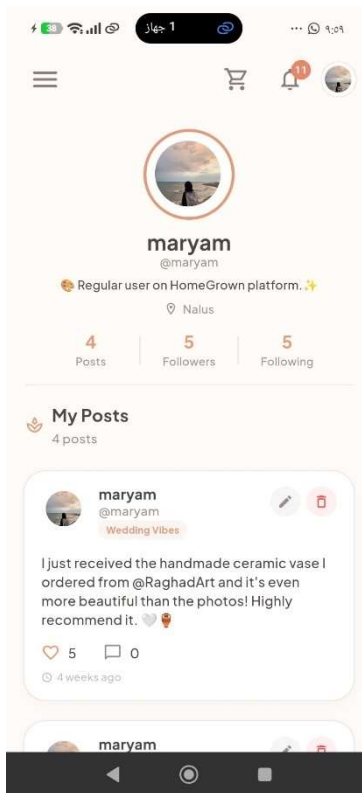
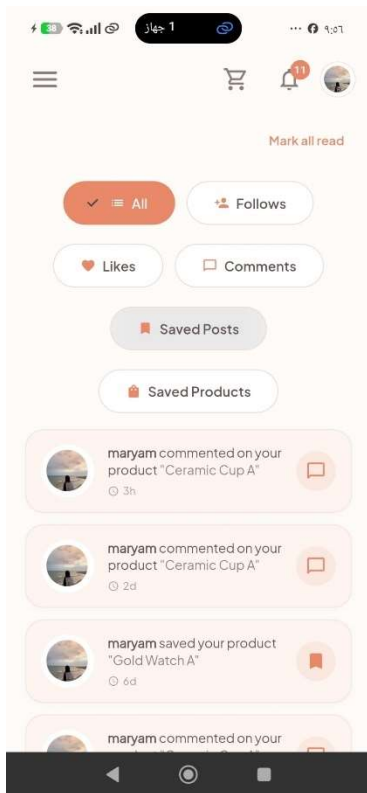
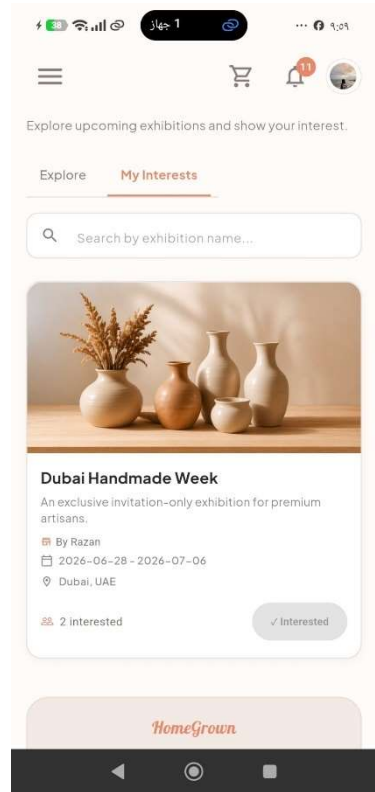
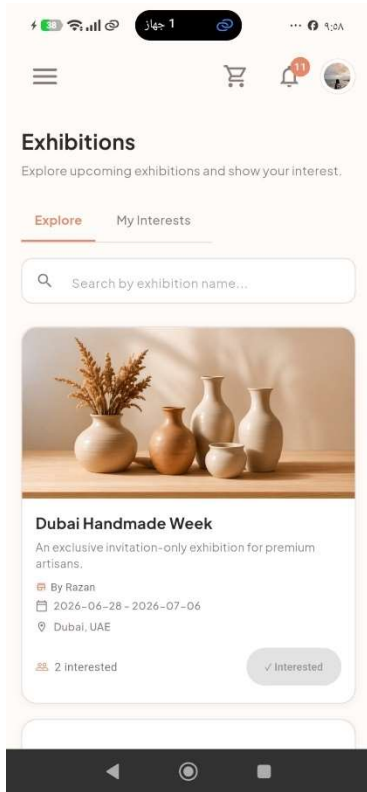


3.4.3 Responsive Customer Module

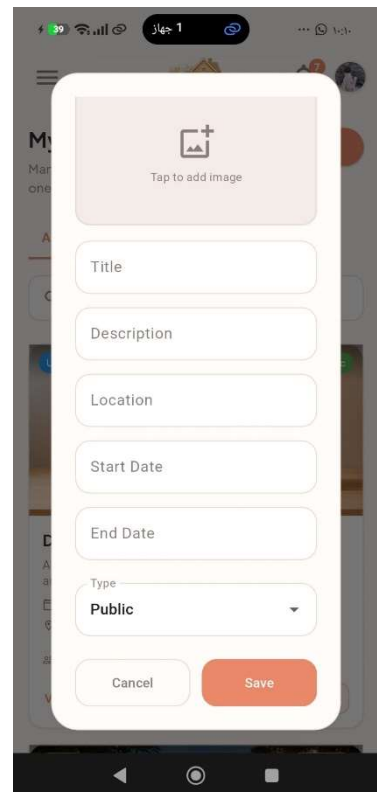
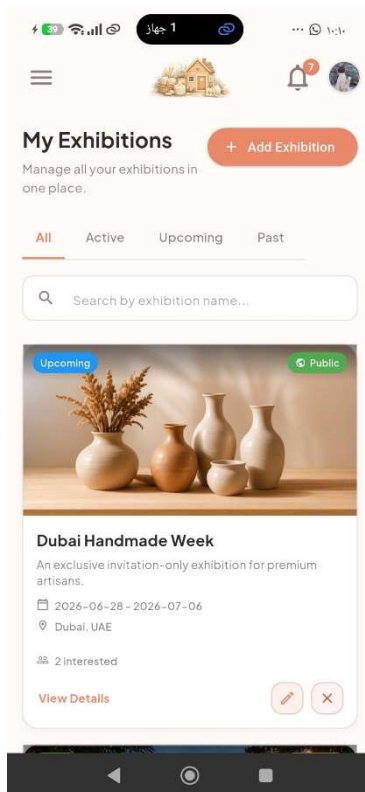
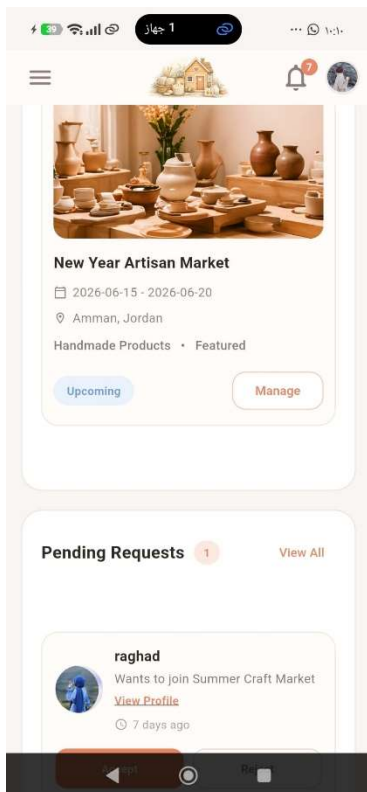
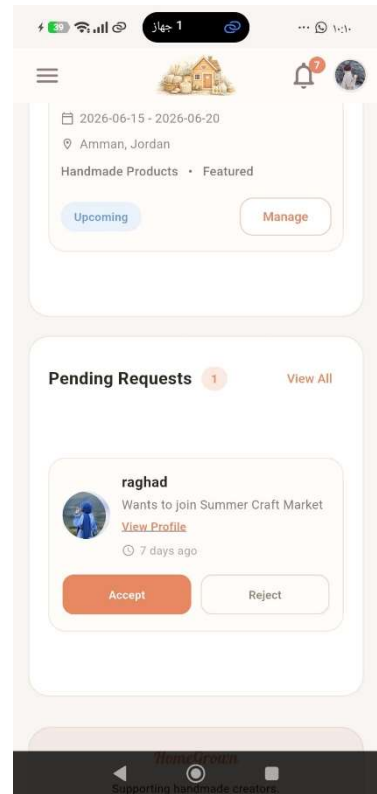
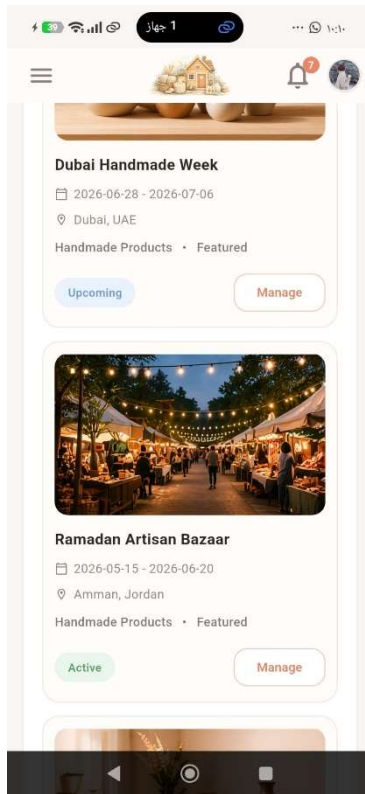
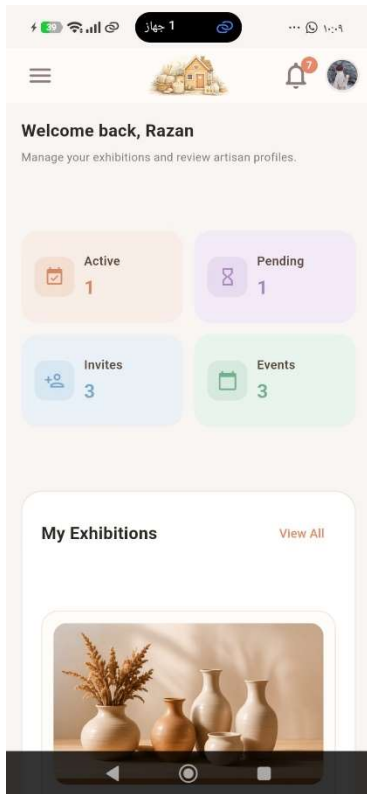


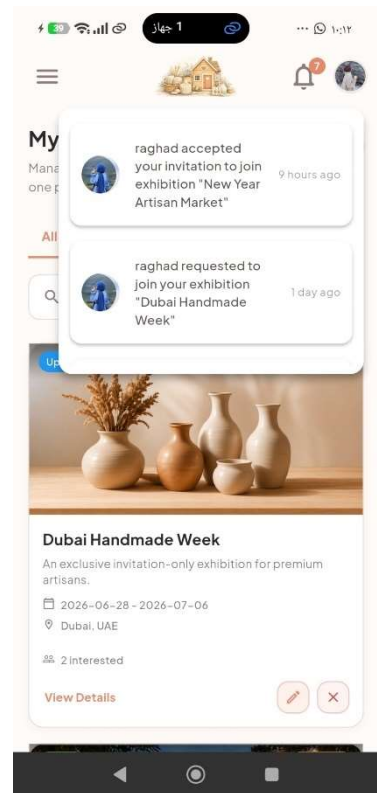
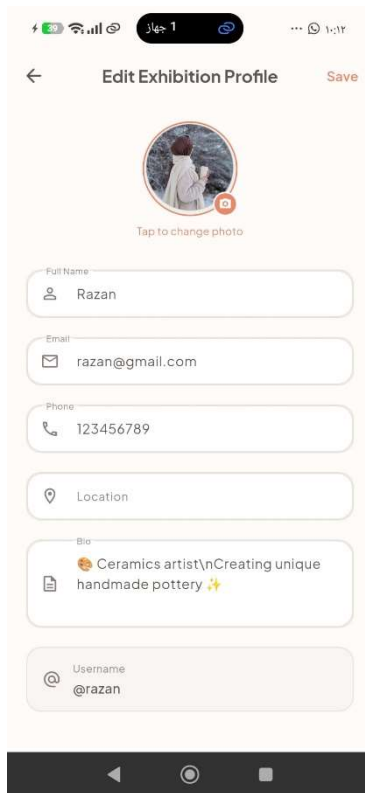
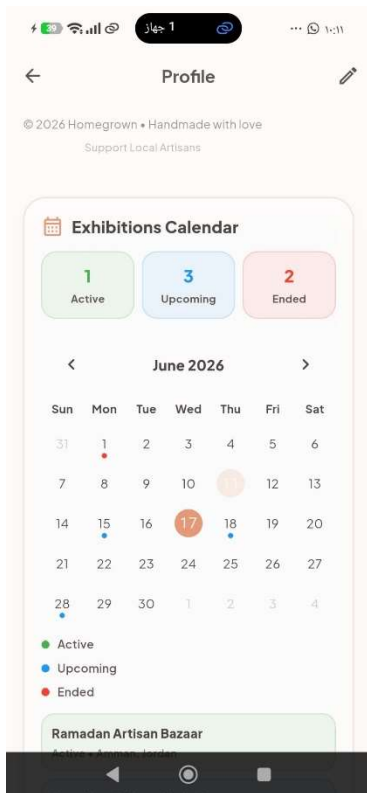
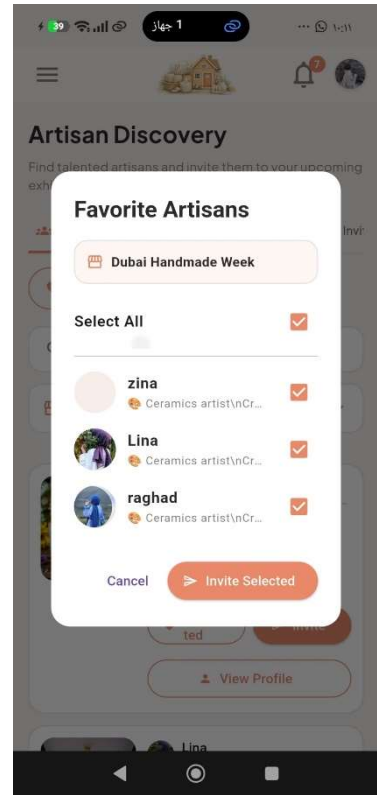
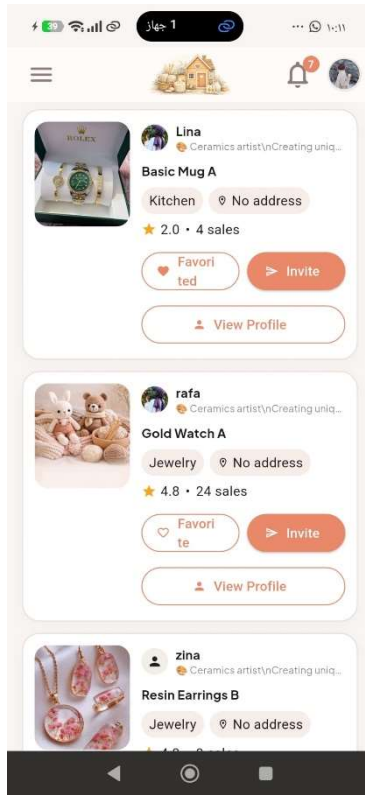
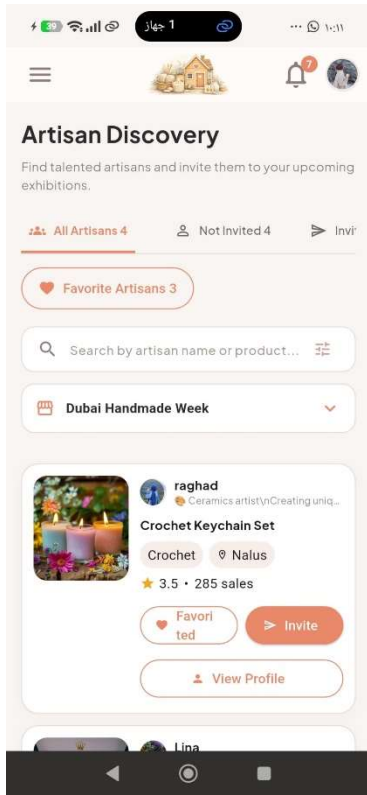




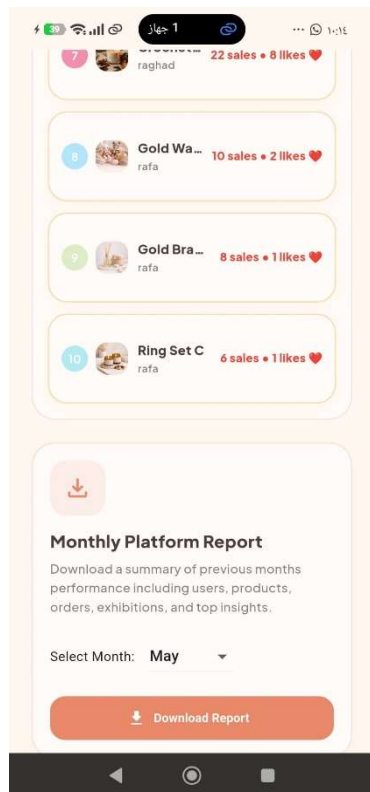
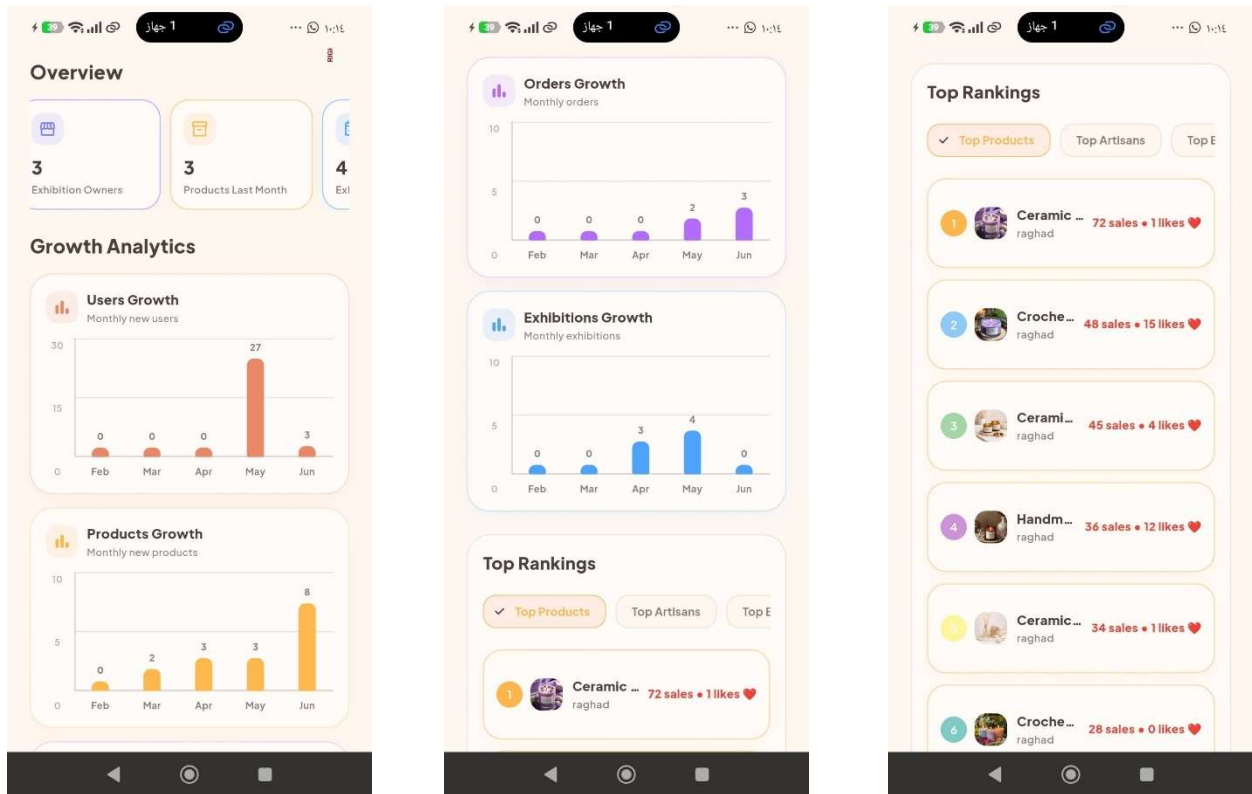


3.4.4 Responsive Exhibition Owner Module





3.4.5 Responsive Administration Module



HomeGrown Monthly Report

Date: May 2026

Platform Summary

Total Customers:	23
Total Artisans:	4
Total Exhibition Owners:	3
Products Last Month:	3
Exhibitions Last Month:	4
Orders Last Month:	2
New Users Last Month:	27

Monthly Growth

Month	Jan	Feb	Mar	Apr	May
Users	0	0	0	0	27
Products	0	0	2	3	3
Orders	0	0	0	0	2
Exhibitions	0	0	0	3	4

Top Rankings

Top Products

#	Name	Artisan	Sales	Likes
1	Gold Bracelet B	rafa	8	1
2	Ring Set C	rafa	6	1
3	Resin Necklace A	zina	5	3

Top Artisans

#	Name	Followers	Rating	Products	Sales
1	raghad	3	3.5	7	285

Chapter 4: Results and Analysis

4.1 Overall System Results

The HomeGrown platform was successfully implemented as an integrated digital marketplace connecting customers, artisans, exhibition owners, and administrators through a unified system. The developed platform provides e-commerce services, exhibition management, social interaction, real-time communication, and AI-powered functionalities within a single responsive environment. The implemented modules were tested and operated successfully, demonstrating stable performance across both web and mobile platforms.

4.2 Recommendation System Results

The personalized recommendation system successfully generated different product feeds for different users based on their individual interactions and preferences. The implemented hierarchical scoring algorithm ranked artisans according to multiple engagement factors, including likes, saves, comments, cart additions, followers, ratings, and category preferences. The generated recommendations reflected each user's interests while also providing additional visibility for newly added products and artisans, resulting in a more balanced and personalized browsing experience.

4.3 Business Insights Results

The Business Insights module successfully analyzed available platform data and generated meaningful recommendations for artisans using a rule-based approach. The generated insights included sales performance analysis, stock-related alerts, customer engagement observations, and business recommendations that assist artisans in making informed decisions regarding product management and promotional activities.

4.4 Analytics Results

The analytics dashboard successfully presented key business indicators through statistical summaries and graphical visualizations. Monthly sales trends, order distributions, product performance, customer engagement, and follower statistics were effectively displayed, providing artisans with a comprehensive overview of their business performance and supporting data-driven decision-making.

4.5 Real-Time Communication Results

The implementation of Firebase Realtime Database and Firebase Cloud Messaging successfully enabled instant messaging and real-time notifications across the platform. Messages were synchronized immediately between users, while important events generated push notifications that were delivered reliably and efficiently, improving communication between customers, artisans, and exhibition owners.

4.6 Platform Management Results

The administrator dashboard successfully provided centralized monitoring and management capabilities for the entire platform. Statistical summaries, growth analytics, top-performing entities, and monthly report generation functionalities enabled efficient supervision of platform activities and supported effective administrative decision-making.

4.7 Overall Analysis

The obtained results demonstrated that the HomeGrown platform successfully achieved its primary objectives by integrating e-commerce services, exhibition management, social networking features, real-time communication, and AI-powered functionalities within a single system. The implemented recommendation algorithm, Business Insights module, analytics dashboard, and real-time communication services enhanced both user experience and platform efficiency. Furthermore, the successful integration of multiple user roles and responsive cross-platform support contributed to providing a complete and reliable digital marketplace for promoting local handmade products.

Chapter 5: Discussion

The HomeGrown platform successfully addressed the main problem of providing a unified digital environment that supports local artisans, customers, exhibition owners, and administrators through a single integrated system. The project contributed more than a traditional e-commerce marketplace by introducing a personalized recommendation algorithm, a rule-based Business Insights module, real-time messaging and push notifications using Firebase services, exhibition management functionality, and a community-driven environment that encourages interaction through stories, posts, comments, and ratings. The obtained results demonstrated that integrating these features within one platform significantly enhances user engagement, improves communication between different stakeholders, and provides artisans with intelligent tools to support business growth and decision-making. As future work, the platform can be further extended by incorporating advanced machine learning techniques to improve recommendation accuracy, introducing a dedicated delivery role with real-time shipment tracking, integrating secure online payment gateways, and expanding the analytics capabilities with predictive models and advanced reporting features.

Chapter 6: Conclusions and Recommendations

6.1 Conclusion

The HomeGrown platform was successfully designed and implemented as an integrated digital marketplace that connects customers, artisans, exhibition owners, and administrators within a unified and responsive environment. The developed system combined e-commerce functionality with social interaction, exhibition management, real-time communication, and AI-powered features to create a comprehensive platform that supports and promotes local handmade products.

The project successfully achieved its intended objectives by providing personalized product recommendations, rule-based business insights, real-time messaging and notifications, comprehensive analytics, and efficient multi-role management. The obtained results demonstrated that integrating these features into a single platform enhances user engagement, improves communication among stakeholders, and provides artisans with intelligent tools to support business growth and decision-making. Overall, the project established a practical and scalable solution that can contribute to strengthening the local handmade products ecosystem.

6.2 Future Work

Future enhancements may focus on integrating advanced machine learning models to further improve recommendation accuracy and provide more intelligent personalization. The Business Insights module can also be extended with predictive analytics and forecasting capabilities to support more advanced business planning and decision-making.

Additionally, the platform can be expanded by introducing a dedicated delivery role responsible for managing deliveries between artisans and customers, including real-time shipment tracking and delivery status updates. Other potential improvements include secure online payment integration, multilingual support, enhanced reporting and visualization tools, and additional AI-powered services that further improve user experience and platform efficiency.

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