

# Student-Centric E-Commerce Platform for Local Business Growth

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## Abstract

E-commerce, especially the marketplace is growing rapidly, offering convenience, accessibility, and an extensive array of products and services. However, the marketplace has become too general, making it challenging for university students to find budget-friendly and locally relevant products for their daily needs and for local businesses to gain visibility. This project addresses the limitations of the current e-commerce marketplace by developing a segmented e-commerce platform for university students. The features implemented in the platform include common marketplace features that have been tailored to align with the platform's objectives, as well as features like university-base filters to prioritize the visibility of products from sellers within the same university as buyers or in the closest proximity and dedicated section for local business promotion. The research methodology used for carrying out this project is Extreme Programming (XP) which enhances customer collaboration and responsiveness to changing requirements. This methodology is employed due to the lack of comprehensive research materials and the absence of a closely similar existing system for analysis, coupled with the necessity for rapid implementation based on customer feedback. The key technologies used for the development of the project include Next.js a Javascript framework, MongoDB Atlas a cloud database, Firebase a backend as a service and Aws S3 an object storage service.

**Keywords:** University students; Local Businesses; E-commerce Marketplace.

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## **1. Introduction**

In today's digital world marked by rapid technological advancements and changing consumer preferences, shopping, and trading are undergoing a profound transformation. E-commerce has become an integral part of our daily lives, offering convenience, accessibility, and an extensive array of products and services. However, in this digital revolution, there remains a pressing need to address the unique challenges faced by an essential group: university students. As education and living expenses continue to increase especially here in Nigeria, students increasingly seek less expensive options for their daily needs, while local businesses often struggle to get increased visibility.

This project is driven by the recognition that the conventional e-commerce platforms, while powerful, lack the tailored features needed to harmonize the interests of students seeking cost-effective solutions and local businesses yearning for increased visibility. The platform will offer several benefits to students including a convenient space to buy and sell items amongst themselves, the ability to verify the condition of fairly used items before purchasing them, deals and discounts tailored to university events such as IT defense and graduation, convenience in easily finding desired items at nearby stores and faster item delivery. At the same time, it will empower local businesses with an efficient channel for advertising their goods online.

E-commerce or electronic commerce, also known as e-business, refers to the transaction of goods and services over electronic communications. It has been perhaps one of the most prevalent terms in this digital era [9].

There have been many events which has occurred that gave birth to modern e-commerce. From the 1970s to the 1980s, electronic data interchange (EDI) laid the groundwork for online business transactions. As the first generation of e-commerce, EDI allowed companies to exchange information, place orders, and conduct electronic funds transfers through computers [8].

The second generation of e-commerce is characterized by the transaction of goods and services through the Internet, which started as a research tool, but has generally evolved into a commercial tool. The primary users of the internet at its early stage were scientists and engineers working for the government or for universities. As a matter of fact, academics or researchers were the only ones capable of using the Internet, because a sophisticated understanding of computer science and a high level of computer skills were necessary for Internet use at that time [2]. It was the development of a graphical user interface (GUI) and the navigability of the World Wide Web (WWW) that changed the nature of Internet use.

The 1990s saw the emergence of the World Wide Web, marking the first secure online purchases and the birth of e-commerce giants like Amazon and eBay. In 1996, Dell began to sell personal computers directly to consumers on the Internet, and, in 1997, the commercial domain (.com) replaced the educational domain (.edu) as the largest in use [5]. The Internet became the fastest-growing technology in economic history. Investors, businesses, and consumers alike were attracted by e-commerce during that period.

Today, e-commerce continues to grow globally, embracing new technology for enhanced online shopping experiences.

The rise of e-commerce over the past two decades has reshaped the way consumers access products and services. Online shopping has grown exponentially, offering a vast selection, competitive prices, and the convenience of shopping from the comfort of one's home. However, this surge in e-commerce has also posed challenges for local businesses, often leaving them struggling to compete with large online retailers. This project recognizes the historical developments in e-commerce while addressing the specific needs of students and local businesses in the current landscape.

## **2. Literature Review**

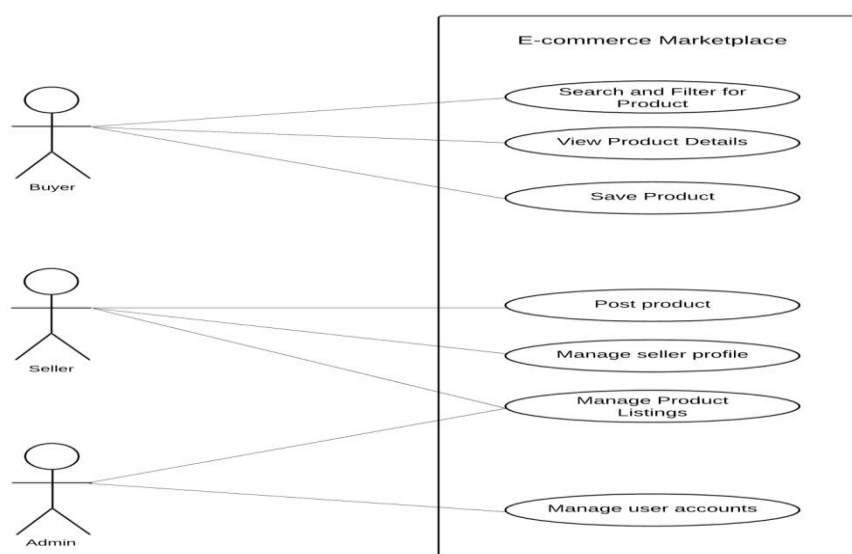
Robin and Pujiyono [7] highlighted the need for a marketplace for campus students and developed a web-based marketplace to cater to the unique needs of campus students called Campus Stalls. The method employed for carrying out this research consists of five stages. These stages are data collection, analysis, design, implementation, and evaluation. The usability test score was 4.62 on a scale of 5. The results of the test indicate that the campus marketplace web stalls are appropriate and meet user needs. Ahmad and his colleagues [1] talk about online shopping behavior among university students, particularly those at the Malaysia University of Science and Technology (MUST). They aim to identify the most commonly purchased products online and the factors that influence the online buying behavior of MUST students. They adopted a quantitative approach, involving the distribution of questionnaires to 100 business faculty students. The findings indicate that almost all MUST students (99.0%) engage in online purchasing, with computer/electronic/mobile products being the most commonly bought items. It was concluded that the functionality of web vendors is the most important factor, followed by privacy, perceived value, firm reputation, and trust. However, trust ranks lower, suggesting that some respondents feel uneasy or unsafe while trusting web vendors. Ismail and his colleagues [4] identified current issues faced by university students while starting their businesses and proposed a student online marketplace for the university community. Their research mainly focuses on entrepreneurship among University Technology Mara (UiTM) students in Shah Alam, Malaysia. Key findings indicated that the main problem faced by students is the lack of a business platform to promote their products or services, existing marketplaces are not suitable for students starting their businesses, there are fees involved and students are interested in an online marketplace specifically designed for them, which would provide a safe and secure environment for business transactions. Rani [6] talks about the challenges faced by local retailers in response to the rise of e-commerce websites and provides strategies for adaptation in the digital shopping age. He highlights the formidable competition posed by e-commerce giants and the shift in consumer behavior towards online shopping, particularly accelerated by the COVID-19 pandemic. He emphasizes the need for local retailers to remain competitive on price while maintaining their unique selling propositions and offers a multifaceted approach for adaptation, including embracing digital channels, fostering community engagement, offering personalized services, and leveraging technology. Ismael and Lingtong [3] investigates the relationship between e-commerce adoption and the performance of small and medium-sized enterprises (SMEs) in Saudi Arabia. They used a specially constructed questionnaire to collect data and employ regression analysis to examine the relationships between e-commerce adoption, business size, e-commerce experience, and business performance. The findings reveal that e-commerce adoption has a significant impact on the performance of SMEs in Saudi Arabia, with business size and e-commerce experience moderating this relationship.

### 3. Methodology

The methodology employed in the development of the system is Extreme Programming (XP). Extreme Programming is an Agile methodology that prioritizes delivering incremental value through frequent releases. It enhances customer collaboration, responsiveness to changing requirements, and technical excellence. Given the lack of comprehensive research materials and the absence of a closely similar existing system for analysis, coupled with the necessity for rapid implementation based on customer feedback, XP's principles and practices align with the project's goals. At the project initialization, potential users were engaged in discussions. Several related research materials and articles were explored, and the existing system was analyzed to gather ideas and requirements. The information gathered was used to highlight essential features and functionalities. After that, the functionalities to be implemented were organized and prioritized to ensure a quicker release of a minimum viable product (MVP), which will be used to gather more customer feedback for improvements. Moving to the system implementation stage, the JAMstack architecture will be adopted, which is a modern tech stack for developing faster, more secure, and easily scalable web applications. The frontend will be developed using Next.js, Redux, and RTK Query, and the backend API routes will be created using Next API routes along with MongoDB for the database and Amazon S3 for image storage.

#### 3.1 Use Case of the Proposed System

Figure 1 shows the use case diagram of the platform. In the diagram, several actors and their corresponding use cases define the interactions within the system. The actors include the Buyer, who engages with the system to search for products, view product details and save products. The Seller, who engages with the system to post product, manage seller profile and manage product listing and the Admin who manages user accounts and also the product listing of sellers to ensure that only product that aligns with the platforms terms and rules are displayed on the platform. This use case diagram offers the overview of the actors, their interactions, and the system functionalities, providing a clear representation of the proposed system's behavior and capabilities.



**Figure 1:** Use Case Diagram of the Student-Centric E-Commerce Platform

## 4. System Implementation

The feature sets of the student-centric e-commerce platform include common marketplace features that have been tailored to offer a straightforward onboarding process for local businesses and a user-friendly interface that facilitates seamless communication between buyers and sellers and additional features like university-base filters to prioritize the visibility of products from sellers within the same university as buyers or in the closest proximity and dedicated section for local business promotion.

### 4.1 Functional Requirement

The functional requirements for the platform include:

1. **User Registration and Authentication:** The system can allow users to register and log in using their name and email address or other authentication methods like Google.
2. **User Profile:** Each user has a profile page where they can view and edit their personal information.
3. **Seller Registration and Profile:** Users should be able to become sellers by providing information such as phone number, university at close proximity to them, and physical store address if applicable. Each seller should have a dedicated page to add and remove products and view analytics of their products.
4. **Product Listings and Search:** The system should be able to display a categorized list of products with relevant details and images and users should be able to search for products based on keywords, categories, and filters.
5. **University-based filters and Local Business Features:** The system can utilize university-based filters to prioritize the visibility of products from local businesses and sellers within the same university. Local businesses should have dedicated sections to showcase their products.
6. **User Feedback and Reviews:** Users should be able to leave reviews on sellers. The system can display aggregated reviews on product pages.
7. **Admin Dashboard:** Administrators should have access to a dashboard for managing user accounts and product listings.

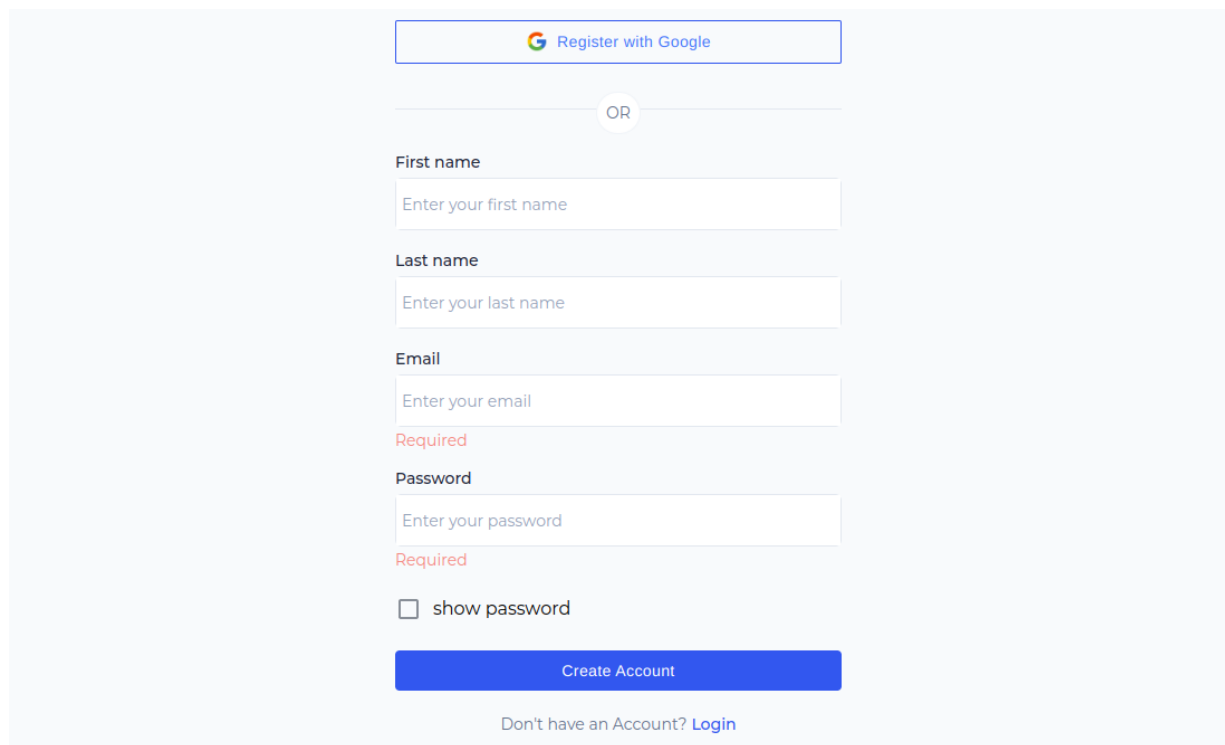
### 4.2 User Interfaces

The design of the platform prioritizes the creation of visually appealing and user-friendly interfaces across key pages. Elements from existing e-commerce marketplaces serve as references during the design of user interface components, aiming to establish a familiar user experience and minimize the learning curve for users.

#### 4.2.1 Registration Page

The Registration Page is a key page that allows for users to create personalized accounts on the platform. It is designed to be user-friendly and efficient, ensuring a seamless onboarding process. New users can easily provide the necessary information to set up their accounts, As seen in Figure 2, the key elements of this page include:

1. **Registration Form:** A Registration form designed to be intuitive, requiring essential information such as name, email and password.
2. **Google Integration:** An option for users to register using their google account, enhancing convenience.
3. **Error Handling and Validation:** Real-time validation of user inputs and clear error messages to assist users in rectifying any mistakes made during the registration process.

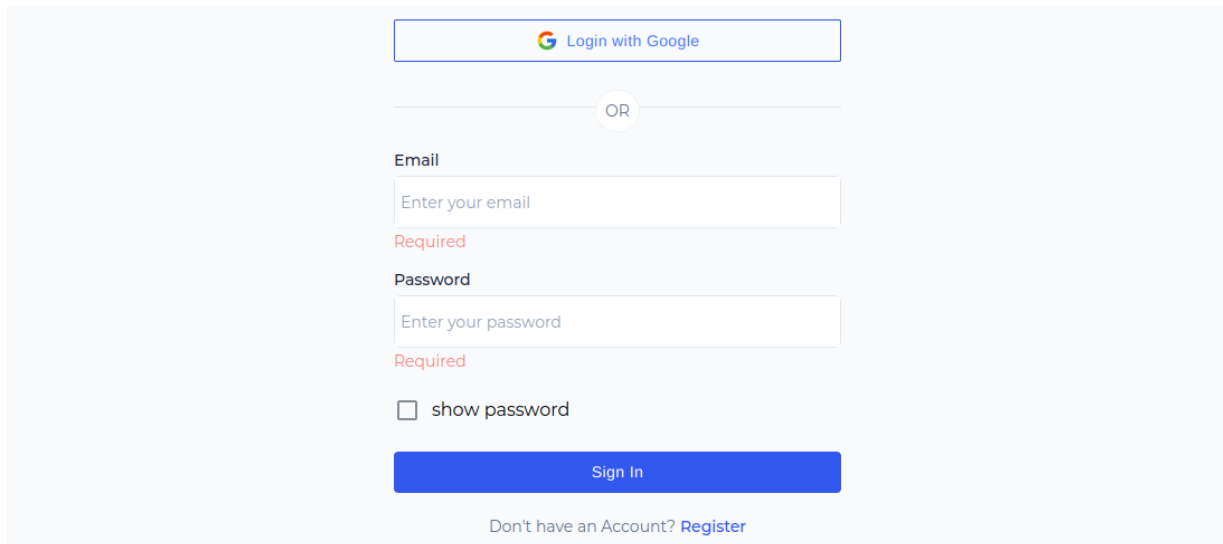
The image shows a registration form on a light blue background. At the top, there is a button with the Google logo and the text "Register with Google". Below this is a horizontal line with a circle containing the text "OR". The form consists of several input fields: "First name" with a placeholder "Enter your first name", "Last name" with a placeholder "Enter your last name", "Email" with a placeholder "Enter your email", and "Password" with a placeholder "Enter your password". Below the "Email" field is a red "Required" label. Below the "Password" field is a red "Required" label. There is a checkbox labeled "show password". At the bottom of the form is a blue button with the text "Create Account". Below the button is a link that says "Don't have an Account? Login".

**Figure 2:** Registration Page of the Platform

#### 4.2.2 Login Page

The Login Page functions as the gateway for users to access their personalized accounts on the platform, designed with a focus on security, convenience, and user experience. As seen in Figure 3, key elements of this page include:

1. **Login Form:** The login form requests users to input their registered email and password.
2. **Google Integration:** An option for users to quickly login using their google account.
3. **Error Handling and Validation:** Real-time validation of user inputs and clear error messages to assist users in rectifying any mistakes made during the login process.
4. **Account Creation Link:** A link to direct users who have not yet registered to the registration page.

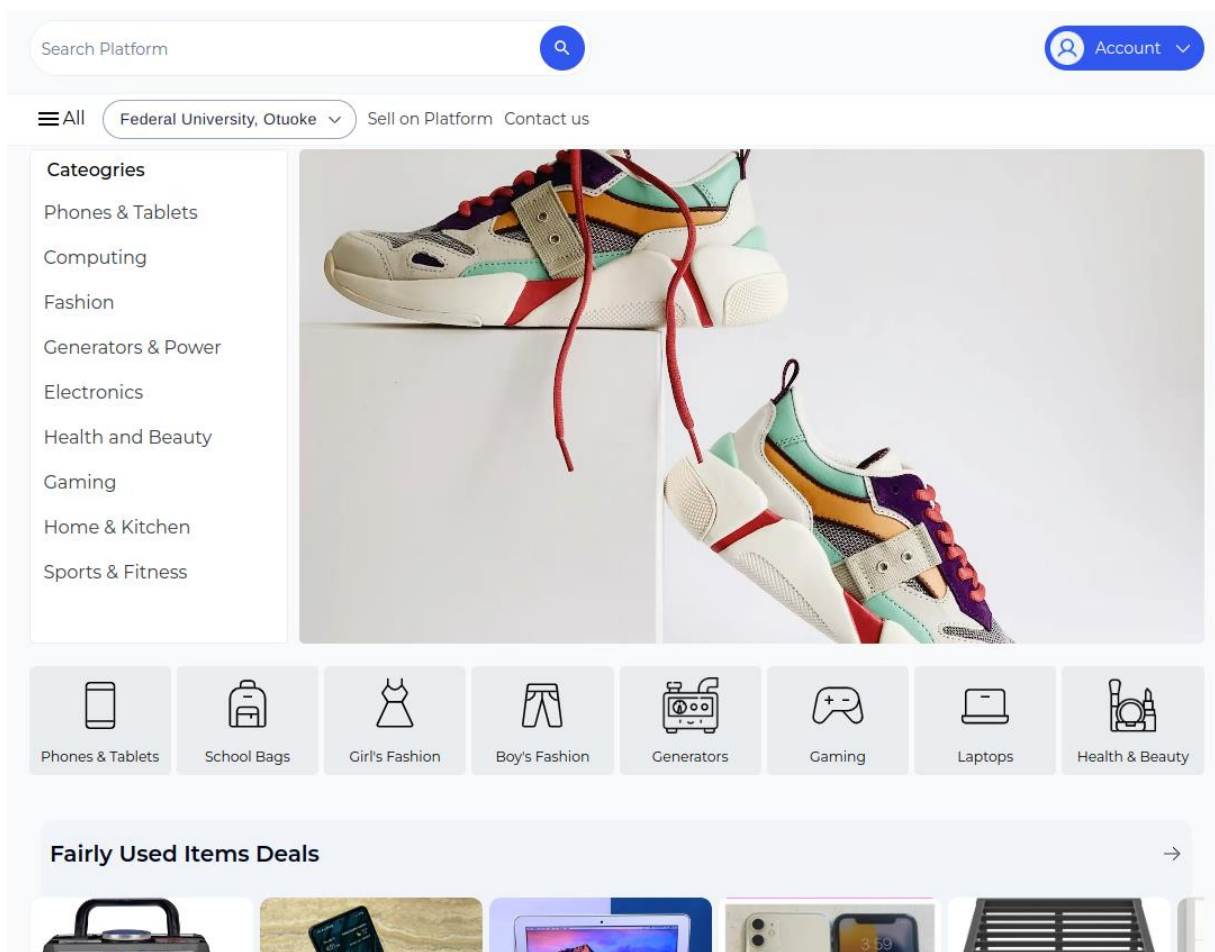
The image shows a login page with a light blue background. At the top, there is a button with the Google logo and the text "Login with Google". Below this is a horizontal line with a circle containing the text "OR". Underneath the line are two input fields. The first is labeled "Email" and contains the placeholder text "Enter your email". Below the email field is the word "Required" in red. The second input field is labeled "Password" and contains the placeholder text "Enter your password". Below the password field is the word "Required" in red. Below the password field is a checkbox with the label "show password". At the bottom of the form is a blue button with the text "Sign In". Below the button is the text "Don't have an Account? Register" with "Register" as a blue link.

**Figure 3:** Login Page of the Platform

#### 4.2.3 Home Page

The home page is the entry point of the platform. It provides an informative experience, guiding users to explore products while enhancing the overall usability of the platform. As seen in Figure 4 the key elements of this page include:

1. **Header:** It contains the navigation menu, search bar and user account options. This is where users can sign in, sign up, or access their account settings.
2. **Search Bar:** This allows users to quickly search for products by entering the product name.
3. **Featured Categories:** This section highlights the key categories of the platforms. It aims to grab users' attention and guide them to popular sections of the platform.
4. **Platform Deals:** This section promotes ongoing deals, offers, aim to attracts users seeking cost-effective options. This is also used to promote products offered by local businesses.
5. **Trending Products:** A curated list of trending products based on user behavior and preferences This section encourages users to explore popular items.



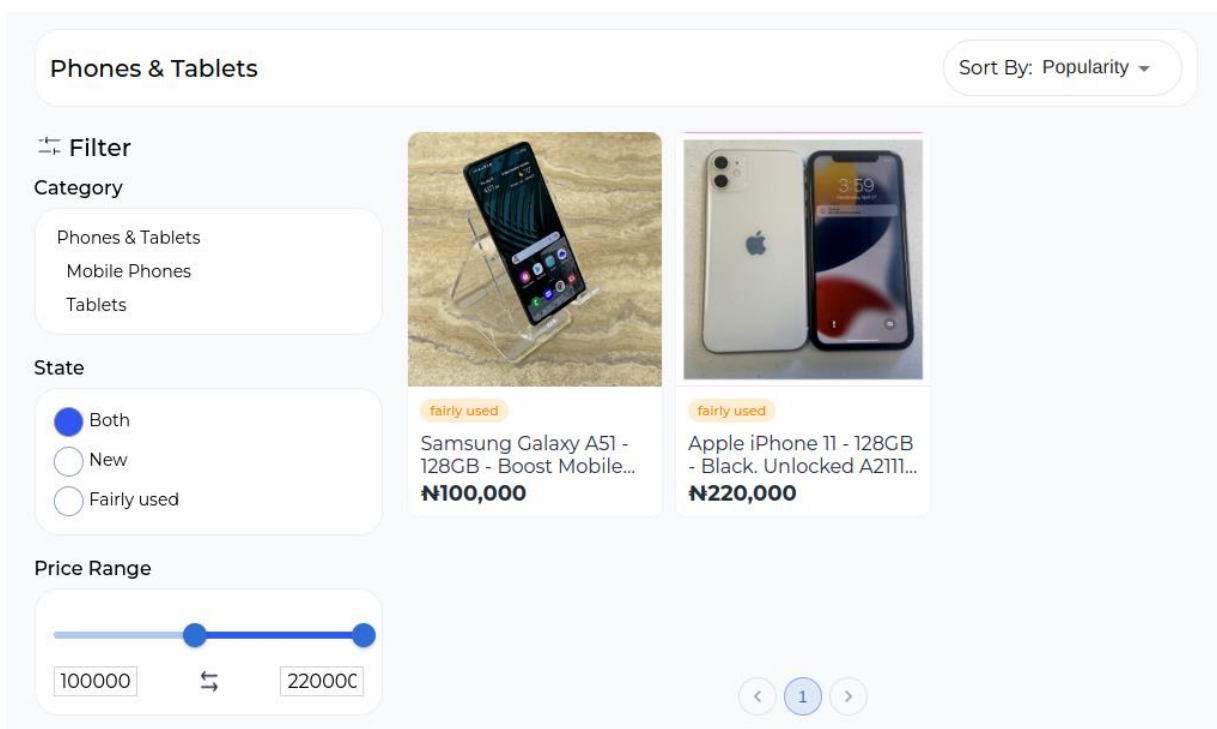
**Figure 4:** Home Page of the Platform

#### 4.2.4 Category Page

The category page serves as a focused destination for users to explore a specific group of products within a designated category. As seen in Figure 5, the key elements of this page include:

1. **Category Title:** This helps users understand the context of the products they are about to explore.
2. **Filter and Sorting Options:** This enhances the user experience by allowing user to refine their search based on parameters such as price range, product state, and more. The sorting options allow users to arrange results by popularity, price and date.
3. **Product Grid:** This is the central focus of the category page which is a grid of product listings. Each product is represented by a thumbnail image, and essential details such as the product name, price, and state are visible. Users can click on each product to view more details.
4. **Pagination:** This allows users to navigate through different pages of products.

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**Figure 5: Category Page**

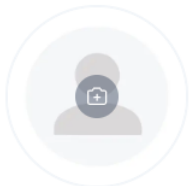
#### 4.2.5 Seller Registration Page

The Seller registration page is a crucial component that allows students or local businesses to join the platform as sellers. This page facilitates the onboarding process, guiding potential sellers through the necessary steps to list and sell their products. As seen in Figure 6, the main elements of this page is the Seller registration form, designed to collect crucial information from prospective sellers while ensuring a smooth and user-friendly onboarding process. The form mainly includes fields that will aid in the proper functioning of the platform. These fields include:

1. **Contacts Fields:** This allows prospective sellers to specify the means they want buyers to reach them which can be either through WhatsApp or phone call.
2. **Location Fields:** This allows prospective sellers to specify the university they are closest to. This data will be used by the platform geolocation feature to display products closest to users.
3. **Physical Store Details:** This allows local business owners to specify their physical store location, enabling buyers to go directly to their store to get the desired item while increasing the visibility of sellers offline presence.

## Seller Registration

Start selling today [Learn more](#)



Upload Profile Picture

WhatsApp Number

E.g 080...

Other Number

E.g 080...

State of Residence

Bayelsa State

Select the university closes to you

Federal University, Otuoke

Select Category

Select the option that describes you

Do you have a physical store?

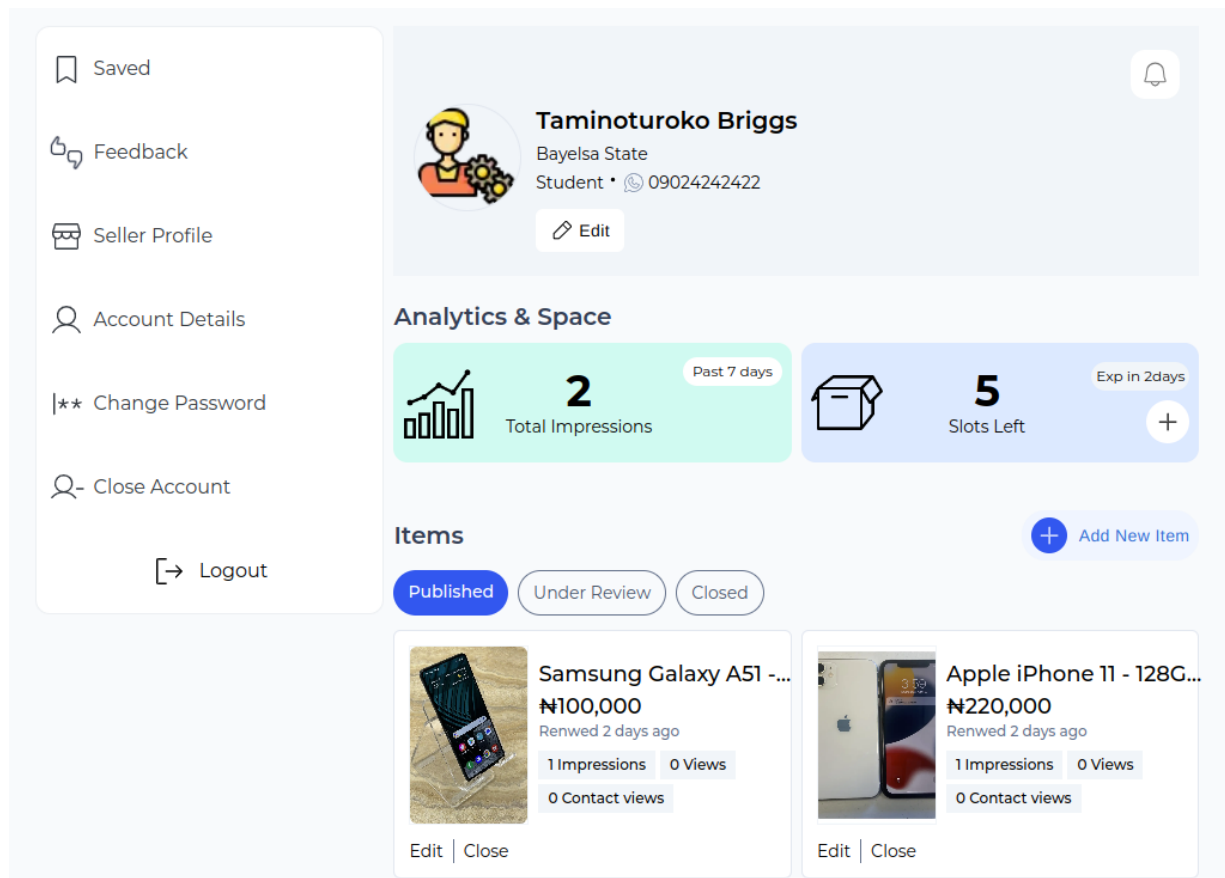
☐ Yes
 ☒ No

**Figure 6:** Seller Registration Page

#### 4.2.6 Seller Profile Page

The Seller profile page is a dedicated space for sellers to manage their accounts and products, efficiently. As seen in Figure 7, the key elements of this page include:

1. **Product Management:** Enables sellers to manage product listing, including adding new products and updating and deleting existing ones.
2. **Performance Overview:** This provides an overview of product performance. It indicates how frequently the seller's products are seen by users. This snapshot allows sellers to quickly assess the growth of their online store.
3. **Seller Account Settings:** This allows sellers to manage personal information, related to their online store.
4. **Notification Center:** This keeps sellers informed about important updates, such as product listing approval or disapproval, terms and policy changes, etc. This ensures timely communication and action on the seller's part.

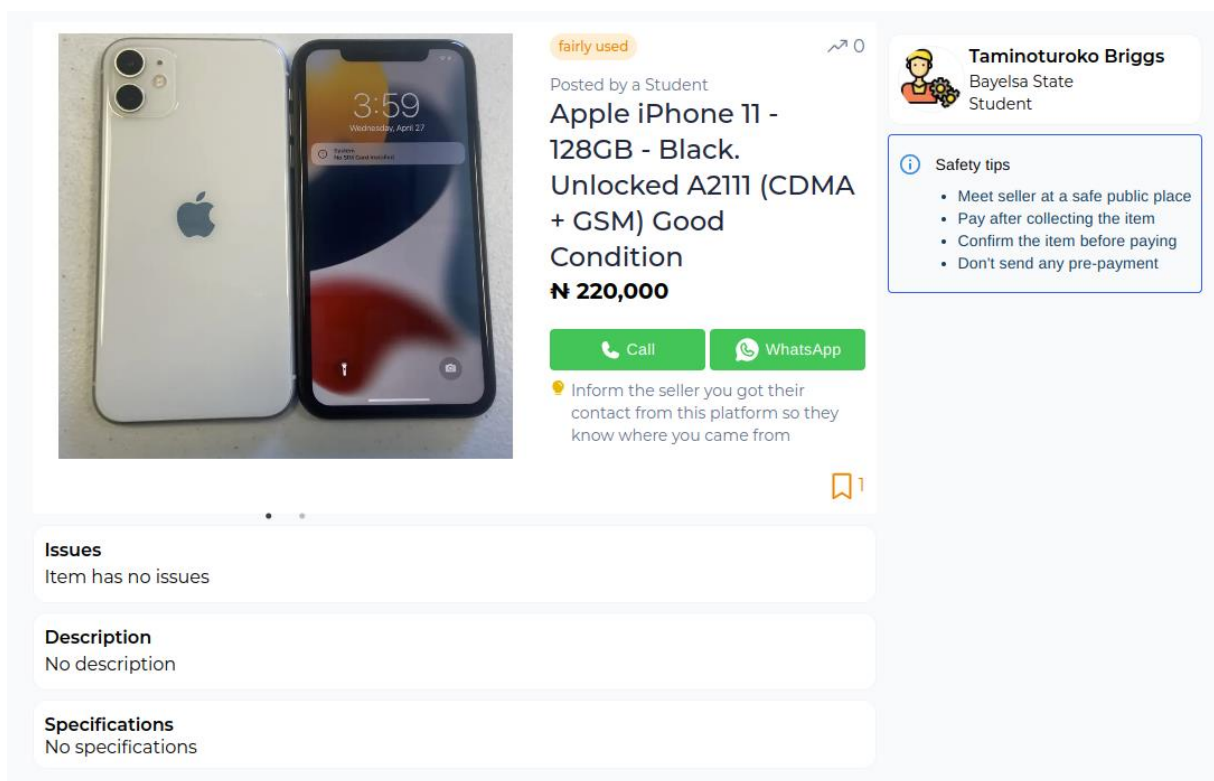


**Figure 7:** Seller Profile Page

#### 4.2.7 Product Detail Page

The product detail page is a comprehensive presentation of an individual product. As seen in Figure 8, the key elements of this page include:

1. **Product Images:** These are multiple high-quality images of the product, allowing users to view it from different angles.
2. **Price and Discount:** This shows the product's price, along with any ongoing discount. If a product has been discounted, a comparison between the original price and the discount price is displayed.
3. **Seller Information:** Information about the seller, including their profile picture, name, category, and state of residence. This adds transparency to the platform.
4. **Product Description:** This is a detailed description of the product, including its features, specifications, and issues if applicable. This section aims to answer any questions users may have about the product.



**Figure 8:** Product Detail Page

## 5. Conclusion

The development of a Student-Centric E-Commerce Platform aims to address the challenges faced by students in accessing affordable products while fostering the growth of local businesses. On the platform, key features and sections have been successfully integrated, such as university-based filters for displaying products closest to buyers, a dedicated section for local businesses, a responsive user interface, and a secure authentication system. The implementation addressed the identified limitations of the existing systems by introducing tailored functionalities for students and local businesses. Although time constraint was a challenge, as adequate time was needed to build several functionalities of the proposed system, the project, however, successfully achieved its objectives by developing a student-centric e-commerce platform that prioritizes affordability and local business growth. By prioritizing affordability for students and fostering the growth of local businesses, the project aligns with broader goals of fostering an entrepreneurship mindset within students, economic empowerment, and community engagement. The findings underscore the importance of tailoring e-commerce solutions to the unique requirements of the student demographic while fostering a supportive environment for local businesses. The project recommends further research and development to enhance targeted marketing strategies, expand promotional initiatives for students, and continually refine the platform based on user feedback. Future work may explore additional features to deepen the integration with the student community and empower local businesses further.

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