A blue and gold logo  Description automatically generated with low confidenceDepartment of Computer Science DCIT302: Human Computer Interaction

SEMESTER PROJECT REPORT

TradeTech

DESIGN AND EVALUATION OF AN INTERACTIVE SYSTEM

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# Abstract

This report presents the phases of an HCI project focused on developing an ecommerce web application to enhance the selling process for Ghanaian phone dealers who currently rely on WhatsApp. The objective of the project is to provide an efficient system for managing device sales and transactions, while offering users a simplified user experience. It is also to provide users (buyers) with the convenience of having certain information like pictures, prices, and other information readily available to them without them having to ask and wait for a reply.

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# Problem Definition and User Research

## Problem Definition

The problem that this project seeks to solve is the inefficiencies and limitations faced by Ghanaian phone dealers who rely on WhatsApp or other social media for selling devices. The reselling and the selling of smart devices such as phones, laptops, monitors, and other accessories is a common business that is run by many young people in Ghana today.

Most of these young entrepreneurs do not have systems tailored to their business to allow them to expand their businesses as such, a considerable number rely on WhatsApp or Instagram, which are accessible social media to promote their business and at the same time to receive and track orders. Initially, this may seem like an easy approach however, as time goes on, it is seen that it becomes difficult to manage orders on WhatsApp as that is not what the software was intended for.

To track an order both the seller and the buyer would have to scroll through chats which can be tedious in a case where a seller receives multiple orders per day. Also, it becomes difficult for the seller to use the social media for personal activities as the messages become too many. This can lead to order mix-ups, frustration, and waste of time.

Also, with using social media to receive orders, the buyer would have to ask many questions regarding the product they want to buy before actually placing the order. And in some cases, after asking many questions like the price, availability of certain devices and so on, the customers do not even place orders. However, with this system, the customers will have the opportunity to have all those questions answered at a glance since they will be able to see pictures of the devices, descriptions, prices and even reviews associated with the same device. They will be able to make up their minds easily and proceed to order a device or to add it to their “wishlist” in case they would like to have a look at it again later.

The goal of this project is to create a system that will allow entrepreneurs who fall in this category to be able to manage their orders easily right from their phones such that, they can reserve their WhatsApp business lines to address peculiar concerns from their customers and to advertise their business. Thus, making their work easier.

The system will also provide an inventory-like feature such that they will be able to manage the quantities of products they have in stock. They will also be able to add and delete products.

The aim of this project is not to create a single application for multiple stores or multiple users but to be targeted towards single businesses. As such, each instance of the system would be for one business where they will manage their products.

## User Research

### Introduction

The objective of this user research was to identify the challenges and issues faced by individuals involved in buying and selling devices through social media platforms. The research was done using an online survey with Google Forms to gather insights from the participants. A total of twenty-five individuals, specifically young Ghanaians, were involved in the research. The selection criteria required participants to have experience in using social media channels. The participants were highly familiar with online selling platforms, allowing for a deeper understanding of their perspectives and experiences. The research also aimed to gather information about the participants' business requirements and their expectations from an ecommerce platform. Through this user research, I sought to uncover valuable insights to inform the development of an improved system for buying and selling devices online.

### User Profiles

* Age Range:

Participants involved in the research were between 18 to 40 years old.

* Experience:

Most of the participants had prior experience in buying devices online through social media platforms. They expressed contentment with online purchasing due to the lack of alternatives, but they encountered various challenges. Most participants expressed a preference for a dedicated system tailored specifically for their buying and selling needs.

* Frequency:

Sellers engaged in buying and selling activities on social media platforms daily, while buyers indicated that they actively searched for devices to buy, although not on a daily basis.

### Research Findings

After conducting my research to understand the pain points, needs and preferences of the potential users, I was able to deduce necessary information to help my design process.

In terms of the users’ experiences with using social media for ecommerce endeavors, only 12.5% of the research participants rated above 3 on a scale on 1 to

5. Thus, leading me to conclude that there is indeed a problem with the existing method and a better method needs to be designed and developed.

A part of the research questions asked the users to express their challenges with using social media for buying and selling and a number of people expressed concern with the lack of information provided about the device being sold. Others complained about constantly having to ask for prices constantly and other people raised concerns with trust.

Another part of the survey asked users to bring up features that they would like to see in a system aiming to solve that problem and people wrote that they would like to see features like device ratings, reviews, ability to pay with visa cards and options to pay on delivery, a full description of the product being sold, ability to see what stage their order is on and a digital receipt. Users also said that they prioritized responsiveness of the application.

More than seventy percent of the users responded that they would be willing to adopt such a platform for buying and selling and about twenty percent of the people said that they would be open to adopting such a platform if it was convincing enough.

### Analysis of User Needs and Pain Points

The findings from my research provided valuable information with regards to the preferences, pain points and needs of the users.

The research participants expressed various pain points and challenges encountered while using social media for buying and selling. These pain points include the lack of information provided about the devices being sold, the inconvenience of repeatedly asking for prices, and concerns related to trust and reliability. These findings emphasize the importance of addressing these specific pain points in the design of the TradeTech platform.

Moreover, the research participants provided valuable input on the features they would like to see in a platform aiming to solve these problems. The desired features include device ratings, reviews, the ability to pay with Visa cards, options for payment on delivery, comprehensive product descriptions, order tracking

capabilities, and digital receipts. Additionally, users prioritized the responsiveness of the application, highlighting the need for a seamless and fast user experience.

The research findings also indicate a positive response from the majority of users, with over seventy percent expressing willingness to adopt such a platform for buying and selling. This demonstrates the potential demand and market opportunity for TradeTech. Furthermore, approximately twenty percent of respondents stated their openness to adopting the platform if it proves to be convincing enough, suggesting the importance of effectively communicating the benefits and value proposition of TradeTech to potential users.

### Competitive analysis and market research

TradeTech's focus on young Ghanaian entrepreneurs and their customers aligns with a user-centered approach. By prioritizing a friendly user interface, simplicity, and effective order management, TradeTech aims to cater to the specific needs and preferences of its target audience. This emphasis on user satisfaction can lead to increased engagement and loyalty. TradeTech's optimization for the Ghanaian experience is a strategic advantage. By tailoring the platform to meet the requirements of Ghanaian phone dealers, TradeTech aims to address pain points specific to the local market. This localization approach can foster a more personalized and relevant user experience.

TradeTech stands out from existing solutions in the market by addressing the needs of Ghanaian entrepreneurs and prioritizing simplicity. By focusing on the domestic market and offering a user-friendly interface, TradeTech positions itself as a unique and attractive option for local users seeking an intuitive and efficient ecommerce platform.

# The Design Process

## Ideation and Brainstorming

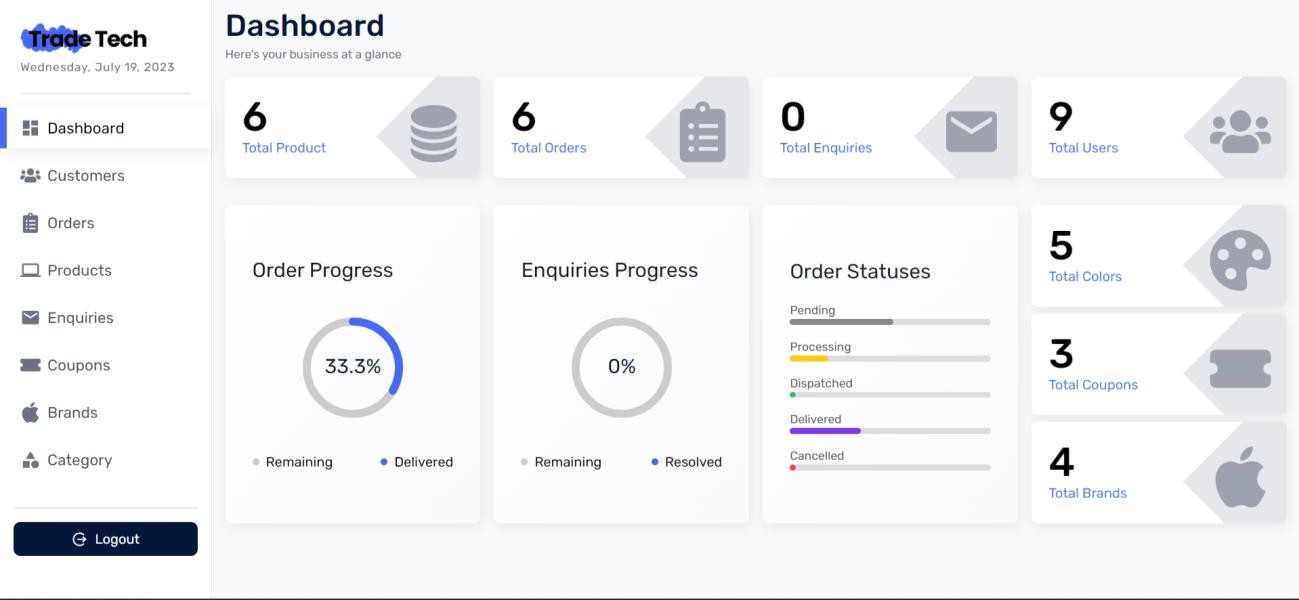
In the process of trying to produce ideas to solve the problem, I referred to existing solutions which I used as a benchmark. I referred to solutions like Amazon, eBay and so on to see how they went about implementing their system. From there, I tried to produce way that I could simplify complex aspects of their system like the navigation and the crowdedness. Afterwards, I referred to my problem definition, to see how I could produce a system that was as professional as existing solutions but directed to solve the needs of Ghanaians. Because most Ghanaians are now becoming technology oriented, I prioritized simplicity in creating the interface. I referred to Dribbble for further inspiration however, most of them did not have the minimalistic touch I was looking for.

## Wireframing, Design and Prototyping

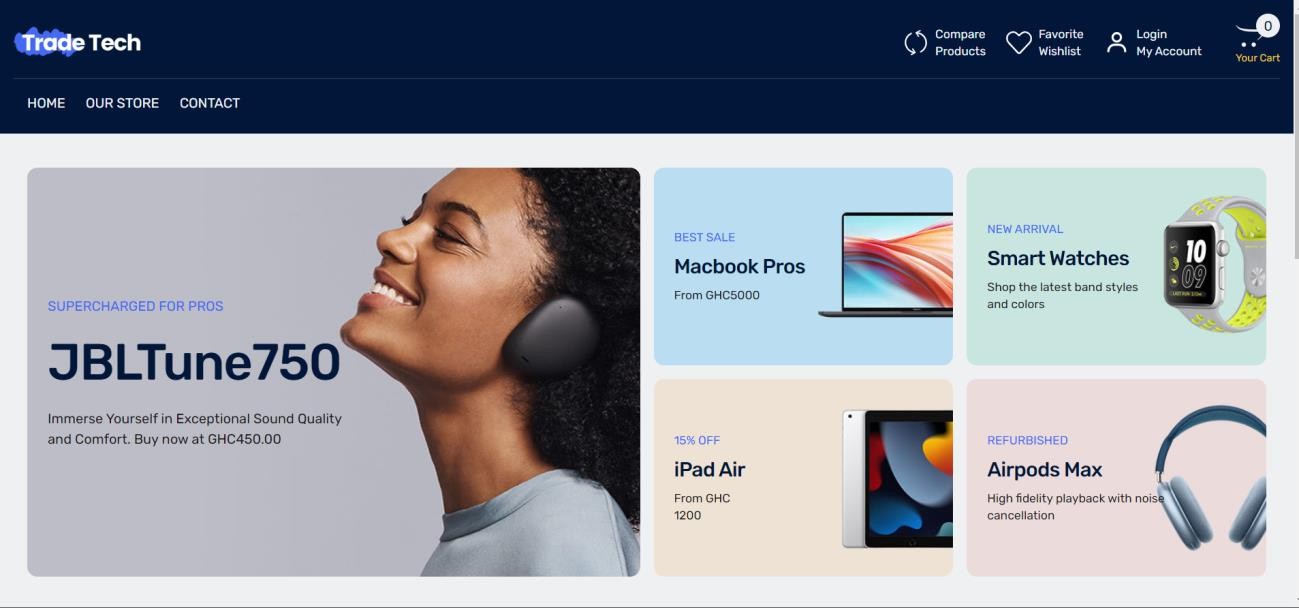
In brainstorming, I often wrote on paper to visualize my thoughts and it was at that point that I started with my first wireframing. I also constantly referred to the results from me google forms online survey to see if the ideas I produced aligned with my research findings.

Also at this stage, I started thinking about suitable colors and font styles that would make up my system. Below are a few screens from my design.

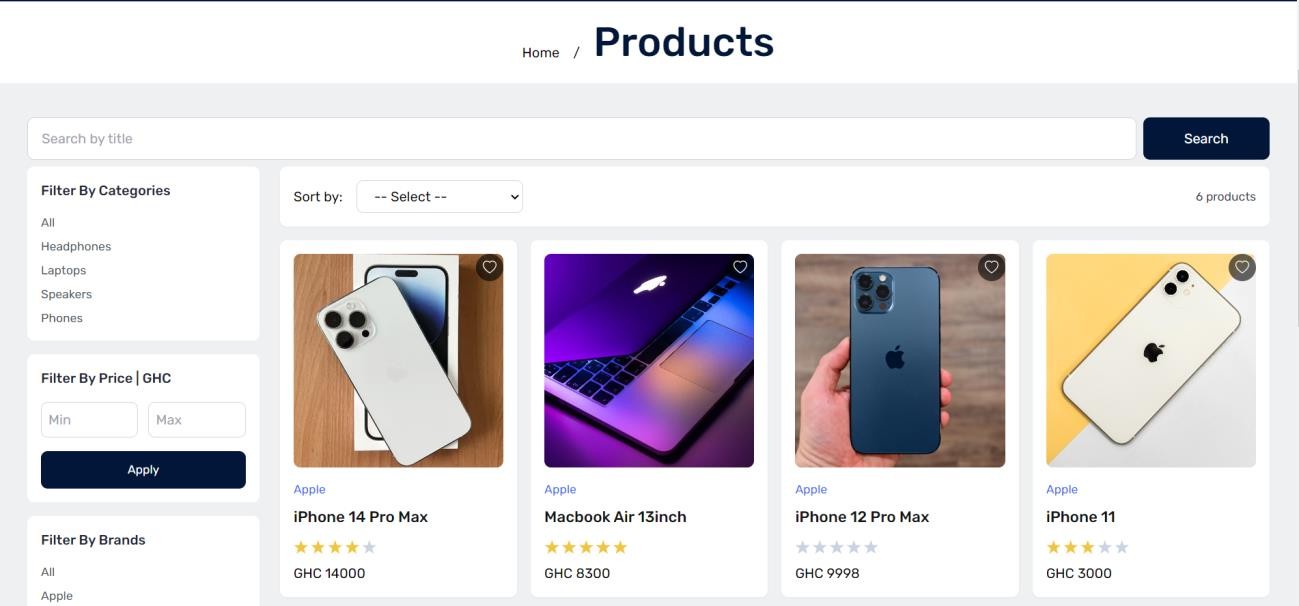
Admin Panel Dashboard



Website Hero Section



Website Products Section



## HCI Laws and Principles

In order to create the interface, I applied some popular Human Computer Interaction laws and principles.

### Fitt’s Law

Fitt’s law states that the time required to reach a target is determined by the distance to the target and its size. This principle is applied in this project by ensuring interactive elements are properly sized and placed. This included making all buttons and input fields large enough on mobile devices for fingers.

### Jakob’s Law

Jakob's Law states that users are more familiar with and expect designs similar to those they have previously encountered. In TradeTech, I considered this principle by aligning our design with the conventions and expectations of Ghanaian phone dealers and buyers. By using web apps like AliExpress, Amazon etc. as a benchmark, it is seen that they all have a pattern they follow and it is most likely that users of TradeTech are already familiar with this pattern and so we follow this pattern.

Simultaneously, the focus of TradeTech is to create a specialized and simple solution so in following the patterns of these apps, we pay attention to making sure that simplicity in the interface is our topmost priority in order not to make things clustered.

### User Centered Design

In TradeTech, we have prioritized user centered design by understanding the needs of the potential users. Observations reveal that the potential users(buyers) of this app want just to want to see proper details about what they are looking for and to be able to save certain products to check them later.

Also, vendors want a simple product and order focused interface that they can use to manage which orders have been attended to and those which are still pending.

Additionally, it has been observed that most of these people need a mobile friendly interface that can allow them to perform functions easily. This means that in TradeTech, extra attention would be given to device responsiveness

# Development and Implementation

## Technology Stack

To implement this project, I used NextJs, Tailwind and TypeScript for both the admin panel and the website section. I used NodeJS, Mongoose, MongoDB and Express for the backend aspect of the project and finally, I hosted the website and admin panel with Vercel, and the API was hosted using Render.

## Development Process

I started with the backend development as I was brainstorming the wireframes and designing the interface with Figma so that I could make good use of the time, next, I developed frontend interface before finally including the API integration into the frontend while I went ahead to simulate the prototypes so that I could manage the short time given.

# Features and Functionality

## Admin Panel

### Dashboard Summary

The system provides an overview of the business in the form of simple card statistics. The reason for this is to give the business owners the chance to have a brief overview of their business at a glance.

### View Customers and Add Admin

The admin is able to add another admin in case the need arises for someone else to assist with the business.

### Order Management

The admin is able to view, update the status and filter all the incoming orders in a straightforward way. This is the main functionality of the system.

### Product Management

The admin can add new products and add images to the products. The admin can also edit, delete, and view existing products. The admin can include multiple attributes of the product including descriptions, quantity, price and so on.

### Coupon Management

The admin can add coupons in case they want to give discounts to the customers.

### Color Management

The admin can dynamically add colors of products so that they can easily associate them with products.

### Category Management

The admin can dynamically add product categories and associate them with products.

## Web Application

### View Products

Customers can view products uploaded from the admin panel and filter them.

### Compare Products

Customers can juxtapose various products to see their details for better comparison.

### Cart Management

Users can add products to their cart to proceed to create an order.

### Wishlist Management

Users can add products to their wishlist so that they can view them easily at a later date.

### Order Tracking

After placing orders, users can check what stage their orders have reached and have a full receipt of what they ordered.

# Usability Testing and Evaluation

I worked closely with a few people who I conducted an iterative prototype testing. So, after prototyping a part of my design, I would allow them to test the user flow and the give relevant feedback. Some test scenarios that I used were registration and login, product search, placing orders and then for the admin panel, creating products, and so on.

Based on these tests, I made certain changes like removing unnecessary features I added earlier like a blog feature and adding filter searches based on categories, price, and brands.

## Project Links

### Website Panel (Customer/Client Panel )

<https://tradetech-web.vercel.app/>

### Admin Panel

<https://tradetech-admin-panel.vercel.app/> Login Details for admin section

Email:dev@tradetech.com

Password: banana123

# Conclusion

Overall, the current version of the system has managed to solve the problem of the lack of effective order management system tailored for Ghanaians phone dealers and buyers. However, there are many other features that could be added in the future but were not added due to time.

In the future, the system will have three access levels for the business owner, employees, and customers with respective roles. Also, there would be a way for sellers to verify their business, and also there would be the implementation of online payment mechanisms. Lastly, the future versions of this project can include GPS tracking of delivery.

In the process of creating this system, I learnt many things like exciting innovative technologies which I used to implement the system and I learnt how to apply principles taught in class and so on.

I would like to acknowledge my dear friend Annette Theodore who was a constant source of motivation when things seemed overwhelming. I would also like to acknowledge all my friends who helped me by participating in the survey by providing their valuable input and further acknowledgements to the lecturer and teaching assistants of this course who were a source of inspiration and a guide for this project and without all these people, this project would not have been a success.