UNIVERSIDAD DE INVESTIGACIÓN DE TECNOLOGÍA EXPERIMENTAL YACHAY

ESCUELA DE CIENCIAS MATEMÁTICAS Y COMPUTACIONALES

Web Application to Buy-Sell Products and Food at the Yachay Tech Campus

Trabajo de integración curricular presentado como requisito para la obtención del título de Ingeniero en Tecnologías de la Información.

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En la ciudad de San Miguel de Urcuquí, Provincia de Imbabura, a los 15 días del mes de agosto de 2022, a las 11:30 horas, en el Aula S_CAN de la Universidad de Investigación de Tecnología Experimental Yachay y ante el Tribunal Calificador, integrado por los docentes:

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Dedication

"I dedicate all my work to my family, who have always supported me in spite of everything, and to God who has given me the blessing of studying at this university."

Acknowledgments

I thank my Yachay family for always being there for me. Also, to my best friend from college Erick for always being there to bring a smile to my face. Also, to Leo for staying by my side all the time and showering me with love whenever I needed it.

Abstract

Commerce is an important point in the development of a city. The students of our University, living independently, use commerce as a source of extra income. Unfortunately, the current sales mechanism has several drawbacks. From lack of information, advertising and quality, to delays in delivery or sudden cancellations of orders, this system has garnered a sense of insecurity and discomfort from its users. To solve these problems, this project presents the development and implementation of a web application, which make things easier for users and buyers. This web application is named EatYT, and allows you to order from your computers or smartphone. This application will have two versions: the first focused on sellers, while the second is intended for buyers. Each will have specific functions for each type of user.

Keywords: Web application, commerce, solution.

Resumen

El comercio es un punto importante en el desarrollo de una ciudad. Los estudiantes de nuestra Universidad al vivir de manera independiente hacen uso del comercio como fuente de ingresos extra. Pero el mecanismo de venta actual presenta varios inconvenientes a la hora de usarlo. Desde falta de información, publicidad y calidad hasta demoras en la entrega o cancelación del pedido, que genera que inseguridad e incomodidad en los usuarios. Para solucionar estos problemas el presente proyecto presenta el Desarrollo junto a la implementación de una aplicación web, que intenta facilitar las cosas para los usuarios como para los compradores. Esta aplicación web lleva el nombre de EatYT y permitirá realizar pedidos desde sus computadoras o smartphone. Esta aplicación tendrá dos versiones, la primera enfocada para los vendedores y la segunda destinada para los compradores, tendrá funciones específicas para cada tipo de usuario.

Palabras Clave: Aplicación web, comercio, solución.

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Chapter 1

Introduction

1.1 Problem Statement

Yachay Tech Experimental University[1] is located within the province of Imbabura, next to the Urcuquí canton in Ecuador, with a population of 160 employees, 170 teachers and 1429 students. Currently, the buying/selling service within the university is not adequate and presents several drawbacks for both buyers and sellers, including but not limited to: lack of advertising, loss of information in social networks, lack of value of products, and problems concerning the payment and ordering systems. These problems may be solved or alleviated using new technologies, such as a web application.

Most of the time, product sales is done through social networks (e.g., Facebook, Instagram), messaging platforms (e.g., WhatsApp) or in some cases through direct marketing of the product on campus. These methods of selling the product generates a great inconvenience since, by doing so within a social group, the offer can be overshadowed by other topics and lower the number of potential buyers. For buyers, this becomes a problem of purchase. Because there is a lack of information about the product value, payments are made only with cash, which means the consumer might not be able to buy the desired product.

On the other hand, by not being aware of social networks, buyers do not know product availability, or current special offers (especially those available for only a short amount of time). There are also potential buyers who do not have access to the product because they are not part of the groups where the content/promotions are being published. In addition, door-to-door selling is an outdated technique that is especially unpopular with younger generations, since very few students are willing to buy a product that comes to them unsolicited. This requires a medium that facilitates the buying and selling of products within the university campus that can still reach the majority of students.

The objective of this project is to design, develop, and implement a web application that is easy to use, dynamic, comfortable, and solves the current aforementioned problems. The web application "Eat YT" for buying/selling within the university environment allows the sale and purchase of products with a space focused on this market, without having problems of loss of potential customers and loss of purchases due to lack of knowledge on the part of the buyer. For this project we have used frameworks focused.

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[1] `https://www.yachaytech.edu.ec` Last access: July 2021

1.2   Objectives

1.2.1   General Objective

Design, develop, and implement a prototype web application that allows buying and selling food products and accessories at the Yachay Tech Experimental University campus.

1.2.2   Specific Objectives

- Develop a web environment in which sellers can reach the potential buyers.

- Implement a beta web application that allows on-campus pre-purchase of products.

- Perform a usability study to validate the proposed web application.

1.3   Contributions

A buying and selling web application was developed within the Yachay Tech university that seeks to improve the different problems when making a purchase or sale, creating a more comfortable and useful system for sellers and customers. We also carried out a usability study of the application, in which the students gave their point of view about the application and rated it to comment on whether it is an idea that will help the buying and selling system.

1.4   Document Organization

This work is organized as follows. Chapter 1 explains the problem this project addresses, along with the general and specific objectives of the project. In Chapter 2, we will talk about the Framework of the web application, i.e., the content management system and all the plugins that have been implemented. Also, we will talk about the Back-End and Front-End along with the web server and the database that allows the web application to work. In Chapter 3, we will show the technological proposals of the project. For this, we will present the functional and non-functional requirements, the architecture and diagrams that show the functions of the different roles that the application allows, and a diagram of how the database is formed. Chapter 4 will focus on the steps taken to build the web application, as well as a test that was performed by people from Urcuquí and the university when using the web application. Chapter 5 contains the user study, which analyzes the survey conducted among the students of the university campus. Finally, Chapter 6 contains the conclusions of the project and future work.

Chapter 2

Theoretical Framework

2.1 Introduction

In this chapter, we present the technological tools and frameworks used within the web application such as Content Management Systems, plugins, database systems, back-end and the Font-end architectures.

2.2 Content Management Systems

A Content Management System, better known as CMS, is a software that is designed to create, administer and manage a website[2]. A CMS allows users to create new pages using HTML; it also connects to a database for storage and resources that will be use within the pages. One of the advantages of CMS is the graphical interface when creating and editing web pages. In addition, they allow users to have the design of the website together with the content within it, but also allows to modify each one separately, that is to say, in case the user needs to modify the design of the page, the content of the same is not affected[2].

Considering the maintenance, either to increase a new web page or modify existing pages, a CMS allows only locate the template and edit the content as appropriate and save it[2]. On the other hand, if you do not use a CMS, it is necessary to work directly with the code of the page, i.e, we have to edit both the HTML, CSS and JavaScript or Python depending on the programming language used for the interaction of the page. Also, by using a CMS the user can organize and search the contents of the page without having to locate each of the physical files and without knowing the actual structure in which the files are stored. Likewise, the administrator of a web site can have total control over the language of the interface, date and time, user management within the site and their profiles. There are several high-level CMS, such as Joomla, Drupal, Magento, Blogger, Shopify and WordPress. In this market, according with [3] 42% of the web uses WordPress, from hobby blogs to the biggest news sites online. Therefore, WordPress will be used as CMS for this application.

2.2.1   WordPress

WordPress[1] is a content management system (CMS) that has the function of creating and developing different types of web pages. Its code is developed using PHP (programming language), MySQL (database) and NGINX (web server) [3]. The CMS is completely free because it is open source, so its growth and maintenance is based solely on the WordPress community itself. It is designed to create web pages without the need to work necessarily with the code, for this WordPress has a visual interface that allows you to design the website easily and quickly. This framework gives us the opportunity to generate any type of web, such as blogs, personal sites, magazines, informative websites, but also an interactive web shopping (online stores)[4].

One of the most important attributes of WordPress is the use of plugins that allows the platform to be flexible for any need of the developer. A plugin is a piece of code (software) that has a specific function that can be added within an existing application to improve its functionality[4].

The origins of wordpress as mentioned by [5] "This application is the brainchild of Matt Mullenweg and Mike Littel, who created from the code of another CMS, thus WordPress was born. They joined forces in January 2003, and WordPress was first released on May 27, 2003. Matt Mullenweg, the initiator of WordPress, created this tool under the idea of democratize publishing and outreach to a wider audience. To put within everyone the possibility to publish online what we appreciate the most"[5].

2.2.2   Plugins

Woocommerce

Woocommerce[2] is a plugin designed for WordPress that allows users to design a functional online store on the web. It allows payment methods such as bank transfers, PayPal and Stripe. In addition, it allows user to attach products for sale, attaching price, description and ratings. It was created by the company WooThemes in 2011. The advantages of the plugin are:

- Online store customization. The plugin itself brings themes with options to change to suit the customer, the themes that are both paid and free.

- Open source. It is an open resource software with GPL license, this means that the community is responsible for the growth and maintenance of the plugin.

- Simple configuration. Like WordPress, it has a simple configuration that allows users to set taxes and add shipping values.

- Products management. From the beginning of the installation it is possible to add products to the website and even separate them by categories and a description of the product to be offered.

- SEO control. It allows us to have control over the aspects that are important for Google search engine optimization, and keep our content relevant. These aspects are the sizes of the photographs as the descriptions of the same ones and the speed of load of the page.

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[1] `https://wordpress.com` Last access: July 2021
[2] `https://woocommerce.com` Last access: July 2021

- Ease of use. It works with a panel, like WordPress, which allows to have control in an easy way for the work of the back office.

WC Vendors

WC Vendors[3] is a plugin focused on creating a multi-vendor marketplace within the WordPress platform. It was developed to work and boost the potential of Woocommerce. It is characterized as a commercial solution; it seeks to save development time as sellers can focus on the front-end with fully integrated self-services that adapts seamlessly to any theme. In addition, it allows sellers to have control of the stores while the administrator builds the marketplace, manages the products, coupons, etc. The commission-focused system allows commission rates to be set globally, per product, or even per vendor. Additionally, WC vendors can be rewarded with tiered commissions based on their total sales. WC vendors also have an improvement in the shipping issue since it is one of the most complete systems in the market since it allows sellers themselves to manage their shipments by setting a flat rate or a table rate. Considering the payment, it provides different forms of payment for sellers either by deposit, PayPal or Stripe[6].

Checkout Files Upload for WooCommerce

Checkout Files Upload for WooCommerce [4] is a plugin that allows you to upload a photo of the payment receipt as part of the purchase procedure to streamline the process for both buyers and sellers. It allows sellers to review the orders they have received along with the transfer from their email and in the same way a receipt is generated for buyers.

2.3   Back-End and Front-End

2.3.1   Back-End

The back-end of a web application refers to the interior of the application. Commonly, it is composed of the interaction of a server, an application, and a database. The Back-end is in charge of taking the data, processing the information and sending it to the user[7]. In the following, we present the programming languages that were used in the back-end architecture.

JavaScript

JavaScript[5] is used for dynamics making the process more flexible, with an advantage of compatibility with browsers, allowing the code to be used optimally. A disadvantage is the slow rate it has to create objects.

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[3]`https://www.wcvendors.com` Last access: July 2021

[4]`https://wpwham.com/documentation/checkout-files-upload-for-woocommerce/` Last access:May 2022

[5]`https://developer.mozilla.org` Last access: July 2021

Structured Query Language (SQL)

It is a common query programming language focused on databases. It allows developers to obtain and declare the results they want to retrieve. It is used for web application queries without the need for general user queries to the database.

Hypertext Preprocessor(PHP)

PHP[6] is a type of programming language focused on web development. The code is processed within the web server through an interpreter such as an executable interface or a module. This plus the data from the server, HTML and binary images results in the HTTP response which is the web pages. In addition, PHP can be used for device control or standalone applications.

2.3.2 Front-End

The font-End of a web application is the part that the client sees, i.e., fonts, color, effects and all the elements that allow navigating within a web page[7]. In this section we present the languages used for the Front-end of this web application.

HTML

HTML or Hyper Text Markup Language is a programming language used for the development of web pages; it is considered a powerful language because with a short number of lines can generate a functional web page. Hypertext refers to the links that connect web pages to each other, either between different websites or within it. In order to create HTML code, the user only need a text editor, it works with tables, formatted text, images, etc. To be able to code it is necessary to use a web browser[8].

CSS

CSS or cascading sheets allow you to create a style of the web page and its parts. They allow you to modify the size, color, font style and work with the entire visual field that the user will have without altering the behavior within the pages that make up the website. As mentioned, the use of CSS generates a lot of advantages since only by altering the information within the CSS we can improve the feel and look of the website, saving web hosting time which allows the web page to load faster and flow with different browsers. This will help as it allows more people to visit and use our website [9].

2.4 Web Server

It is known as a web server the program that use hypertext transfer protocol (HTTP) to deliver files that form the web page to the users depending on the requests that are generated in the HTTP of the computers of the same clients, for this reason can also be considered a computer as

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[6]https://www.php.net/manual/es/intro-whatis.php Last access: July 2021

a web server. To deploy a website it is necessary to have a web server program; there are several, including Apache which is one of the best known in the world, Internet Information Server (IIS) and NGNIX[10]. The last one will be used in the implementation of this work.

NGINX [7] is a high performance web server that works with an IMAP/POP3 proxy focused on email protocols, it has the advantage of being a free open source software. It is developed to satisfy a large number of websites that receive approximately 500 million requests per day, for this reason it is considered the second most used web server, moreover, compared to Apache, NGINX uses less memory and can work four times faster requests per second. The features it has are: File server, reverse proxy, load balancing, fault tolerance, HTTP support, FastCGI support, virtual servers based on name or IP address, FLV and MP4 file streaming, authentication support, IPv6 compatible, SPDY protocol support, gzip compression and enabled to support more than 10 000 simultaneous connections. For this web site is the best because this web server is multiplatform which allows it to run on different systems such as Linux, Mac OS X and Windows, in addition to its large capacity of requests per day.

2.5   Database

A database is a set of data belonging to the same context and stored systematically for later use[5]. In this web application, MySQL will be used because it comes by default with WordPress.

MySQL [8] is a relational database management system that is written in both C and C++, it is considered one of the most popular databases along with Oracle and Microsoft SQL Server in the web development environment. MySQL has a relational management system that allows data to be stored in separate tables which improves speed and flexibility, tables have defined relationships that allow data from different tables to be combined. The programming languages that work with APIs include libraries that allow to connect with the database, one of the most famous is Visual Studio, but there are other drivers that allow languages like Python and Node.js to connect with the database directly. For this web application, it is used because it can be linked to PHP and it is a high speed database reading because it uses a non-transactional engine (MyISAM) which allows to have the data at a high speed within the website.

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[7]`https://www.nginx.com` Last access: July 2021

[8]`https://www.mysql.com` Last access: July 2021

Chapter 3

Technological Proposal

In this chapter, we will discuss the functionality and architecture of the web application. We will explain the requirements that the web application meets and we will also talk about UML diagrams, which is a Unified Modeling Language that specializes in system design and modeling languages that will allow a clearer understanding of the behavior of the proposed application.

3.1 Requirements

3.1.1 Functional Requirements

Functional requirements are the functions of the components of a software system or their behaviors. They can be: functions to be fulfilled by the system, data manipulation, technical details and data calculations. In this section, we will be able to know the functional requirements and how they are incorporated into the web application, as shown in table 3.1.

Table 3.1: Functional requirements

ID	Title	Description
FR-001	Menu	When the page is opened and in all tabs, the main menu with the following options should be displayed: Home, Vendor, My Account and Shop.
FR-002	Home	When "Home" is selected, a page will open showing the products separated by categories, new products, favorites and discounted products. Each product will appear with its price and a button to add to the shopping cart, except for products that are already sold out and categories.
		Continued on next page

Table 3.1 – continued from previous page

ID	Title	Description
FR-003	Cart	When you select "Cart", a page will open showing the selected products, you can edit the quantity, remove a product from the selection and in turn the subtotal value will change. In addition, you will be able to see the total value of the cart and the price that will be added for shipping and IVA to calculate the total. There will be a button to finalize the purchase.
FR-004	Checkout	When "Checkout" is selected, a page will open that will show the order detailing the product, subtotal, shipping, VAT, Total. Also, you will have a form in which to put the billing details and includes a checkbox in case the wants to send the product to a different address. In addition, you can select the type of payment, direct bank transfer in case the user prefers to make a transaction instead of paying physically and cash on delivery in case the customer prefers to pay physically upon receipt of the product.
FR-005	My Account	When you select "My Account", you will be taken to a page that will display a form where you can create a new account or if you already have an account you can log in to your account. Accounts will allow customers to make purchases while sellers will be shown a desktop where they can view recent orders, manage, configure account details, manage shipping and billing addresses.
FR-006	Shop	When "Shop" is selected, a page will open showing all the products available within the page, you will also be able to sort products by popularity, average rating, last products added, low price and high price.
FR-007	Search	A product search engine that will perform the search by matching the letter you type with the letters of the product names.
FR-008	External cart	A cart will be added so that you can directly select the products you have selected and the value of the purchased items without adding taxes. In this option you will be able to go directly to the "cart" page or to finalize the purchase.

Clients

The functional requirements that will be taken into account for the clients as shown in Table 3.2 are one of the most important because the clients are the center of the application. For this we took into account the requirements that allow the user to have a good experience within the application and facilitates the use of it.

Table 3.2: Customers' functional requirements

ID	Title	Description
FRC-001	Create an account	Crete a customer account to register my purchases.
FRC-002	Products	To be able to see the categories of the products and to be able to see all the products inside the web page.
FRC-003	Cart	To be able to check the cart on any page and see the total value of the products in the cart.
FRC-004	Taxes	To be able to see the value to be added for IVA.
FRC-005	Shipping address	To be able to send the purchase to another address than the buyer's, if requested by the customer.
FRC-006	Type of payments	Have the option to pay in person or by bank transfer.

Vendors

As well as customers, salespeople are important within the application, so the functional requirements for salespeople shown in Table 3.3 are focused on having a comfortable and easy experience when selling and managing the store.

Table 3.3: Vendors' functional requirements

ID	Title	Description
FRV-001	Become a Vendor	To be able to change the customer account to a seller account.
FRV-002	Product image	As a seller you can upload a new product and at the same time you can add an image of the product you want to offer as part of the publication.
FRV-003	Price	To be able to add a value within the publication of our product and, if necessary, to be able to edit this value.
FRV-004	Emails	The seller must receive an email when they make a purchase of your products.
		Continued on next page

Table 3.3 – continued from previous page

ID	Title	Description
FRV-005	Add value for product ship-ment	To be able to add a shipping value of the product within the publication of the product.

3.1.2   Non-Functional Requirements

The non-functional requirements for the application are established according to the conditions that the web application needs to run correctly. In case a device does not meet any of these requirements, the application will not work as intended. The non-functional are shown in Table 3.4.

Table 3.4: Non-Functional requirements

ID	Title	Description
NFR-001	Security	Login requirements with different access levels. Password requirement
NFR-002	Performance	Application loading time 5 to 10 seconds.
NFR-003	Availability	Available every day of the year excluding mainte-nance days.
NFR-004	Compatibility	Compatibility on different platforms

3.2   Application Architecture

Within this section, we will talk about the architecture of the web application. The architecture of an application is also known as the skeleton of the same, where we can observe the interactions of the components, database and interfaces. This allows the application to work in a fluid way for the users as a server/client architecture would do. According to Marini [11] "Client/server models allow diversifying the work performed by each application, so that clients are not overloaded, preventing them from performing the functions in a direct and transparent way". The components with which this architecture is made and can be seen in Figure 3.1: DNS, Load Balancer, Web Application Servers, Databases, Caching Service, Data Storage, and CDN.

The Domain Name System (DNS) is in charge of looking up the domain name and IP address; this request is made by the user to the server. The load balancer is in charge of balancing the user's loads so that all servers process the requests in the same way. The web application servers are the back-end infrastructure and are responsible for processing user requests and sending documents. The database, on the other hand, provides the data and works directly with the

servers. Caching service, as the name implies, stores web page information in the cache to be able to access it in a faster way. Data storage is responsible for storing files such as videos or images and be able to show the user. The CDN is in charge of sending HTML, CSS, JavaScript, etc.
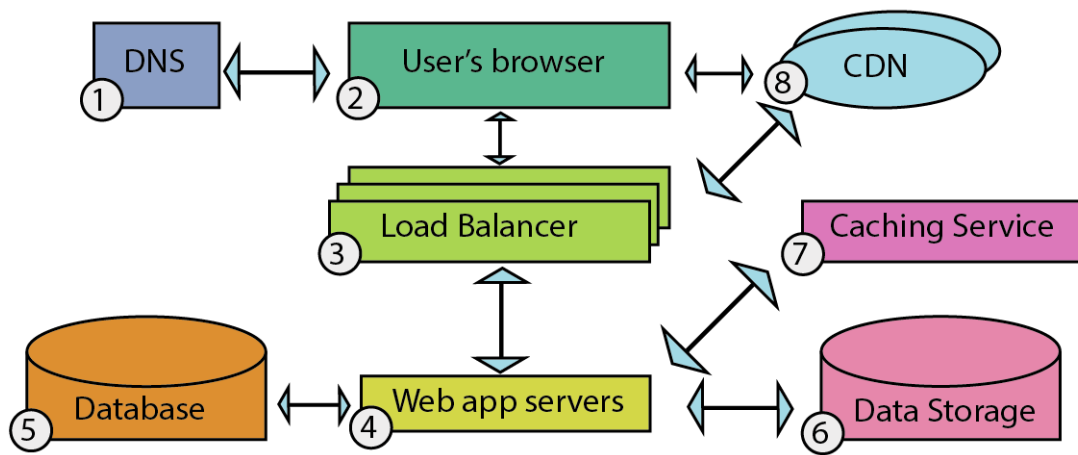
Figure 3.1: Application Architecture

3.3 Use Case Diagrams

In this section we will talk about the case diagrams that the application has. A case diagram is a graphical description that demonstrates the possible interactions of the users with the system. Typically the different types of users are represented with stick figures.

Figure 3.2 shows the diagram of the buyer showing how he is related to the sellers and the administrator. It also shows the actions that can be performed, such as paying, creating an account, becoming a seller, finalizing a purchase and selecting products.
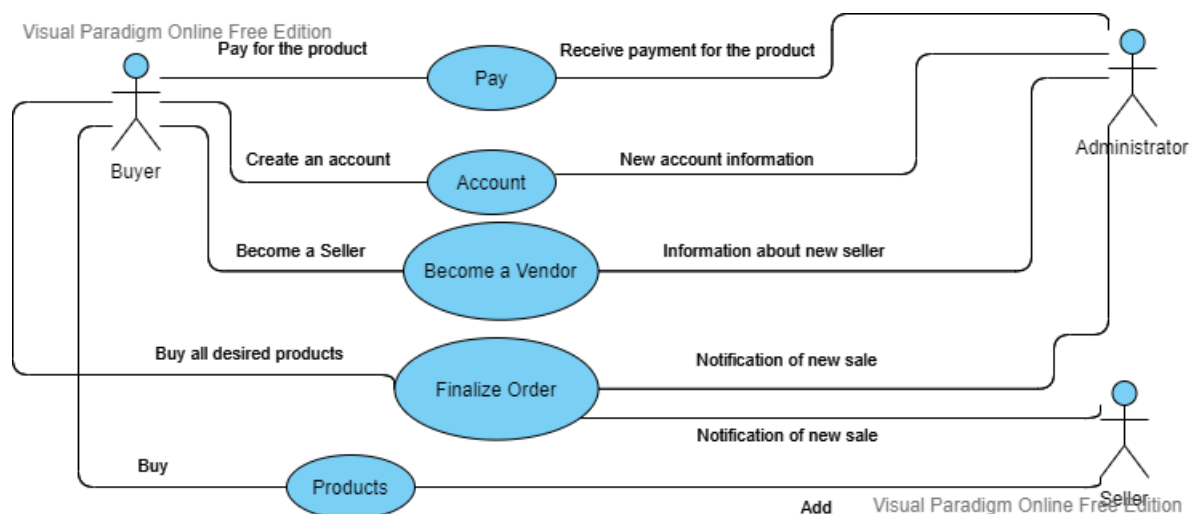
Figure 3.2: Use Case Buyer

Figure 3.3 shows the diagram of the seller who is related to the buyers and the administrator. You can also see the actions you can perform, such as Commission, create an account, send products, receive a notification of a purchase and add products.
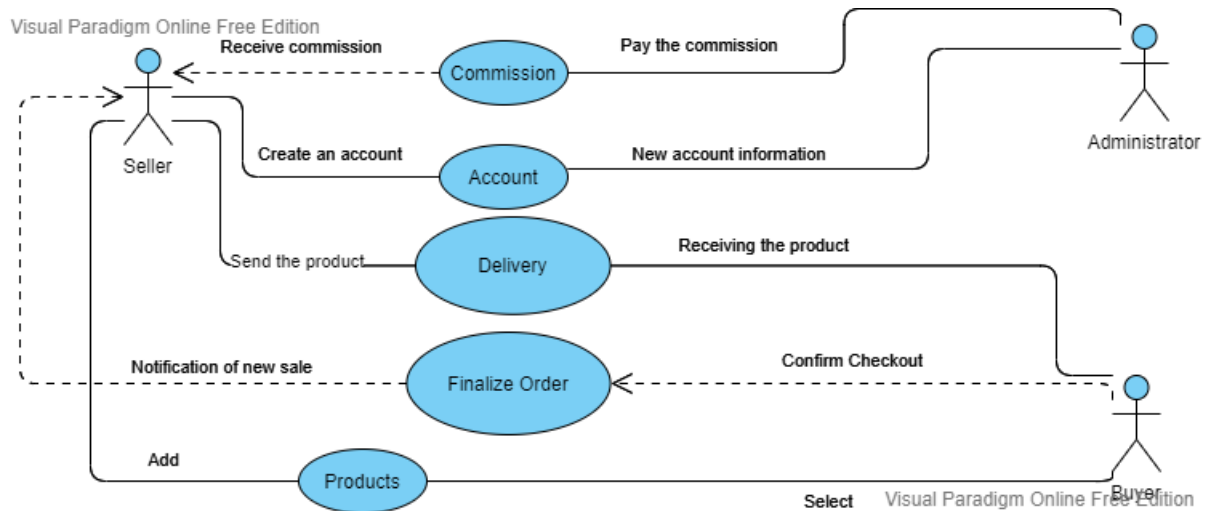
Figure 3.3: Use Case Seller

Figure 3.4 shows the diagram of the administrator who is related to the buyers and sellers. You can also see the actions you can perform, such as Paying a commission, Notification when an account is created, getting paid for products and receiving a notification of a purchase.
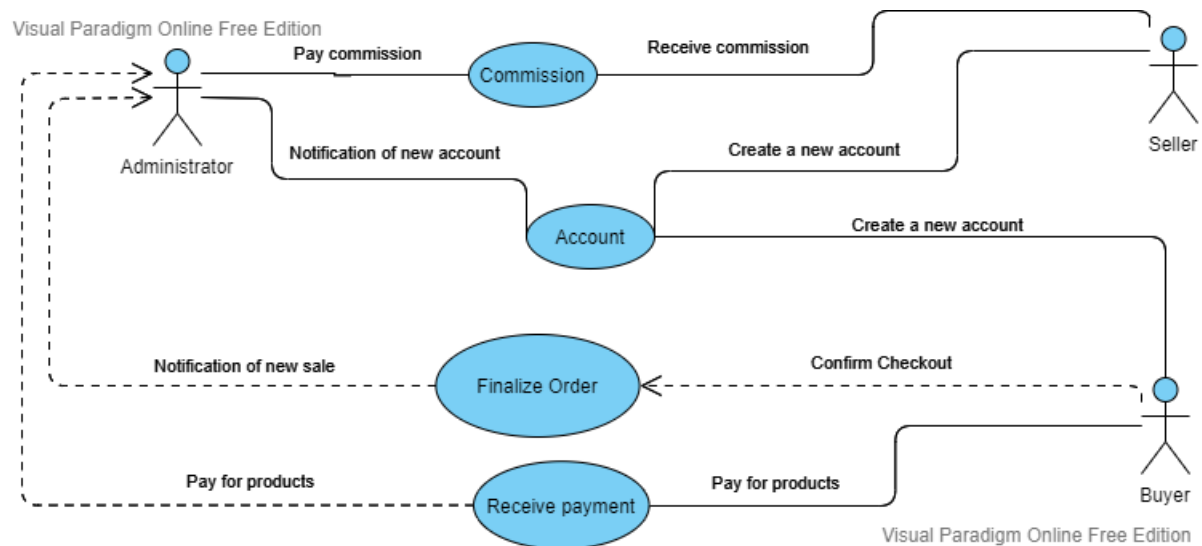
Figure 3.4: Use Case Administrator

3.4   Activity Diagrams

This section will show some diagrams that describe the dynamic aspects within the web application. It is considered an advanced version of the flowchart.

3.4.1   Customer Functions

Within the customer functions we have the checkout as shown in Figure 3.5 that allows us to finalize the order in case we are ready or return to the shopping cart, it also shows that in case we do not have an account, in the checkout we can create it.
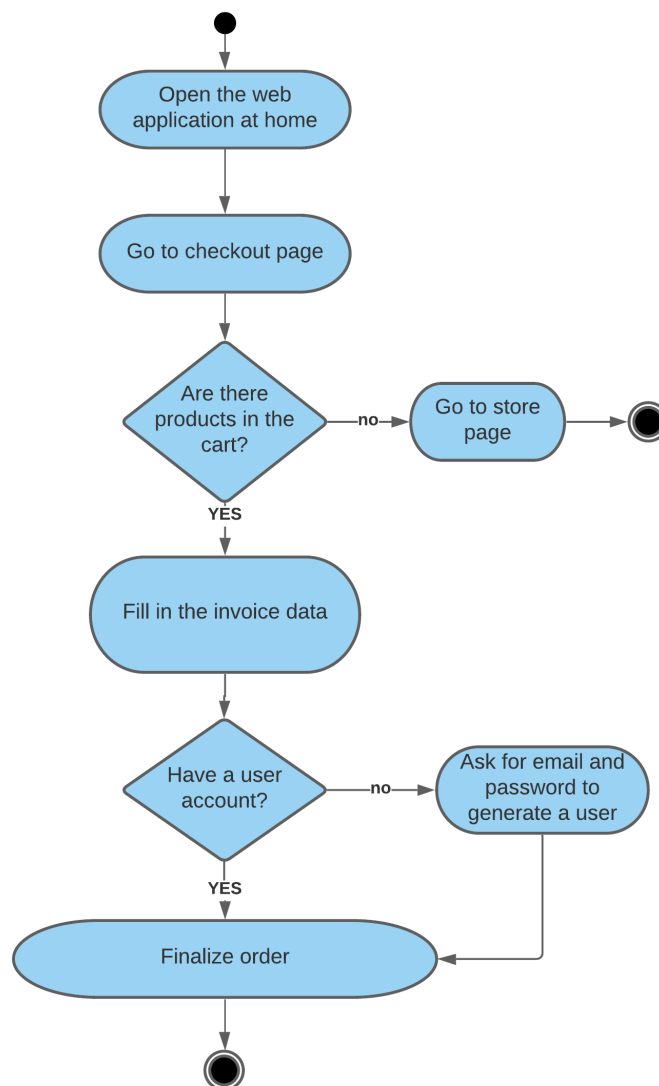
Figure 3.5: Customer functions (Checkout)

The Cart function shown in Figure 3.6. Within the cart we can review the selected products and change the quantity if necessary and then the user can proceed to checkout.
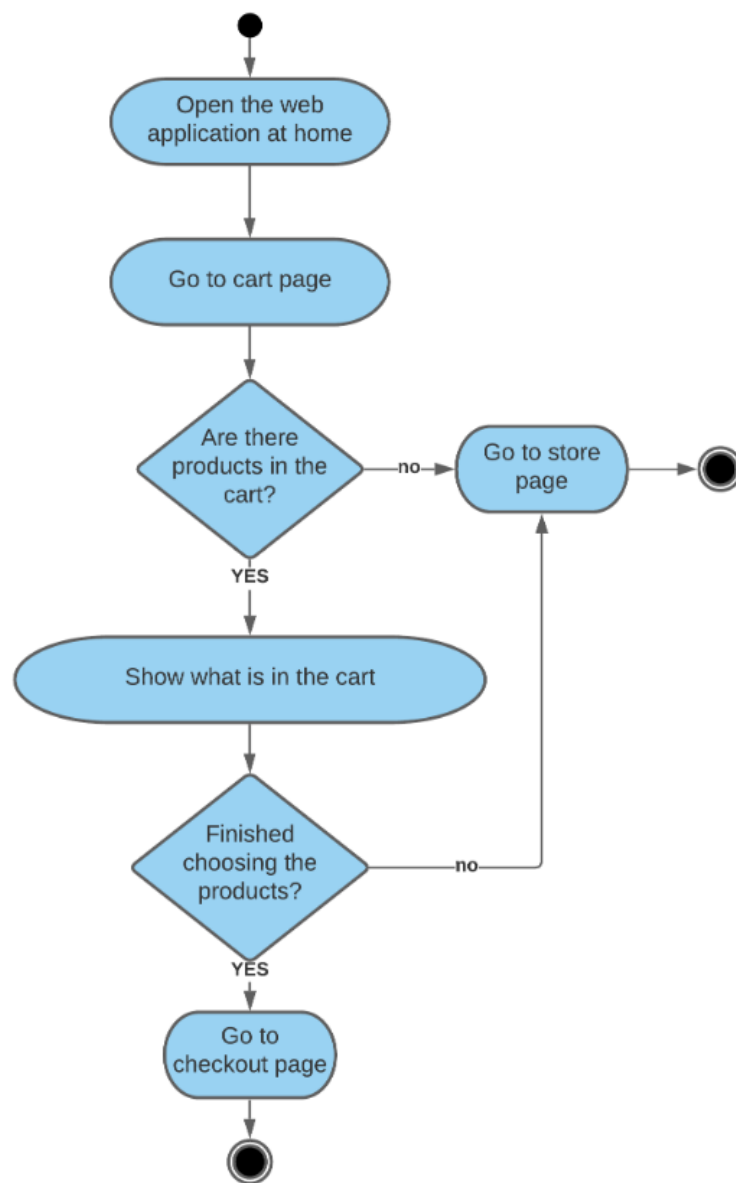
Figure 3.6: Customer Functions(Cart)

The home function shown in Figure 3.7 explains that if the user has finished choosing the product at the start, he can go to the cart.
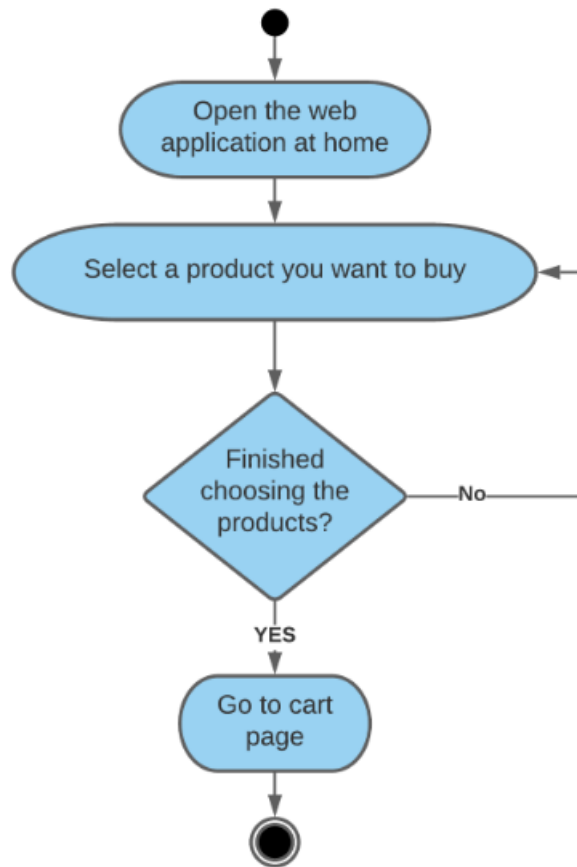
Figure 3.7: Customer Functions(Home)

The function My account shows us that the user can log in and in case the user does not have an account he can register as a buyer or as a seller as shown in Figure 3.8.
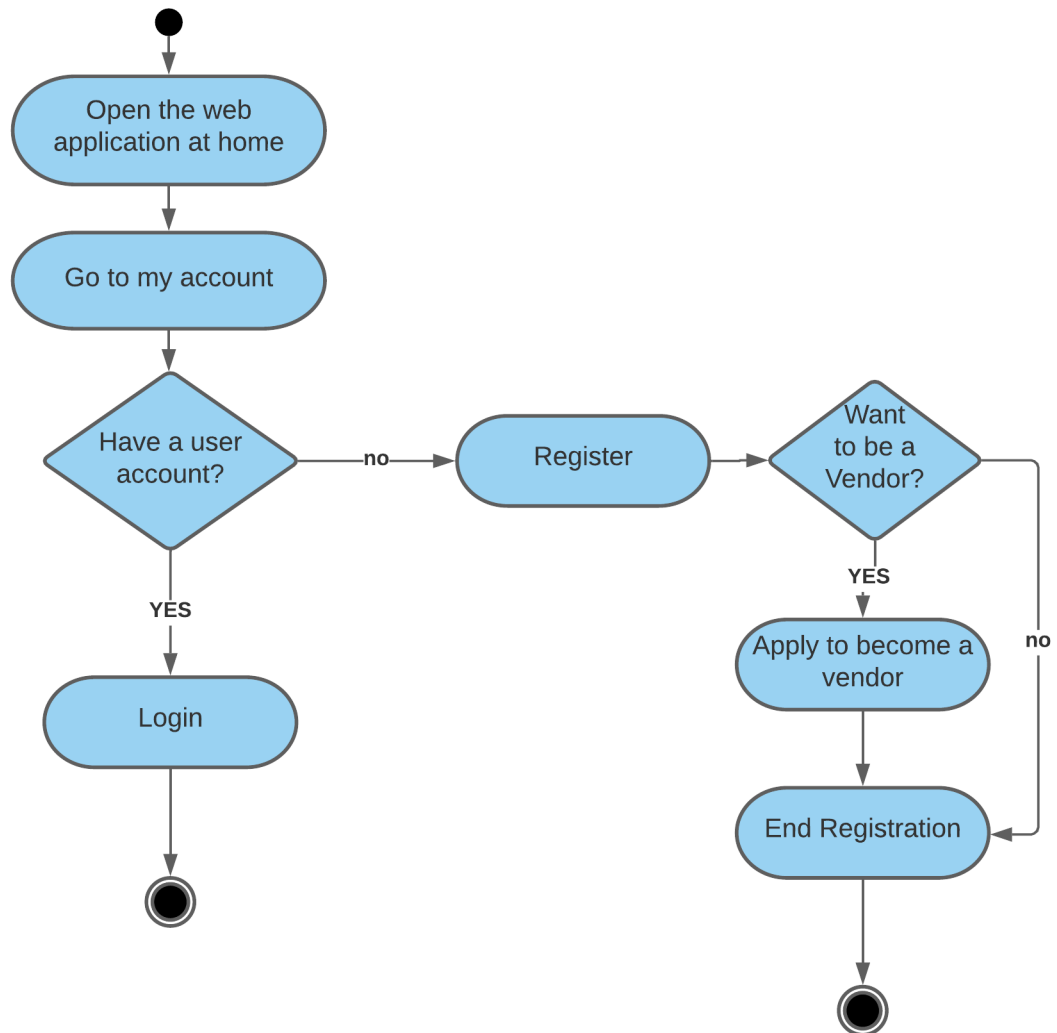
Figure 3.8: Customer Functions(My account)

The shop function shows us in Figure 3.9 that if the user has chosen all the products he can go to the cart and in case he has not finished he can continue choosing.
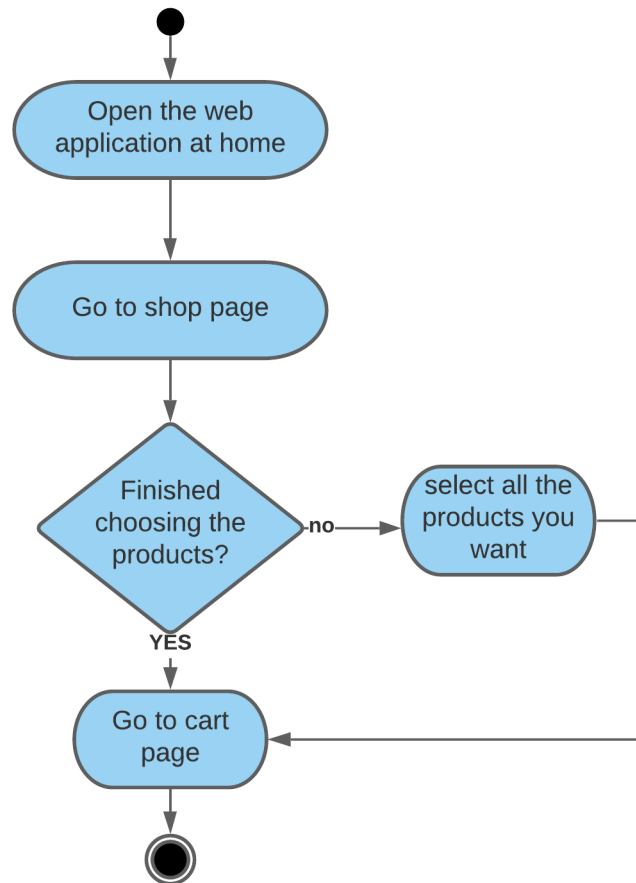
Figure 3.9: Customer Functions(Shop)

3.4.2   Ventors Functions

Within the vendor functions there is the view store function that allows the user to view the products in his store as shown in Figure 3.10.
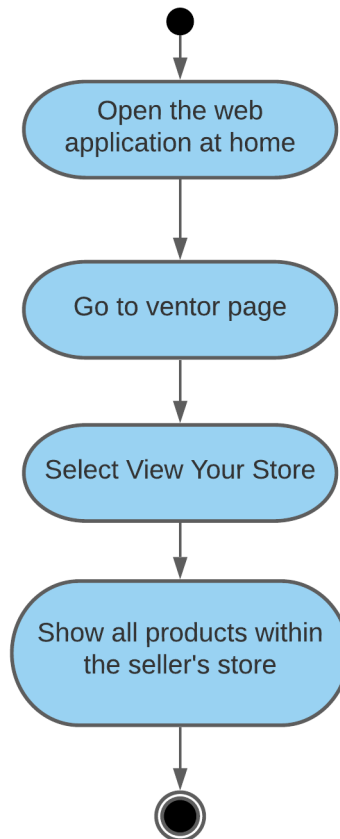
Figure 3.10: Ventors Functions(View Store)

The shop settings function allows the user to view all the information of his store as shown in Figure 3.11.
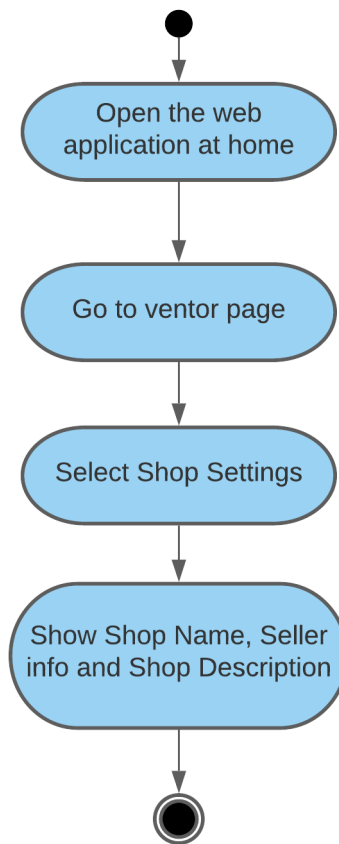
Figure 3.11: Ventors Functions(Shop Settings)

The add products function as shown in Figure 3.12 allows the user to open the interface so that he can upload products to his store.
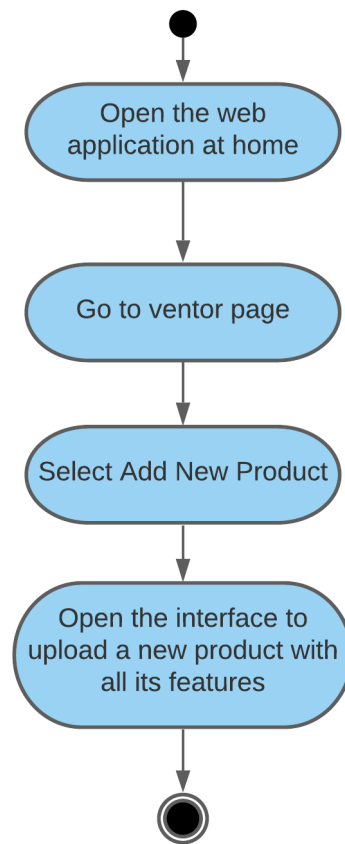
Figure 3.12: Ventors Functions(Add Products)

The edit products function allows the seller to edit the values or data of the products that are inside your store, this is shown in Figure 3.13.
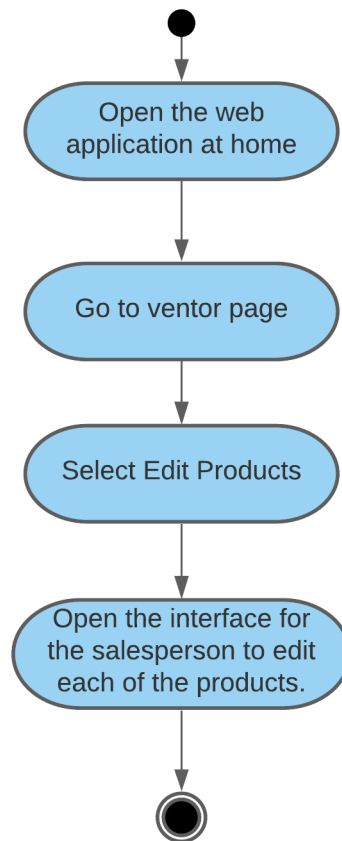
Figure 3.13: Ventors Functions(Edit Products)

The Ventor's report function shown in Figure 3.14 allows the user who is a seller to view a report and orders of his sales.
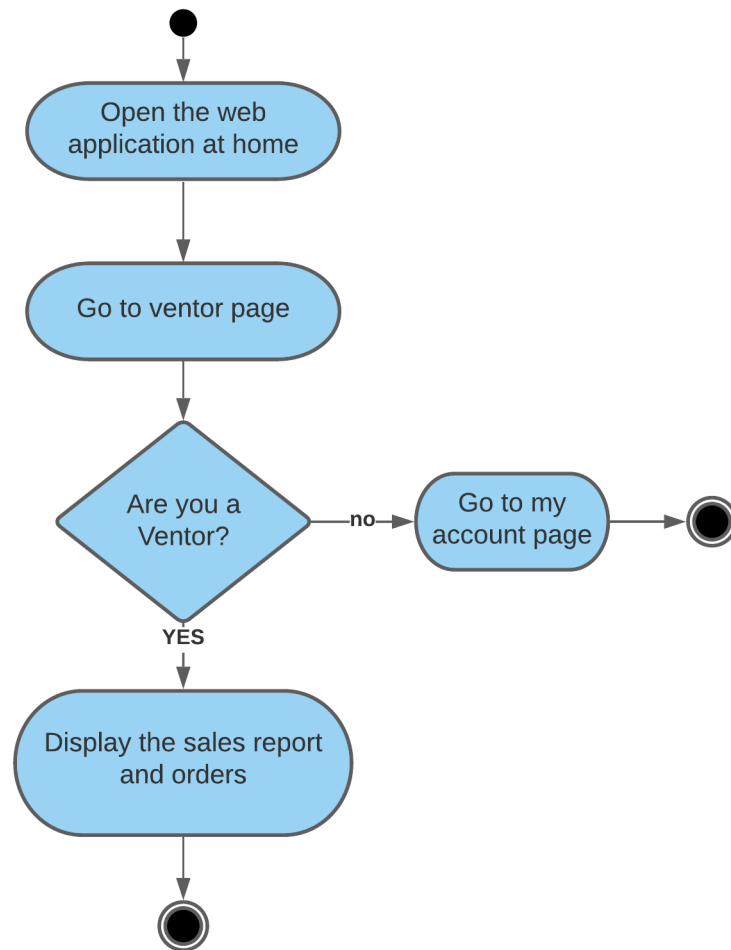
Figure 3.14: Ventors Functions(Ventor's report)

3.5　Database Diagrams

3.5.1　WordPress Database

A database diagram is responsible for representing the database visually. The data diagrams show how the tables that compose the database are related, inside Wordpress you have a diagram as you can observe Figure 3.15.
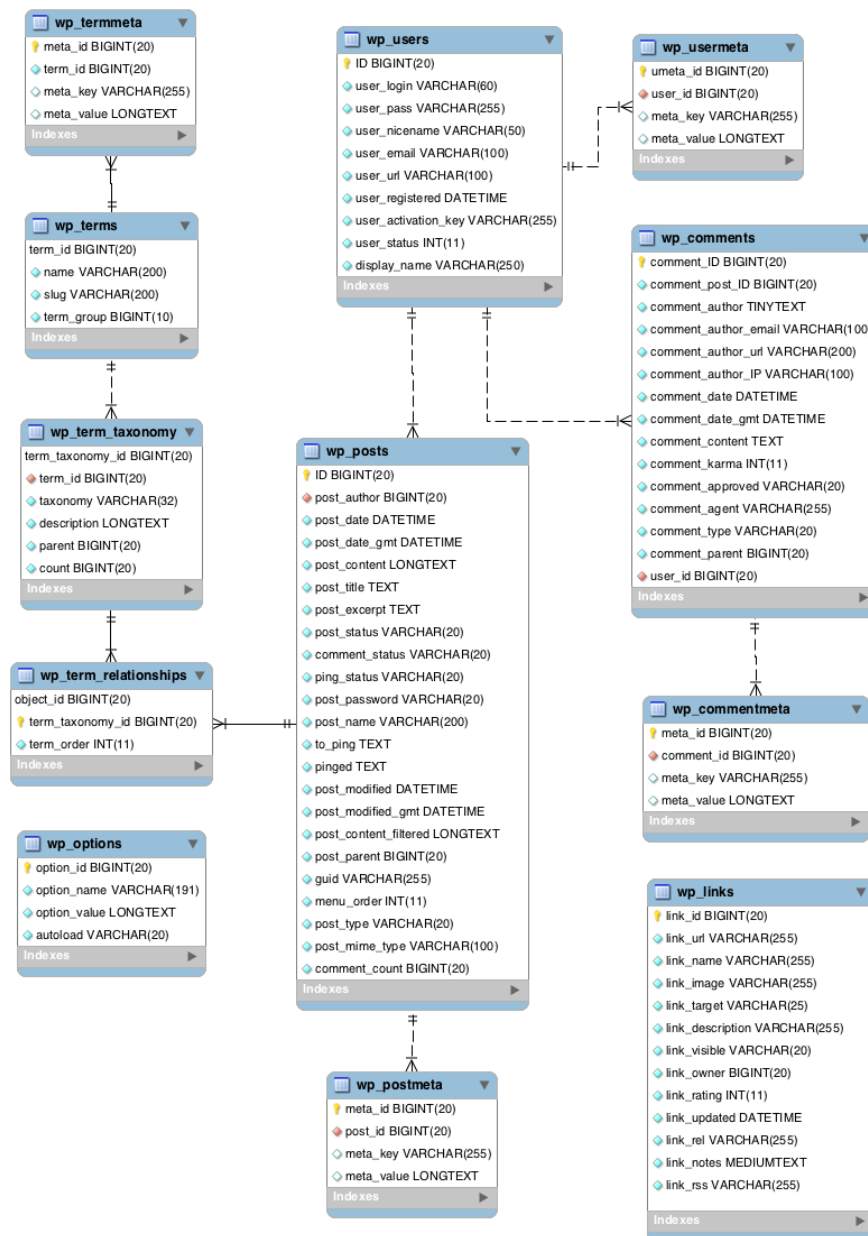
Figure 3.15: WordPress Database [1]

Within the table Figure 3.15 we have the role of each of the tables in the WordPress diagram.

Table 3.5: WordPress Database Table

ID	Description
wp_commentmeta	It is responsible for incorporating comments as meta data.
wp_comments	It is responsible for storing WordPress comments.
wp_links	It is responsible for storing WordPress links.
wp_options	Stores WordPress administration settings configurations.
wp_postmeta	Each entry contains data information that is stored in this table (plugins store information here)..
wp_posts	Menu information, pages and entries are stored in this table.
wp_terms	The respective categories of entries and links are stored.
wp_term_relationships	Saves the relationships that exist in wp_terms.
wp_term_taxonomy	The entire taxonomy of the wp_term table is saved.
wp_usermeta	It is responsible for storing all user information.
wp_users	A list of each of the users in the wp_users table is stored .

3.5.2 Woocommers Database

Woocommers has its own tables as you can see in Table 3.6 where it details each table, these tables are related to the Wordpress wp_postmeta table.

Table 3.6: Woocommer Database Table

ID	Description
woocommerce_sessions	This table stores the customer's session data.
woocommerce_api_keyss	This table stores API keys Stores.
woocommerce_attribute_taxonomies	This table stores the names of product attribute taxonomies.
woocommerce_downloadable_product_permissions	This stores the permissions for downloadable products.
woocommerce_order_items	Stores the information associated to the products.
woocommerce_order_itemmeta	Stores the metadata associated with the orders.

Continued on next page

Table 3.6 – continued from previous page

ID	Description
woocommerce_tax_rates	This stores the taxes created in the administrative control.
woocommerce_tax_rate_locations	Stores the locations created for each tax rate.
woocommerce_shipping_zones	This stores the shipping zones created in the configuration area.
woocommerce_shipping_zone_locations	Stores the locations associated with your shipping zones.
woocommerce_shipping_zone_methods	This stores the shipments for each of the zones.
woocommerce_payment_tokens	Stores customer payment tokens.
woocommerce_payment_tokenmeta	Stores metadata about payment tokens.
wc_webhooks	Stores the webhooks that have been configured in the store.
wc_download_log	This stores user downloads of downloadable products for record keeping.
wc_product_meta_lookup	Lookup table that indexes order metadata to speed up requests.
wc_tax_rate_classes	Stores tax class data.

3.5.3 Application Database

This diagram is a simplified version since when adding the different plugins, the database will be more extensive and with more attributes, but the ones shown are the main ones for the web application. Inside the database, we have the tables: user, client, salesman, store, product, and store. Also, have the primary keys of each one of the tables that shows which is the primary and most important data of the table, in addition, have the foreign keys that present the data that refer to another table.
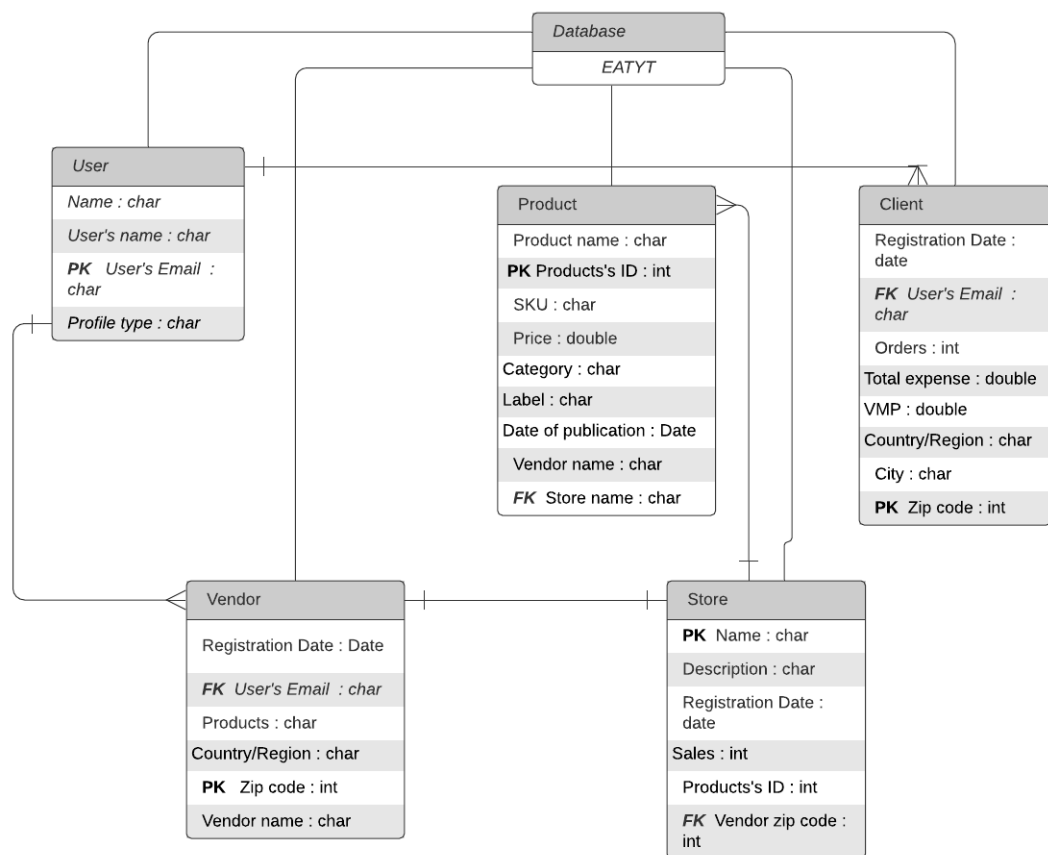
Figure 3.16: Database Diagram

Chapter 4

Deployment

4.1 Introduction

In this chapter we will explain step by step how to build a website, in the same way EatYT was built. It will also show the results of the tests that have been done with students of the university to prove its effectivity for the community.

4.2 Deployment

1. To begin, we must download Local and for that we will go to its main page as shown in Figure 4.1 through the following link: https://localwp.com, Local is used in case we do not have a domain and a host, it is in charge of using our computer with a local link to be able to see our web site.
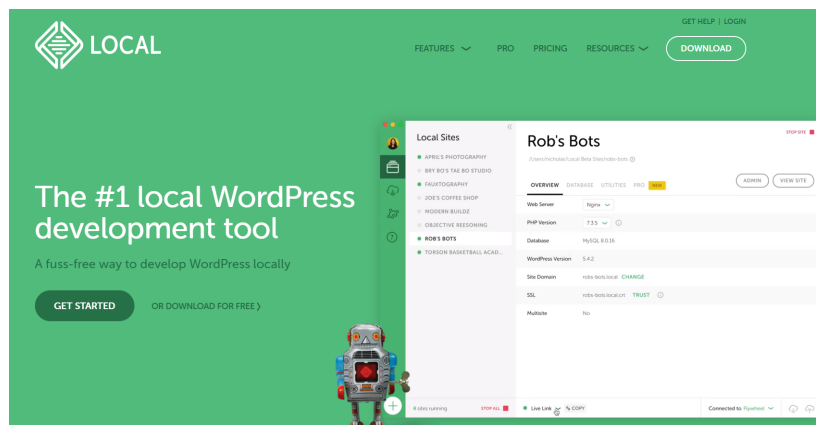
Figure 4.1: Local's web

2. After installing the program we will have a view as shown in Figure 4.2, we will create a web site with the base and the web server that we want for our web page.
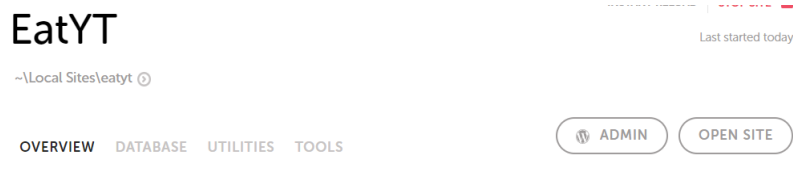
Figure 4.2: Local's admin

3. Then we will open the WordPress administrator inside Local, if we have done it correctly we will have a seen as in Figure 4.3, with this step we can start to design the web page.
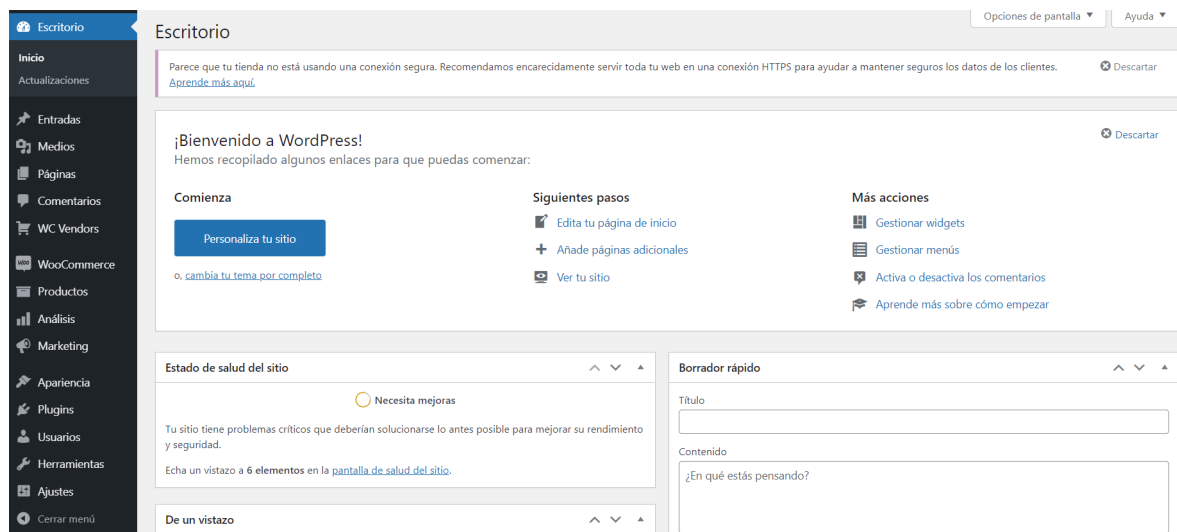
Figure 4.3: Wordpress administrator

4. Let's download the necessary plugins. First, Woocommers: go to plugins, add new, search for Woocommers, choose the plugin that is shown in Figure 4.4, then click on install and then click on the activate button. It will open a wizard in which we will adjust to our needs the general settings, products, taxes, payments, shipping, accounts and privacy and emails. At the end it will ask us if we want to select a theme for the page and we will use storefront because it is designed for this type of plugins.
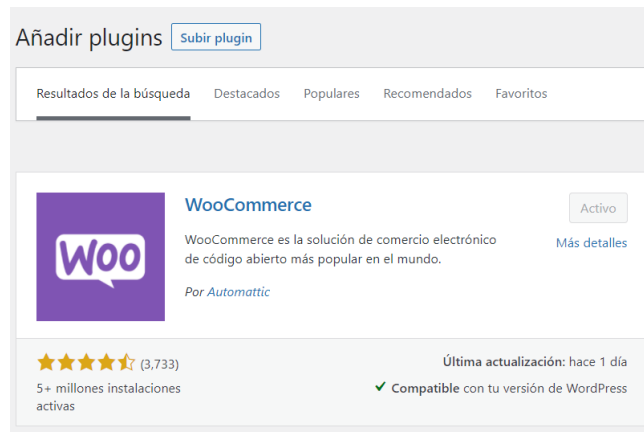
Figure 4.4: Woocommers plugin

5. Next we will add the WC Vendors plugin that will allow us to add vendors to our website, we go back to plugins and this time we look for WC Vendors and select the same as in Figure 4.5, once we install and activate it we continue with the configuration of the commissions and the permissions that we want to give to the vendors.
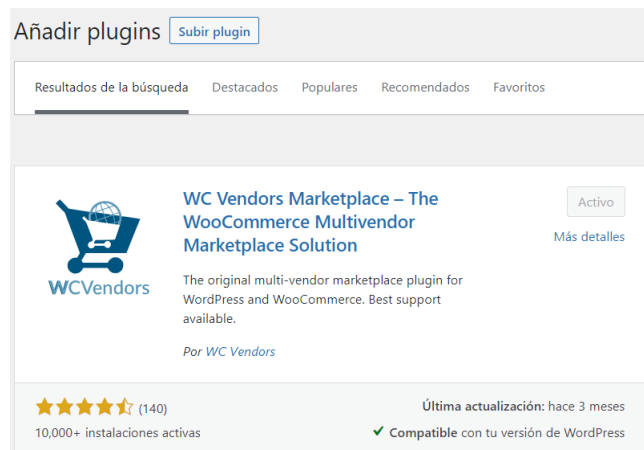
Figure 4.5: WC Vendors plugin

6. In the case of this application, we do not want the seller to put their own bank details so we need to remove these forms from the plugin, for this step we will look inside our computer the address where the plugin is located and edit the PHP file directly as shown in Figure 4.6.

```php
<form method="post">
    <?php

    do_action( 'wcvendors_settings_before_paypal' );

    if ( $paypal_address !== 'false' ) {
        wc_get_template(
            'paypal-email-form.php', array(
            'user_id' => $user_id,
        ), 'wc-vendors/dashboard/settings/', wcv_plugin_dir . 'templates/dashboard/settings/'
        );
    }

    do_action( 'wcvendors_settings_after_paypal' );

    ?>

    <?php do_action( 'wcvendors_settings_before_bank_details', $user_id ); ?>
```

Figure 4.6: PHP vendors

Chapter 5

User Study

For this section, a survey was done to the students of Yachay Tech Tech, and they were provided with the link to the web application (eatyt.net) so that they could try it and give their feedback.

5.1 Survey

The survey was conducted on the students of Yachay Tech University; the results were 23 students. This survey was done with the google form and control of the university emails. The survey was open for one week so that the students could test it comfortably.

First, the students were asked if there is or if they know of any website where they can make purchases and sales within the university campus. The results show that 95.7% of the students have no knowledge of a website with these characteristics, as can be seen in Figure 5.1.
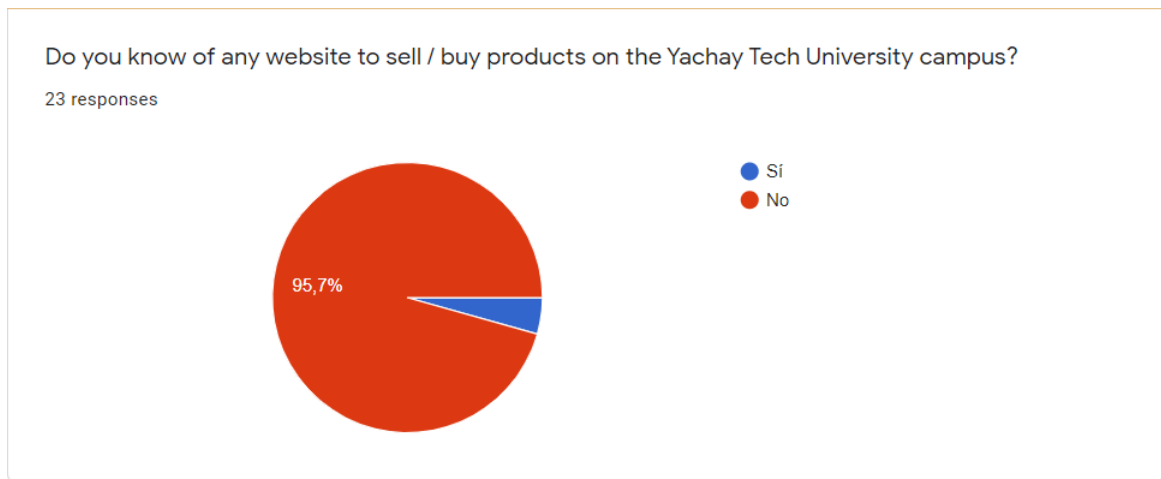
Figure 5.1: Percentage of students who are aware of another buying/selling platform

The second question (Figure 5.2) sought to find out what the most common problems are when making purchases within the university campus, for which several options were proposed. The most valuable were:

- Not knowing if the seller is reliable (39.1%).

- Not knowing if the product is reliable (52.2%).

- Not knowing the characteristics of the product offered (60.9%).

- Not knowing how to pay for the product (43.5%)

- Spam on WhatsApp of the products (17.4%)

In addition, students added that one of the problems they feel within the current system is not knowing if a product is still available in stock.
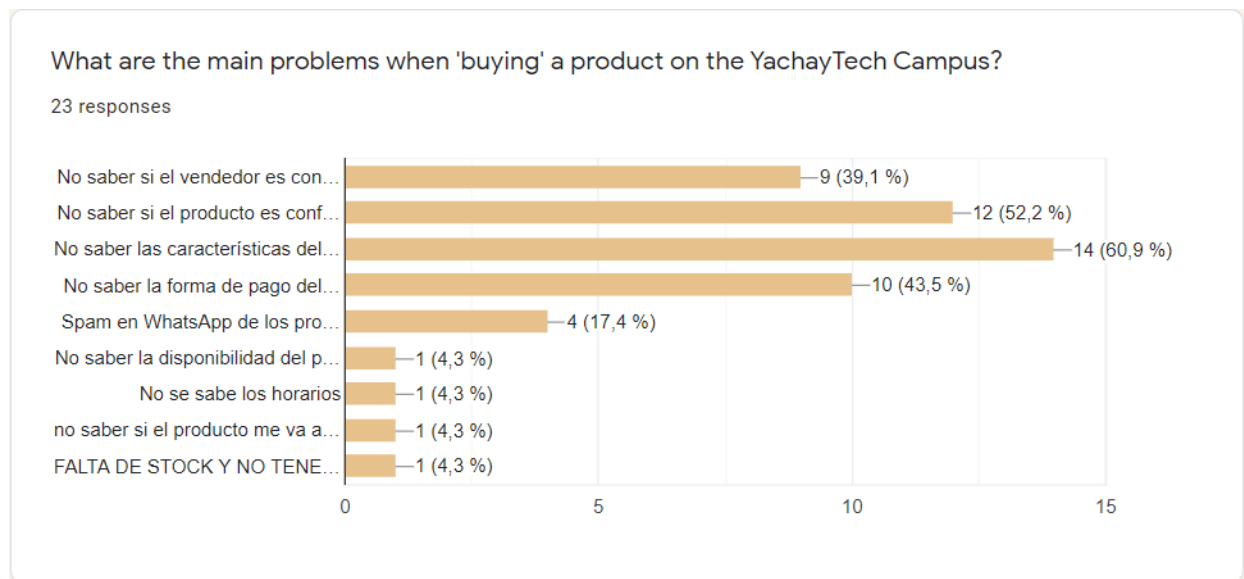
Figure 5.2: Buyers' problems with the current system

Question three (Figure 5.3) sought to find out what are the most common problems when making sales within the university campus for which several options were proposed. The most valuable were:

- Not knowing if the buyer is trustworthy (30.4%).

- Not having a direct communication with the buyer (65.2%).

- Not knowing how to pay for the product (30.4%).
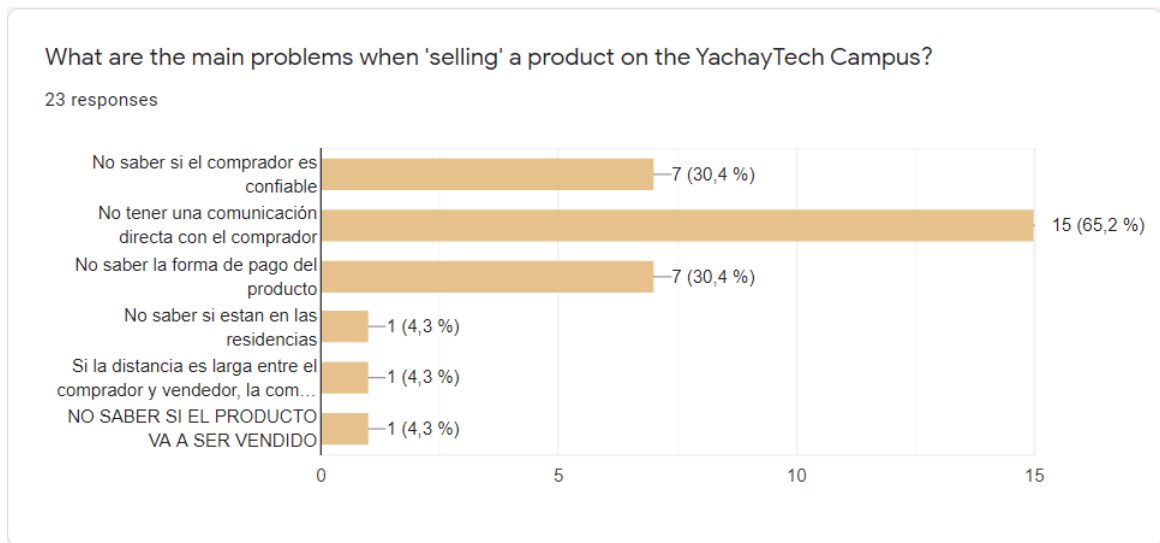
Figure 5.3: Vendor problems with the current system

After this question the link was provided to the students so that they could answer the following questions when they finished testing the web application. The following questions were rated on a scale of 1 to 5: How was the experience with the EatYT site? (Figure 5.4) How useful do you find the EatYT site? (Figure 5.5) How do you rate the content of the EatYT site? (Figure 5.6)
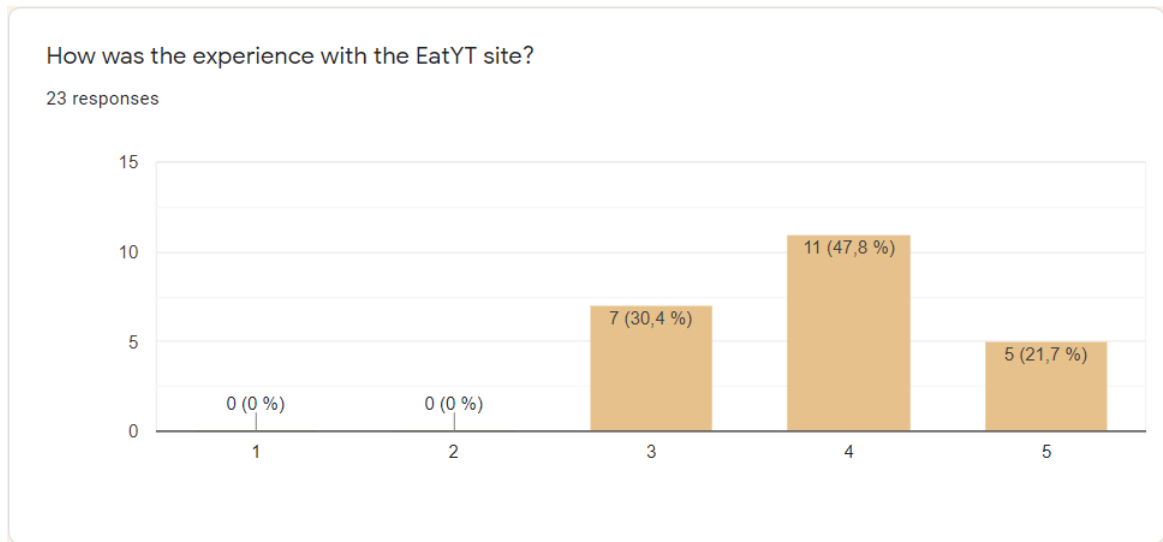
Figure 5.4: User experience when using the application
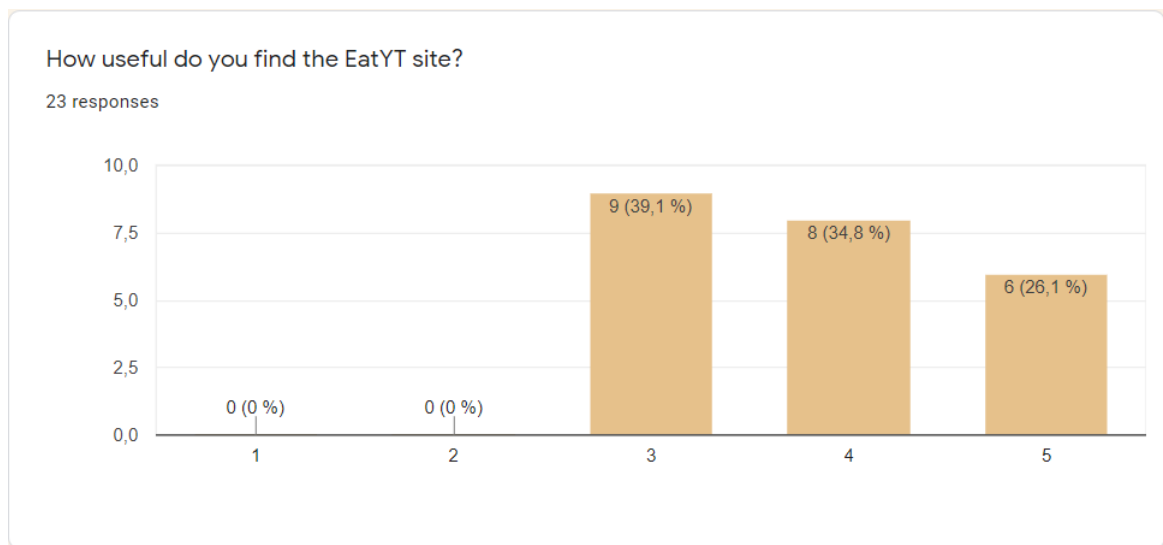
Figure 5.5: Utility rating
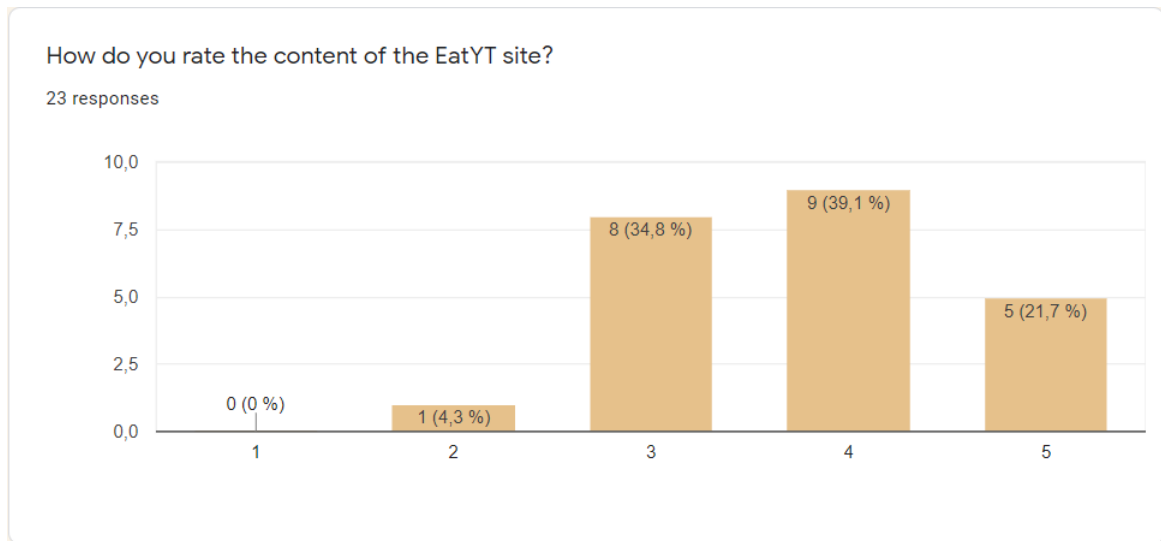
Figure 5.6: Content rating

Finally, some usability questions were asked so that students could express how smooth the web application was. First the students were asked: Does the purchase process seem simple and fast? The answer was 87% yes (Figure 5.7).
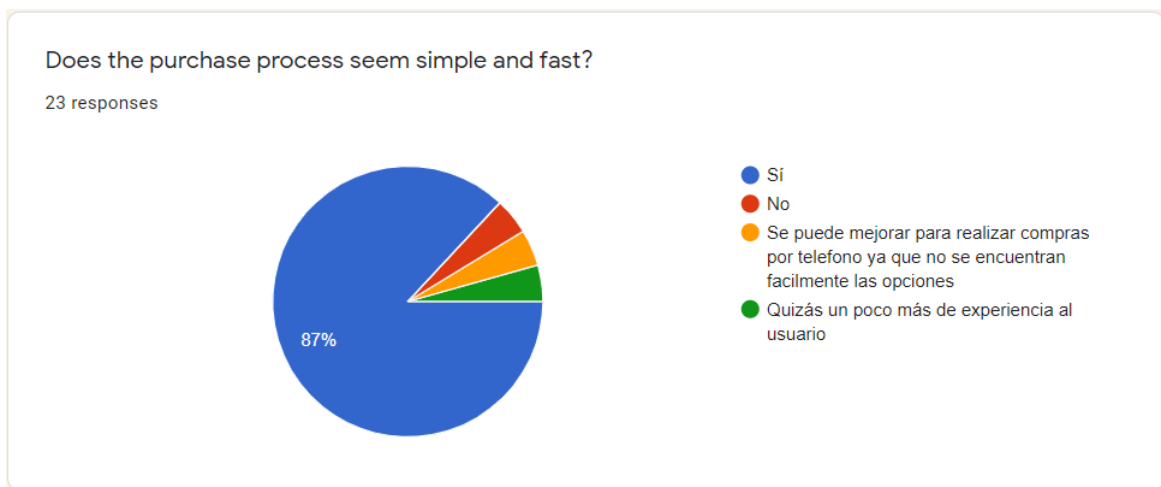
Figure 5.7: Opinion on the application purchase process

The second question was: If you are a seller, does the sales process seem simple and fast? This question was answered with 91.3% yes (Figure 5.8).
Next we asked: Was the content presented correctly? This question also had a 91.3% yes rate (Figure 5.9).
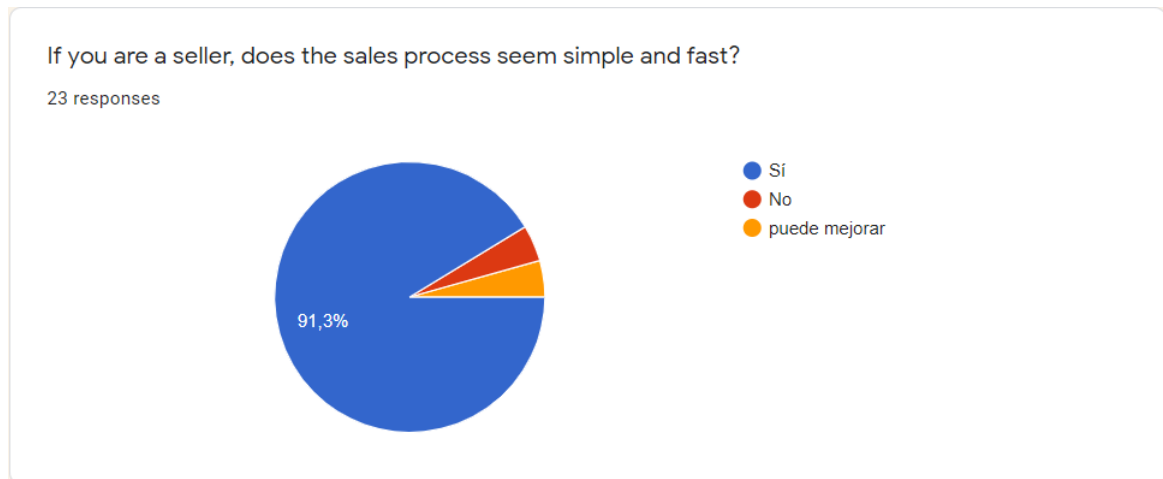
Figure 5.8: percentage of sellers who found it easy and simple to use the application
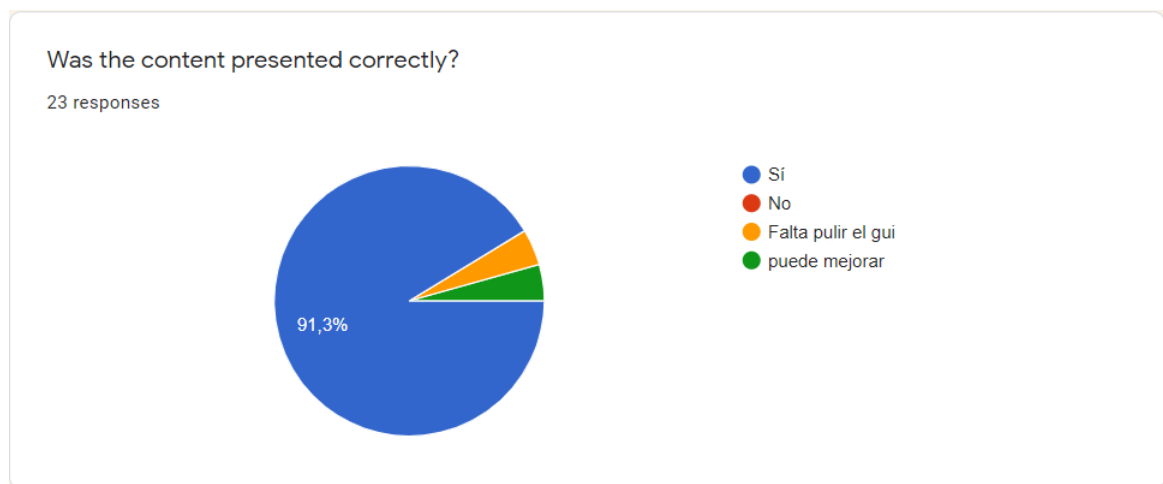
Figure 5.9: Percentage of users to whom the content was presented well

Last question: Do you think EatYT would help solve product sales / purchase problems on the Yachay Tech University campus? To which a 91% of yes was obtained (Figure 5.10).

Figure 5.10: Percentage of users who think that the application would solve the current problems of the buying and selling system

5.2   Discussion

We can observe that the students of the experimental university Yachay Tech within the university campus do not have a buy/sell application; this can be seen in Figure 5.1. For this reason, the EatYT application is a necessity because it is an application that facilitates the buying/selling within the university. We can also observe that within the campus, there is a purchase system with several problems when selling or buying products, for this reason, in Figure 5.2 and Figure 5.3 we can see how users, both buyers, and sellers remarked the current problems, such as: not knowing which product is reliable, not knowing which seller is reliable, not knowing the payment method, etc. On the other hand, the students who tested EatYT show us that they had a good experience, as can be seen in Figure 5.4 and Figure 5.5, this is also because the user likes the content of the application as they responded in Figure 5.6 . The experience of the application is something very important, so it is good to know how users lived the experience of buying and selling products within EatYT, as we can see in Figure 5.7 and Figure 5.8, both sellers and buyers responded mostly that the application gives them an easy and fast way when buying and selling their products, in addition to the content found in the web application is displayed correctly to users as we can see in Figure 5.9. To conclude, we can see that for the student users who tested the application they see EatYT as a practical solution to the current system and the problems it has, as shown in Figure 5.10, improving the buying and selling of products within the university campus.

Chapter 6

Conclusions and Future Work

6.1   Conclusion

At the end of this work, as discussed in section 1.2.1, a web application was created that allows the purchase/sale of food products and accessories. In addition, as discussed within section 1.2.2, EatYT allows sellers to reach more prospective buyers and allows buyers to pre-sell products. Similarly, fulfilling the usability objective, the application was tested through a survey of university students, with satisfactory results. With a complete version, the system of buying and selling within the university campus can be improved. This work gave me the opportunity to improve my knowledge of web application development; specifically, the use of CMS focused on web development and plugins focused on the online sales market. In addition, it allowed me to understand the architecture of a web application and to be able to work on both the back-end and the front-end and thus provide an application through the internet with its functionalities.

6.2   Future Work

Some ideas will be of great help to improve the experience of both buyers and sellers. In addition, we will take feedback from the students who tested the web application, so the future work to improve the web application would be:

- To add more payment methods such as credit cards to facilitate the purchase procedure.

- To add an option to agree with the seller in case it is better for the customer.

- To have a shipping service to facilitate deliveries by both sellers and buyers.

- To develop a mobile version of the application.

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Appendices

.1 Graphical User Interface Manual

The web application has a presentation, but for sellers it will show specific functions to control the products and the store.

.1.1 Customers

Home page

As can be seen in (Figure 1) it shows the products separated into categories, new in, fan favorites, discounted and best sellers, so that the customer can start with the choice of products and access the ratings directly by uploading the products to the cart.
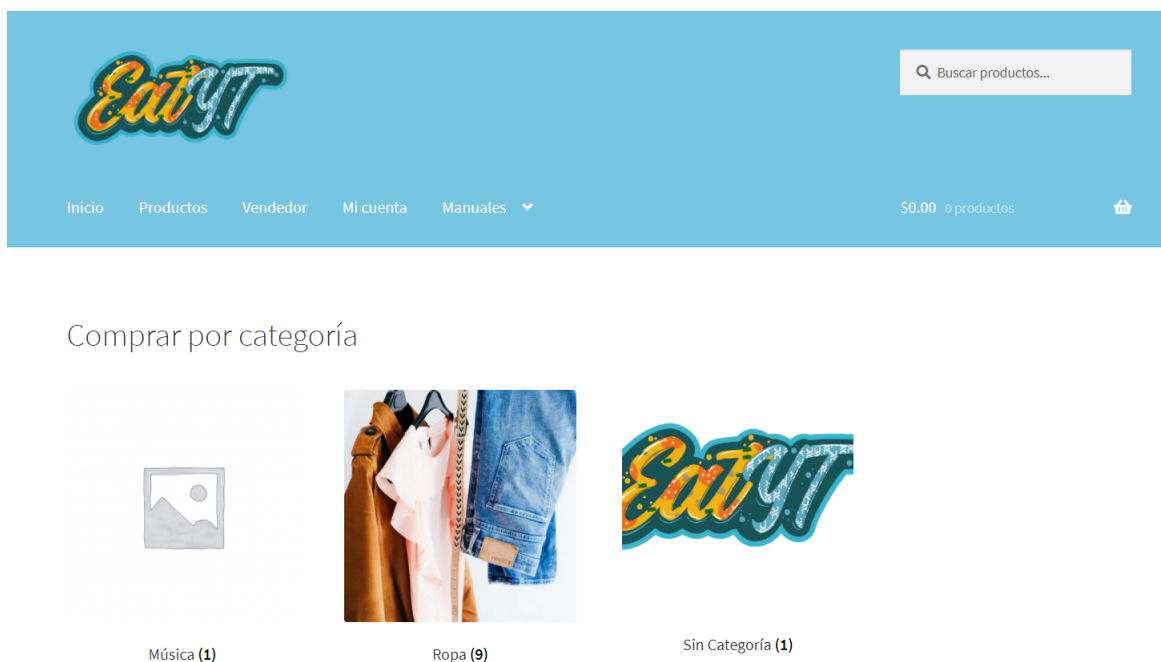
Figure 1: Home

Cart page

On this page (Figure 2) the user will be able to see everything that has been selected and added to the cart. The user will be able to modify the quantity of each of the selected products and the subtotal price will be adjusted to the new quantity. We can modify the address of the user and at the same time observe the interest that will have by shipment and the value of the Iva to be able to calculate the total of the purchase. In case the customer has finished choosing the products he/she will be able to use the checkout button.

Figure 2: Cart

Store page

The store page (Figure 3) has all the products inside the web page and can be sorted into different categories that will help the customer to better find the products. Each of the products shows the product name, price and the seller. When selecting a product, we can see a small description, general information and ratings both by comments and stars.
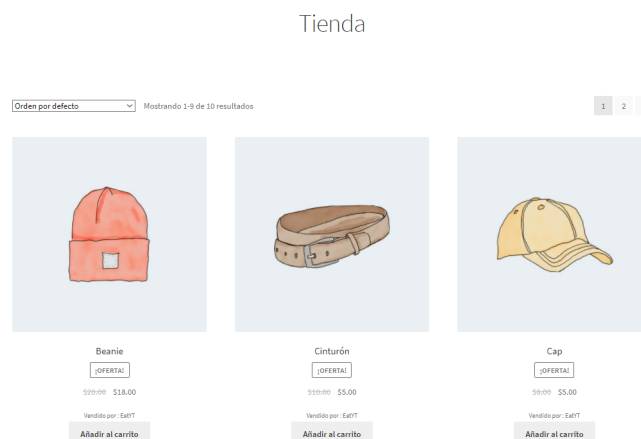

Figure 3: Store

My Account Page

The user will be able to access the "my account" page (Figure 4) to register to the site by filling in the email and password fields. In case it is not the first time you can log in with your email and password. In addition, if you wish you can apply to be a seller and thus have all the options of a seller.

Figure 4: My Account

Checkout Page

After having products in the cart when entering the checkout page (Figure 5), the customer will be able to fill in the information for the purchase: name, last name, address, telephone and email. In case the customer has not generated a user in my account, some options will be generated where it will ask for an email and password to generate a new user. In addition, the price will be displayed and the payment method can be selected, either bank transfer or cash. Then you will be shown the data to which you have to make the transfer or the data of the purchase.

Figure 5: Checkout

As a last step before finalizing the purchase with transfer, the user will be asked to upload a photo of the payment receipt(Figure 6), which will be sent to both the buyer and the seller to the email where the purchase data is detailed.

Figure 6: Payment Receipt

.1.2   Vendor

Vendor page

Within this page (Figure 7) the seller will be able to have control of his store and his product. It will show a list with the sales report with the commission he has on the page and it will show the orders that have been generated in the store. Then there are the options where we have to view the store, store configuration, add product and edit product. Within view the store will display all the products within the store. In configuration you can change the name of the store, a small description and a box for store information. Inside add a product will open the interface to be able to place the product with its respective price, description, shipping price, a photograph and quantity of product. To finish we will have to edit products where it will allow us to eliminate, to change the price, the quantity or the photograph of some of the products already published.

Figure 7: Vendor

.2   Administrator User Manual

Within WordPress (Figure 8), for the Administrator, the system will show several tabs with different configurations. Within this manual we will only focus on three of them. The first is pages that is responsible for displaying each of the pages within the web application, you can edit all the content of each of them.

The following two are more important so there will be a greater emphasis on the features they have and how the administrator can take advantage when controlling the web application.
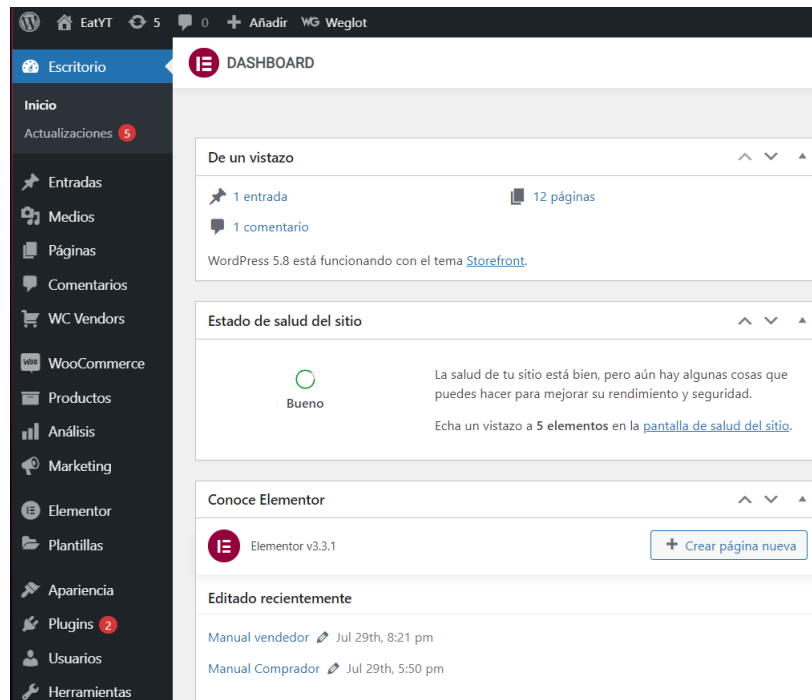

Figure 8: WordPress

.2.1 Woocommers

This tab (Figure 9) has all the necessary tools and features to manage products, payments, shipping and taxes. It always shows the basic configuration options: add products, configure payments, configure taxes, configure shipping and customize the store.

- Store details: In this section you can put the details of the store such as: Physical address in case it exists and the types of products that will be sold on the website.

- Add products: Allows you to load some default products to test how the store would look like having products, add products manually and by CSV which allows you to add from a list without image.

- Configure payments: Allows you to select which types of payments will be allowed on the page such as: Prepayment, wire transfer or PayPal.

- Configure taxes: To be able to add the taxes of each of the countries or personal taxes if necessary.

- Shipping configuration: Gives the possibility to add different types of shipments or to configure where shipments are allowed or not allowed, plus you can add a value for the shipment depending on the destination.

- Customize my store: Leads directly to the store theme to be able to edit the aesthetic part.

On the other hand, you can see a summary of statistics showing the number of orders and total sales for the day, week and last month. Finally, it has a store management that allows you to advertise the site, add products as if we were sellers, customize the store logo and view the store as if we were a buyer.
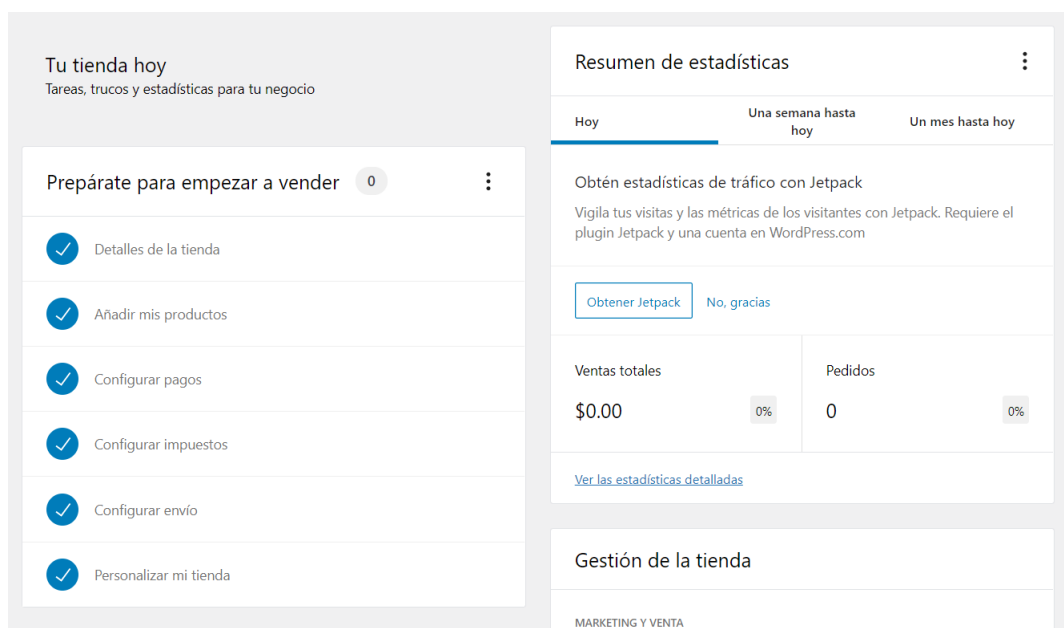

Figure 9: Woocomers

.2.2   WC Vendors

In this tab (Figure 10) the user can control several fields of the different sellers, for starters it shows the commissions, it shows which seller has sold the products at what price and how much the administrator has to deposit to the store and how much he receives for each of the sales. Also in the settings you can configure who only can be a seller, what are the terms and conditions. There is another tab that allows you to restrict the permissions that the seller will have with each of the products he uploads to his store.

Order ID	Vendor	Product	Quantity	Commission	Shipping	Tax	Total	Status	Shipped	Date
178	erickedu85	Guitarra eléctrica (2)	1	$40.50	$0.00	$0.00	$40.50	due	No	agosto 6, 2021
69	prueba2	prueba (1)	1	$1.00	$0.00	$0.00	$1.00	due	No	mayo 14, 2021
Order ID	Vendor	Product	Quantity	Commission	Shipping	Tax	Total	Status	Shipped	Date

Figure 10: WC Vendors