BUSCABECAS: TU PORTAL DE BECAS EN ESPAÑA

BUSCABECAS: YOUR SCHOLARSHIP PORTAL IN SPAIN

TRABAJO FIN DE GRADO
CURSO 2023-2024

AUTORES
DANIEL MARTÍN GONZÁLEZ, INÉS PALERO SAN ROMÁN, LAURA SAN MARTÍN DOBLADO

DIRECTOR
ANA MARÍA GONZÁLEZ DE MIGUEL

GRADO EN INGENIERÍA INFORMÁTICA
FACULTAD DE INFORMÁTICA
UNIVERSIDAD COMPLUTENSE DE MADRID

BUSCABECAS: TU PORTAL DE BECAS EN ESPAÑA
BUSCABECAS: YOUR SCHOLARSHIP PORTAL IN SPAIN

TRABAJO DE FIN DE GRADO EN INGENIERÍA INFORMÁTICA

AUTORES
DANIEL MARTÍN GONZÁLEZ, INÉS PALERO SAN ROMÁN, LAURA SAN MARTÍN DOBLADO

DIRECTOR
ANA MARÍA GONZÁLEZ DE MIGUEL

CONVOCATORIA: JUNIO 2024

GRADO EN INGENIERÍA INFORMÁTICA
FACULTAD DE INFORMÁTICA
UNIVERSIDAD COMPLUTENSE DE MADRID

27 DE MAYO DE 2024

DEDICATION

To all students striving to achieve their academic goals.

ACKNOWLEDGEMENTS

Words cannot express our gratitude to Ana María González de Miguel for her commitment and support since the beginning of the project. Her dedication and guidance have been invaluable to us and have made this journey an enriching and rewarding experience. Thank you for encouraging us to improve and grow at every step of the way.

Additionally, this endeavor would not have been possible without our beloved friends and family, who have journeyed with us over these four years. Their support has been indispensable, nurturing our personal growth and development along the way. Thank you for being there for us during both the good times and the challenging moments.

RESUMEN

BuscaBecas

BuscaBecas es una plataforma dedicada a simplificar la búsqueda y solicitud de becas en España. El objetivo es proporcionar un acceso centralizado a todas las becas disponibles en el país, desde oportunidades universitarias hasta programas de investigación o formación profesional.

La plataforma ofrece la funcionalidad de búsqueda intuitiva y personalizable, permitiendo a los usuarios filtrar las opciones según sus necesidades específicas, como área de estudio, ubicación, nivel educativo y más.

Además de facilitar la búsqueda de becas, BuscaBecas se compromete a proporcionar orientación integral a los usuarios a lo largo de todo el proceso de solicitud; desde la identificación de oportunidades hasta la presentación de solicitudes y el seguimiento del progreso.

Una característica distintiva de BuscaBecas es la mascota, Bequi, quien está disponible para proporcionar asistencia en línea y hacer que la experiencia de búsqueda de becas sea más interactiva y agradable.

Palabras clave

Becas, España, búsqueda, chat, notificación, personalización, Bequi, educación.

TABLE OF CONTENTS

TABLE OF FIGURES

Chapter 1 - Introduction

Scholarships play an important role in facilitating access to higher education and professional development in Spain. These educational opportunities serve as means for students and professionals to seek their academic and career goals.

In Spain, the list of available scholarships is both extensive and diverse. Ranging from undergraduate and postgraduate university scholarships to those supporting research, entrepreneurship, and vocational training, the country offers a rich variety of options. These scholarships are provided by various institutions, including the government, private organizations, foundations, and universities, with the aim of promoting academic and professional excellence.

1.1 Motivation

The purpose for this project stems from addressing several problems regarding access to scholarly information and its effective sharing in Spain.

1. Information Gap: There are many scholarships in Spain to support education and professional growth. However, a significant gap in information exists. This lack of easily available, organized, and current data frequently results in numerous scholarships going unclaimed, leaving allocated funds underused.
2. Absence of Comprehensive Platforms: Currently, no single platform consolidates details about all scholarships in Spain. Applicants often must search multiple websites, complicating comparisons between opportunities and qualifications.
3. Supporting Promising Learners: Our goal reaches to aiding promising students to chase their educational and career visions. Scholarships provide not only fiscal aid but additionally diffuse a sense of self-assurance and inspiration to excel academically.
4. Enhancing Transparency: By furnishing clear and reliable scholarship information, we seek to improve trust in the scholarship applying process.

Applicants ought to be able to make informed conclusions and trust that the data furnished is accurate and up to date.

1.2 Goals

The aims we wish to accomplish with this project are as follows:

1. Develop an intuitive website that aggregates scholarship information from diverse sources, focusing on grants available in Spain.
2. Implement scalable database that properly stores and administers scholarship information, user profiles, and related data.
3. Contribute to promoting accessible and equitable education by facilitating financial resources for those in need.
4. Regularly refresh and maintain the platform to ensure data accuracy and relevance.
5. Increase awareness about the importance of scholarships and the life-changing opportunities they offer regarding education and personal growth.
6. Provide a user-friendly, step-by-step application guide for each grant, including document prerequisites and deadlines.
7. Deploy robust data security measures to safeguard users' personal information.
8. Add an element of excitement to the website, making it livelier and more enjoyable.

1.3 Work plan

To organize ourselves with the planning of the project, we chose the Miro tool (https://miro.com/es/) due to its ease and intuitive interface, which perfectly suited our needs. Moreover, as it is an online collaborative tool, we could work together in real time and edit the table.

We divided the table into three columns to differentiate the tasks that were still to be done (To do), those that were being done (In progress) and those that had already been completed (Done). This is a typical Kanban board to help visualize work. In addition,

to make it visually clearer, we assigned each column a color: blue, yellow and green respectively; as well as the expected delivery date of each task.

This way we could clearly see the progress we were making and easily add new tasks or change the status of the ones we already had.

In addition, to follow up the project with our tutor we organized meetings at the end of each assignment to review what we had done and see what we could add or improve. For some tasks that lasted more than a week and were a bit more complex, we would sometimes send Ana halfway through time what we had done so she could guide us and tell us how we were doing. These meetings have significantly contributed to the development of the project, as we highly value the support of our tutor, which has provided us with a significant boost.

In *Figure 1: Initial working plan with Miro, Figure 2: Intermediate working plan with Miro* and *Figure 3: Final working plan with Miro* we can observe how we have used the Miro tool while doing the project:

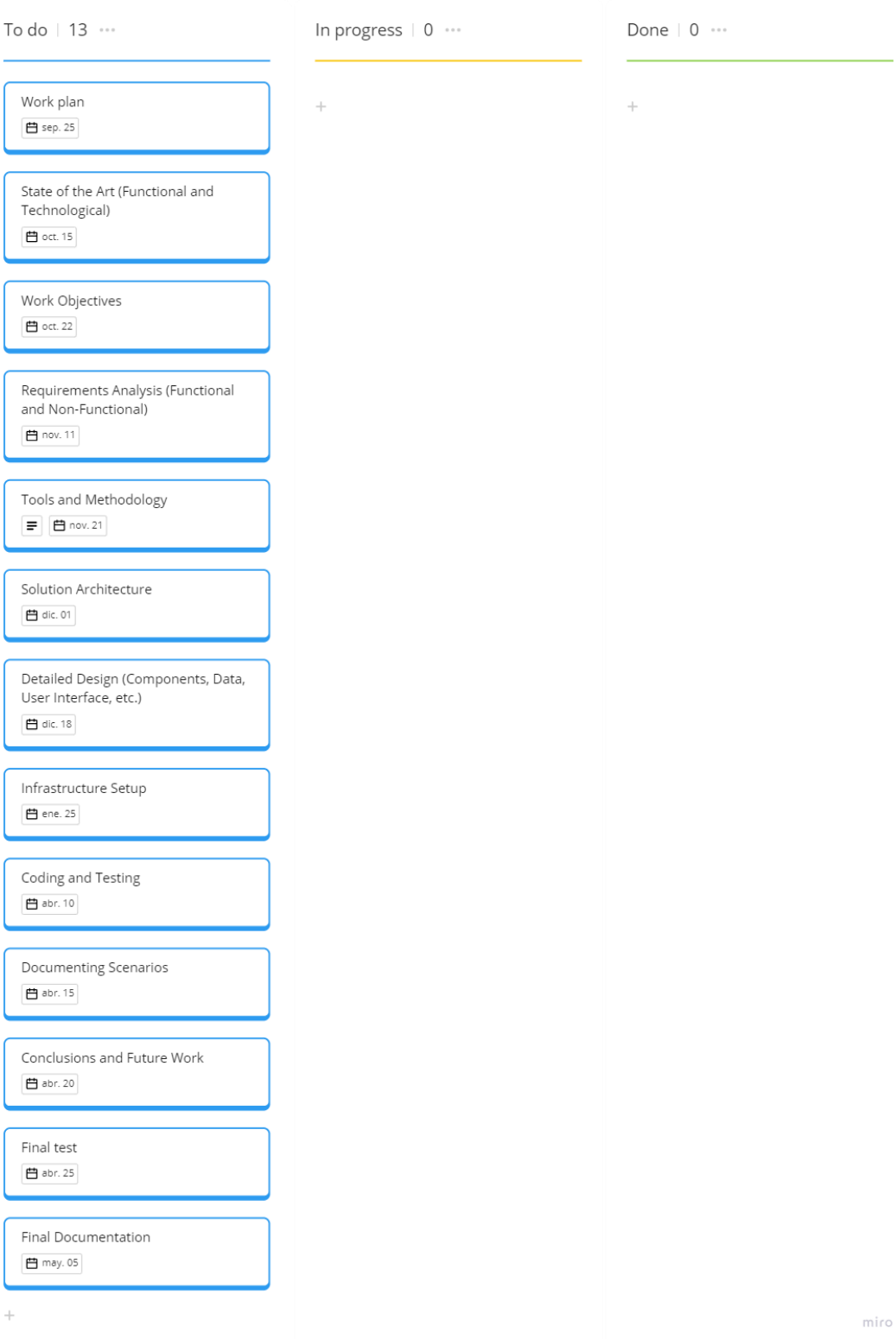

Figure 1: Initial working plan with Miro

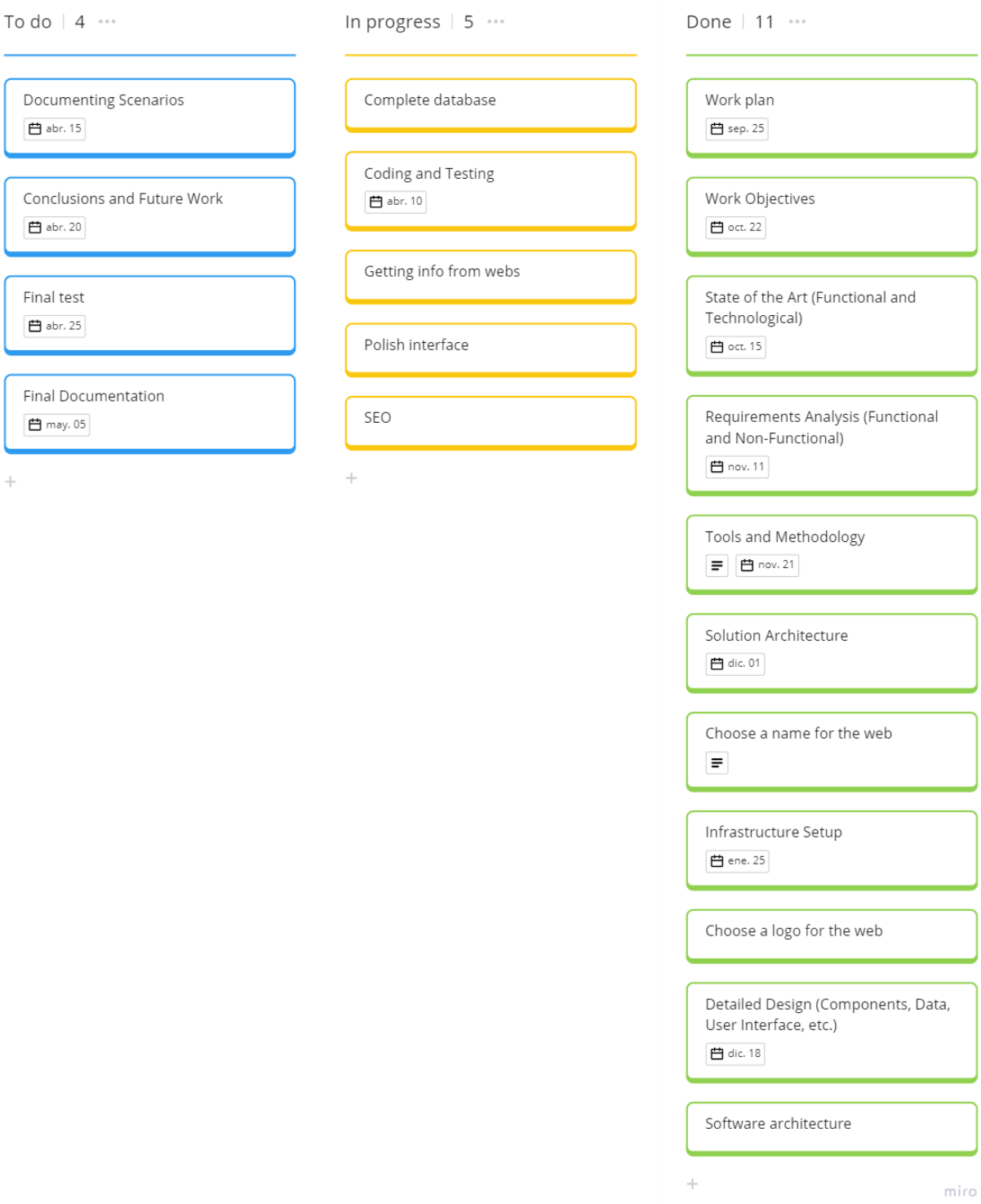

Figure 2: Intermediate working plan with Miro

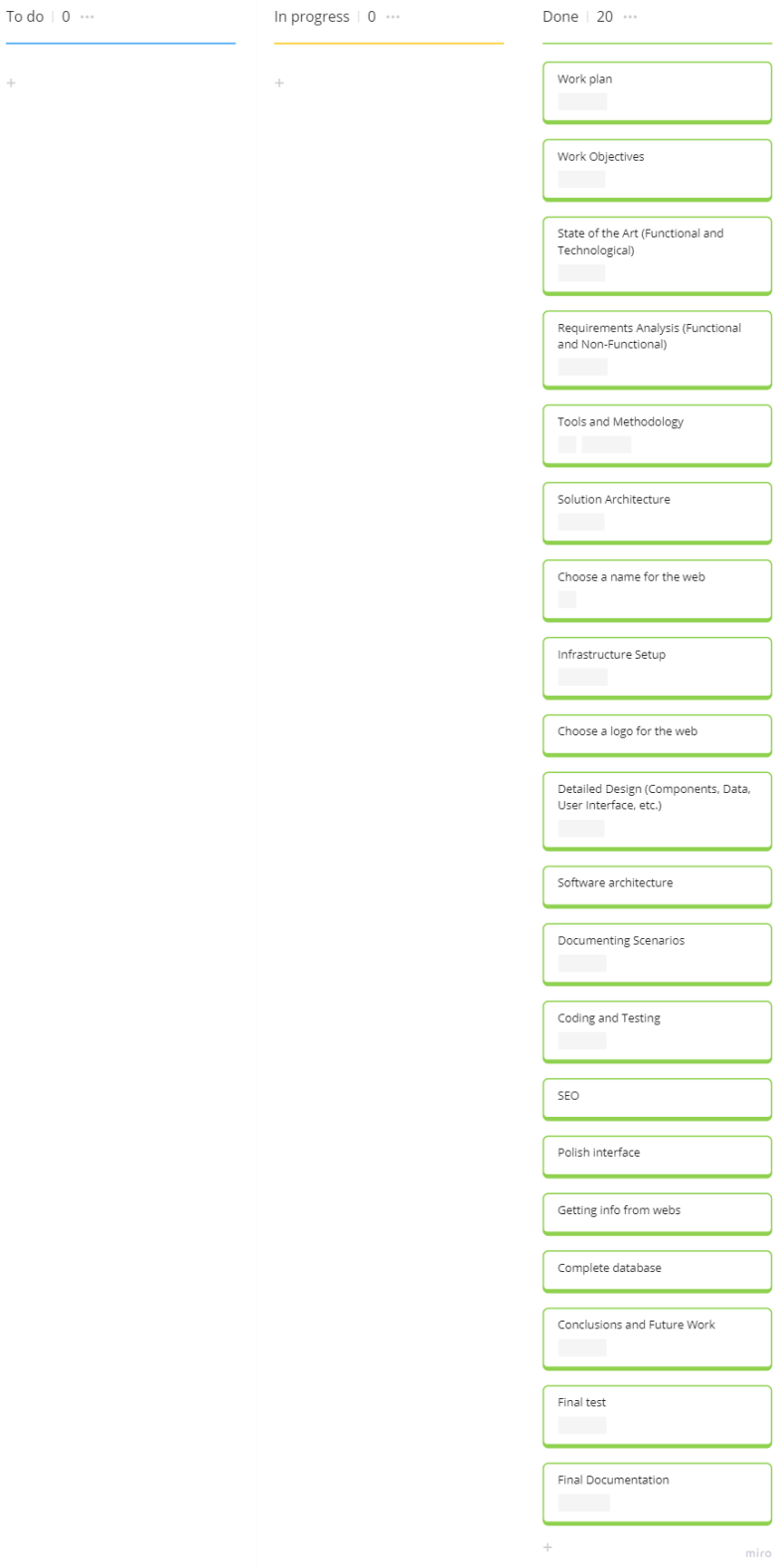

Figure 3: Final working plan with Miro

1.4 Chapter conclusions

The motivation behind this project is driven by a tough reality: misinformation and complications are present in the scholarship landscape in Spain. With unclear procedures, missed deadlines, and a lack of comprehensive platforms, many scholarships and allocated funds remain unclaimed.

From the outset, the objectives were clear: to create an intuitive web platform that provides information and facilitates the scholarship application process in Spain, supported by a robust database.

A well-structured project plan, including regular meetings with our tutor and the effective use of the tool Miro, ensured that the project progressed smoothly. This collaborative approach enabled us to stay on track and make informed decisions.

Basically, this project seeks to bridge the information gap, simplify the application process, and ensure that scholarships and their associated funds reach those who deserve them.

Chapter 2 - State of the art

This section plays a key role in serving as a starting point for understanding the current landscape of applications and web pages related to our idea. Through a detailed analysis, we explore the advantages and disadvantages of these applications and platforms in order to identify opportunities for improvement and thus design a solution that integrates the best features. This process will allow us not only to innovate and differentiate ourselves, but also to optimally meet the needs and expectations of our users. We will also present the conclusions derived from this study, which will serve as a solid basis for the development and design phase.

2.1 Similar websites

➢ European Funding Guide

This website provides information on funding scholarship opportunities in Europe (https://www.european-funding-guide.eu/). It is a non-profit organization based in Germany called MY Access to Funding GmbH (https://access-funding.org/). The main objective of its initiative is to bring transparency to the EU funding landscape and to ensure that study support is accessible for everyone.

Key features of this website include the registration option and the fact that it is entirely free. Other than scholarships, it also includes loans and grants, prizes and awards, governmental support for students, and other funding opportunities. Users can take advantage of advanced search filters to find options based on specific criteria, such as the level of study, field of study, and location. The website is regularly updated to provide access to the latest scholarship and funding opportunities.

Additionally, the website offers multilingual support, making it accessible to a broader audience, and it features a user-friendly interface that simplifies the search and application process. Users can also find valuable resources and guidance on how to prepare and apply for scholarships, loans, or grants.

This website lacks an effective scholarship search feature for several reasons. When you sign up and provide your personal information, it uses that data to recommend scholarships that you might be eligible for. However, the number of scholarships it displays is quite limited, leaving out many potential opportunities. What is more, if your preferences for the type of scholarship you are interested in change, you are required to modify your entire profile rather than offering a more user-friendly approach of using search filters to fine-tune your results.

Additionally, the profile setup on the platform does not ask for sufficient details to conduct a refined search and limits the website's ability to provide tailored scholarship suggestions.

- Becas.com

This website enables users to search for scholarship information while offering the option to refine search results (https://www.becas.com/). It includes multiple categories (fields of study, autonomous region, scholarship provider). Users can register, allowing them to receive notifications concerning the offers that match their interests.

This website is the one that comes closest to our idea. It covers a wide range of scholarship types, including academic, artistic, athletic, and more, providing diverse opportunities for users. Becas.com is known for its timely updates, constantly adding new scholarship listings and providing information about application deadlines and to help students stay informed.

Additionally, the website encourages user interaction. It offers a forum where users can share their experiences, ask questions, and provide insights related to scholarships. Moreover, Becas.com is accessible on mobile devices, ensuring that users can access scholarship information conveniently while on the go.

While it does allow for registration, you cannot subsequently log in to the website with your account to modify your scholarship preferences, which complicates the process. However, aside from that, we believe it offers many positive aspects, such as excellent search filters, a wide range of results, comprehensive information about each scholarship, and a user-friendly interface.

- Becasparaestudiantes.net

A dedicated platform for scholarships, employment opportunities, and student assistance, this website offers information on available scholarships ranging across multiple fields of study, educational levels, and diverse geographical regions (https://becasparaestudiantes.net/).

It features scholarships in multiple categories, including academic, sports, artistic, and more.

In addition to scholarships, the website offers a resource library that includes articles, guides, and educational content related to scholarships and student support. This educational value enhances the user experience and provides valuable information to students.

However, one limitation is the absence of a user registration option. As a result, users cannot receive notifications or follow up on scholarship opportunities. To stay informed, users need to manually track scholarships and deadlines on the platform.

In addition, they do not offer a search option or selection filters to adjust it, which we consider to be an important feature that helps the user find what they need.

As for the scholarships for which it offers information, they are quite scarce. For instance, in the category of "Scholarships by autonomous communities" it only includes those of the Community of Madrid, and in the category of Scholarships to study in Spain it only includes four of them.

Also, the website is overly simplistic in terms of its HTML structure, lacking essential features such as a proper menu. The absence of a menu or navigation structure makes it challenging for users to easily access different sections of the site.

- Misbecas.com

It is a Spanish website that provides access to both public and private scholarships, along with details on their eligibility criteria, application procedures, and deadlines (https://www.misbecas.com/). The platform encompasses a wide range of scholarships, including regional, national, European, and international opportunities.

The website features a user-friendly search engine where users can input keywords or scholarship descriptions, and it also offers various filters to refine the search results, such as recipient category, educational level, field of study, and geographical location.

Moreover, the website offers additional resources, including a blog section with informative posts, a frequently asked questions (FAQ) section, a listing of sponsors who offer exclusive benefits to registered users, and a section where individuals can submit their scholarships for inclusion on the website.

However, it's worth noting that the website's information is somewhat outdated, with most of the scholarship listings dating back to 2020. Users have reported technical issues, including a message that incorrectly states "order successfully placed, total: 0€" when creating an account, even when no order is involved. Additionally, the user account page consistently displays an "error 1004" message.

Moreover, it requires users to fill in all filter fields to conduct a search effectively and sometimes they do not narrow down as they should.

2.2 Similar applications

- Mi Beca

A digital platform by the Government of Mexico that provides information and services related to scholarships and educational support programs (https://www.mibeca.net/). The platform consists of a mobile application and a website that allow students and their families to access information about available scholarships and manage and track their applications.

"Mi Beca" is aimed at students across various education levels, including secondary, undergraduate, and postgraduate studies. It serves as a valuable resource for both national and international education.

The platform offers guidance on the scholarship application process, helping users understand how to apply for various scholarships and how to manage their applications efficiently.

In the free version, users are limited to accessing information on only five scholarships. Information only up to five scholarship opportunities is available. Beyond that limit, users have the option to upgrade to a paid version paying a monthly subscription priced at $2.99 to access a broader range of scholarship listings.

Besides the fact that the free version only shows five scholarships, the descriptions about them are scarce and in many of them the information is outdated as it involves previous years.

- Becas Benito Juarez

It is a mobile application launched by the Mexican government as part of its social scholarship programs (https://www.gob.mx/becasbenitojuarez). The goal of these programs is to provide financial assistance to low-income students, people with disabilities, and other vulnerable populations in Mexico to help them access education and improve their living conditions.

One noteworthy aspect is the user-friendly interface of the application, which presents information in a clear and easily understandable manner. We particularly appreciate this feature, as it significantly enhances the user experience. Furthermore, the platform provides users with recent news updates, various filtering options, and the ability to bookmark preferred items.

However, it is essential to note that the application is exclusive to the Android operating system. Additionally, the registration process is limited to Google accounts, and regrettably, the functionality of the app is currently compromised.

Also, it is important to highlight that, due to its Mexican origin, the application lacks information pertaining to scholarships in Spain.

- Beca fácil

"Beca Fácil" is a mobile application that provides information about scholarships in Mexico, Spain, and some international opportunities (https://becafacil.com/).

We appreciate how this application organizes scholarship details, placing key information at the top, such as the official page URL, publication date, potential

monetary assistance, available slots, and eligible countries. Also, the concept of registration and profile creation is commendable, allowing users to add skills or a CV.

However, it is crucial to note that the application does not validate any entries, prevents saving changes in your profile unless all fields are completed, and lacks verification of registration details, raising potential security concerns. The application is exclusive to Android users, lacks information verification, and includes numerous advertisements that may become intrusive. Additionally, the app may give a misleading impression that users can apply to all displayed scholarships directly from the app, which may not be the case.

Despite these drawbacks, we also appreciate the feature upon registration that prompts users to specify whether they are seeking or offering scholarships. This inclusivity allows for unknown scholarships to have the opportunity to be featured on the platform.

➢ Info Becas Argentina

This mobile application is dedicated solely to displaying scholarships available in Argentina (https://infobecas.ar/).

We don't find it particularly appealing due to its platform exclusivity to Android and Argentina. It has an excessive use of advertisements within the application that detracts from the overall user experience. Additionally, there is a notable amount of outdated information present.

2.3. Technologies

Database

For the development of this project, we decided to work with a MySQL (https://www.mysql.com/) database as the foundational technology. This choice aligns with our objective of creating an efficient and reliable platform for scholarship information and application.

Our decision to employ MySQL is further supported by its scalability and compatibility with various programming languages, ensuring flexibility in our

development process. This database management system will enable us to securely store and quickly access scholarship information.

Moreover, we have prior experience with MySQL, having successfully utilized it in previous courses, often through the PHPMyAdmin (https://www.phpmyadmin.net/) interface. This familiarity with both MySQL and PHPMyAdmin has allowed us to navigate their capabilities effectively, making them natural choices for our current project.

Other Database Considerations

While MySQL is our primary choice for this project, we have also considered and used other database management systems in different educational contexts. One such system is MongoDB (https://www.mongodb.com/es), a NoSQL database known for its flexibility in handling unstructured data.

However, for this initiative, we have opted for MySQL for several key reasons: One of the factors driving our choice in favor of MySQL is its integration with SQL (Structured Query Language). MySQL's native support for SQL simplifies the process of crafting and fine-tuning queries, which is advantageous for us as we have prior experience in SQL.

Additionally, MySQL's status as one of the most popular and widely used relational databases in the world has played a significant role in our decision. This means that finding support, resources, and talent for MySQL is relatively easy. The community and documentation are extensive, providing a wealth of knowledge and expertise to draw upon as we develop our project.

HTML

HTML stands for "Hypertext Markup Language." It is the standard markup language used to create and structure content on the World Wide Web (WWW). It provides a set of tags and attributes that allow web developers to define and organize the content of a web page, such as headings, paragraphs, links, images, and more.

HTML is often used in conjunction with other technologies such as Cascading Style Sheets (CSS) for styling and layout, and JavaScript for interactivity.

CSS

CSS, or Cascading Style Sheets, is a style sheet language used in web development to describe the look and formatting of a document written in HTML or XML. CSS separates the content of a web page from its presentation, allowing developers to control the layout, appearance, and styling of HTML elements.

CSS is a critical part of front-end web development, working alongside HTML and JavaScript to create visually appealing, user-friendly, and responsive websites.

JavaScript

JavaScript is a high-level, interpreted programming language primarily used for building interactive and dynamic content on the web. As one of the core technologies for web development, JavaScript allows developers to add functionality, manipulate the Document Object Model (DOM), and respond to user interactions within web browsers.

PHP

PHP, which stands for "Hypertext Preprocessor" (https://www.php.net/), is a widely used server-side scripting language designed for web development. It is embedded within HTML code and processed on the server, generating dynamic content that is then sent to the client's web browser.

PHPMailer

PHPMailer is a widely used open-source library for sending emails using PHP. It serves as a bridge between PHP scripts and email servers, allowing developers to send emails programmatically. It supports various features such as attachments, HTML content, inline images, and more, making it a versatile tool for crafting diverse email communications.

AJAX

AJAX (Asynchronous JavaScript and XML) is a web development technique that enables asynchronous communication between a web browser and a server. Unlike traditional web requests, which reload the entire page when fetching new data, AJAX allows specific portions of a webpage to be updated without requiring a full reload.

jQuery

jQuery is a concise and powerful JavaScript library designed to simplify client-side scripting in web development (https://jquery.com/). It abstracts common tasks, making it easier to manipulate HTML documents, handle events, create animations, and interact with servers. One of its notable features is its ability to simplify Ajax requests. jQuery provides a simple and consistent interface for making asynchronous HTTP requests, allowing developers to fetch or send data to a server without the need for low-level XMLHttpRequest or Fetch API manipulation.

Bootstrap

Bootstrap (https://getbootstrap.com/) is a popular toolkit for building responsive websites and web apps. It provides ready-to-use styles and components, like buttons and navigation bars, which make it easy to create attractive and user-friendly designs.

Lottie

Lottie is a library that enables developers to easily add high-quality animations to their web and mobile applications (https://airbnb.design/lottie/). Developed by Airbnb, Lottie allows designers to export animations in JSON format using Adobe After Effects and then render them natively in apps using lightweight, interactive, and scalable vector animations.

Selenium

Selenium is a versatile automation tool primarily used for testing web applications. However, it can also be employed for web scraping purposes. Web scraping involves extracting data from websites, and Selenium can be particularly useful in scenarios where the target website employs dynamic content rendering or requires interaction with elements like JavaScript-driven features or AJAX-loaded data.

Beautiful Soup

Beautiful Soup is a Python library specifically designed for web scraping tasks. It provides convenient methods and tools for parsing HTML and XML documents, navigating the parse tree, and extracting desired information from web pages. Beautiful Soup excels at handling static web content, making it an efficient choice for extracting data from websites with well-structured markup.

Python

Python is a versatile and widely used programming language known for its simplicity and readability. It is utilized for web scraping due to its robust libraries and tools specifically designed for this purpose.

Ionic Framework

Ionic Framework is an open-source UI toolkit for building high-quality cross-platform mobile and desktop apps using web technologies like HTML, CSS, and JavaScript (https://ionicframework.com/). It provides a library of components, themes, and tools to simplify the app development process.

Node.js

Node.js is a JavaScript runtime built on Chrome's V8 JavaScript engine (https://nodejs.org/en), (https://v8.dev/). It allows developers to run JavaScript code on the server-side, enabling the development of scalable and high-performance applications.

npm (Node Package Manager)

Npm is the default package manager for Node.js, allowing developers to discover, share, and reuse code packages (https://www.npmjs.com/). It simplifies dependency management and automates the process of installing, updating, and removing packages in Node.js projects.

Angular with NGmodules

Angular is a TypeScript-based open-source web application framework led by Google (https://angular.dev/). It's used for building single-page client applications and offers features like two-way data binding and dependency injection. NGmodules refer to Angular modules, which help organize an Angular application into cohesive blocks of functionality (https://v17.angular.io/guide/ngmodules).

Capacitor Ionic

Capacitor is an open-source cross-platform runtime that allows developers to build web apps that run natively on iOS, Android, and the web

(https://capacitorjs.com/). It's often used in conjunction with Ionic Framework to access native device features using web technologies.

Cordova Framework

Apache Cordova is an open-source mobile development framework that allows developers to build mobile apps using web technologies (https://cordova.apache.org/). It provides a set of APIs for accessing native device functionalities

Cordova InAppBrowser Plugin

The Cordova InAppBrowser plugin provides a web browser view that displays web pages within the app (https://cordova.apache.org/docs/en/10.x/reference/cordova-plugin-inappbrowser/). It's often used to open external links or display web content without leaving the application.

Cordova Network Information Plugin

The Cordova Network Information plugin allows developers to retrieve information about the device's network connection, such as connection type and status (https://cordova.apache.org/docs/en/11.x/reference/cordova-plugin-network-information/). It helps developers optimize their apps based on network conditions.

2.4 Chapter conclusions

Through comprehensive analysis, we have scrutinized the advantages and disadvantages of these applications and platforms, seeking opportunities for enhancement. This analysis is crucial for us to design a solution that combines the best features, positioning us not only to innovate but also to meet our users' needs and expectations effectively.

Some of the limitations include restricted functionality, limited scholarship recommendations, and compatibility issues.

The choice of MySQL as our primary database technology for this project aligns perfectly with our goal of creating an efficient scholarship information platform. Its scalability, compatibility with various programming languages, and our prior experience with it make it the ideal choice for securely storing and retrieving scholarship data.

Moreover, web scraping serves as a crucial component of our web monitoring system, enabling us to track changes across our various websites. It's instrumental in keeping our platform updated with the latest scholarship listings, ensuring we provide our users with the most comprehensive and up-to-date information available. Python, with its strengths in text processing and web resource handling, serves as an invaluable tool for creating web scrapers.

We have integrated HTML, CSS, JavaScript, PHP, Bootstrap, jQuery, AJAX and Lottie to code our website. These technologies work harmoniously, each playing a vital role in creating a cohesive and engaging online experience. HTML establishes the structural foundation, CSS ensures a visually appealing design, and JavaScript brings interactivity to the user interface. Meanwhile, PHP, operating on the server side, enables dynamic content generation and interaction with databases. Furthermore, Bootstrap streamlines the creation of responsive and visually appealing designs, jQuery simplifies client-side scripting tasks and AJAX enables asynchronous communication between the browser and server. Additionally, Lottie adds high-quality animations to enhance user engagement.

With the combined power of Ionic Framework, Node.js, npm, Angular with NGmodules, Capacitor Ionic, and Cordova Framework, we've successfully transformed our web application into an Android app packaged as an APK.

Chapter 3 – Scenarios and Requirements Analysis

In any software development project, the clear and precise definition of requirements is an essential component for the success of the project. Requirements act as the bridge that connects the customer's vision and expectations with the software design and development process.

In this section we discuss both functional and non-functional aspects. Functional requirements describe the specific functionality that the system is expected to provide, while non-functional requirements focus on the quality attributes, performance and other key aspects that define the user experience and operation of the system.

We also present different scenarios users may undertake in our web.

3.1. Scenarios

In this chapter, we delve into various scenarios to illuminate the user experience on our scholarship management website. From registration processes to personalized notifications and effective use of search filters, these scenarios showcase the website's versatility in catering to the diverse needs of our users.

- User Registration:

  Scenario: A new user visits the website and registers for an account.

  Outcome: The user successfully creates an account, providing necessary details for personalized assistance.

- User Login:

  Scenario: A registered user logs into the platform using their valid email and password.

  Outcome: The system authenticates the user's credentials, granting access to their account dashboard.

- Browsing and Saving Favorites:

Scenario: A registered user explores the available scholarships and saves preferred options.

Outcome: The user saves those scholarships in its profile for future reference.

- Notification Settings:

  Scenario: A user decides to receive notifications regarding deadlines and application dates.

  Outcome: The user configures notification preferences, ensuring reminders for key scholarship-related activities.

- Effective Use of Search Filters:

  Scenario: A user employs search filters to narrow down scholarship options based on specific requirements.

  Outcome: The user successfully finds relevant scholarships tailored to their academic and personal criteria.

- Account Management:

  Scenario: A registered user needs to update their profile information.

  Outcome: The user navigates to the account settings, makes necessary changes, and saves the updated information.

- Password Recovery:

  Scenario: A registered user forgets their password and needs to recover it.

  Outcome: The user initiates the password reset process, receives a secure link via email, and successfully creates a new password.

- Initiating an Application:

  Scenario: A registered user decides to start the application process for a particular scholarship.

Outcome: The user begins the application process, creating a structured plan with steps to follow for completion.

- Completing Application Steps:

  Scenario: A registered user progresses through the application steps for a scholarship.

  Outcome: The user completes each step of the application process, marking them as finished as they proceed.

- Exploring Scholarship Details:

  Scenario: A user clicks on a specific scholarship to view its details.

  Outcome: The user accesses information about the scholarship.

- Engaging with Chat Support:

  Scenario: A user has questions about a feature on the website's page and interacts with the chat support function to seek assistance.

  Outcome: The user finds helpful responses to their inquiries, enabling them to better understand and utilize the page feature effectively.

- Taking the Personality Test:

  Scenario: A user decides to take the personality test to discover their alignment with the mascot's personalities.

  Outcome: The user completes the test and receives results indicating which mascot personality they align with most closely.

3.2. Functional requirements

In this section, we outline the essential functional requirements that form the core of our platform. These requirements define the fundamental features and capabilities that our platform must provide to meet the needs of our users effectively. In each one it is specified if it can be carried out by a visiting user or if it is necessary to be logged in for it.

User Registration

New users must be able to register on the platform by providing information such as their name, email address, level of education and a secure password.

Login (Sign-In)

Users must be able to log in to the platform using their credentials (email and password).

Notifications (Logged-in user)

The platform should provide email notifications to users regarding important updates, including:

- Opening date: The date when applications or submissions become available for users.
- Closing date: The deadline by which users must complete their applications or submissions.
- Important submission dates: Notifications about key dates such as document submission deadlines or other crucial milestones in the application process. These notifications should be sent to users to ensure they are aware of and can meet all necessary deadlines.

Search (with filter options) (Visitor/logged-in user)

Users should have the capability to search for available scholarships on the platform by employing various filters.

Users can fine-tune their search using filters such as education level (i.e., None, Primary, Secondary, High School, Undergraduate, Master's, Doctorate, Vocational Training, Artistic and Sports Education), availability period, financial amount (with customizable ranges), province, duration, big family and disability. The duration filter allows users to specify the desired duration in either months or years, providing them with the flexibility to tailor their search according to their preferences.

Search term correction (Visitor/logged-in user)

Users should receive a suggestion when the system recognizes that the term entered does not generate any results, but it closely resembles a term that is associated with search results. This proactive suggestion aims to guide users towards relevant content despite potential misspellings

"For you" Filter (Logged-in user)

Authenticated users possess the ability to filter scholarships based on the account features chosen during registration, utilizing a button that only appears in the search bar once they have logged in. The filters used are: province, disability, big-family and education level.

Favorites (Logged-in user)

Users can mark scholarships as "favorites" for easy access and reference in their user profile. Additionally, they can efficiently manage notifications associated with each selected scholarship. Users can always remove the scholarships from their favorites.

User Profile (Logged-in user)

Each user should have the ability to create and maintain their own user profile within the platform.

Edit Personal Information (Logged-in user)

Users have the capability to modify their personal information within their profile. This includes updating details such as name, contact information, and other relevant personal data.

Edit Password (Logged-in user)

Users have the option to enhance the security of their accounts through the "Edit Password" functionality. This feature enables users to modify their current passwords, providing them with control over their account access.

Reset Password (Logged-in user)

Users can initiate a password reset process, a valuable feature for those who may have forgotten their passwords or need to implement heightened security measures. By

selecting the "Reset Password" option, users trigger a secure and user-friendly procedure. This involves receiving a link via email, guiding users through the steps to create a new password.

See Details (Visitor/logged-in user)

Users should be able to click on each search result to access specific information of each scholarship such as name, image, description, link, contact phone and email, publication date, province, amount, places, start date of application, end date of application, resolution date, duration, required education level, whether it is applicable for large families, and if there are any disabilities required.

Chat (Visitor/logged-in user)

Users are presented with a list of predefined questions within the chat interface, allowing them to quickly initiate conversations and obtain specific information. Additionally, users retain the freedom to compose their own questions or messages, enabling them to engage in personalized discussions or address topics not covered by the default list.

FAQ Section (Visitor/logged-in user)

Users should have access to a dedicated Frequently Asked Questions (FAQ) section where they can find detailed answers to common queries, mirroring the questions available in the chat interface but providing more comprehensive responses. This FAQ section aims to offer users in-depth explanations and solutions regarding various aspects of the platform, including notification settings, scholarship functionalities, user profile management, and other pertinent topics.

Personality Test (Logged-in user)

Users can engage with a unique feature on the website: the mascot or character personality test. This test allows users to discover which personality of the mascot they align with most closely.

Explore Personalities (Visitor/logged-in user)

Users will have access to a "View Personalities" feature, allowing them to explore a page showcasing the various personalities of the mascot. This page will display images of the mascot representing different personalities, accompanied by detailed explanations for each personality type. This feature aims to engage users by offering them an entertaining and informative glimpse into the mascot's distinct personalities, enhancing their overall experience on the platform.

Start an Application (Logged-in user)

Users engaging with our platform have the capability to initiate applications for scholarships. It's essential to understand that these requests do not constitute formal submissions. Instead, they serve as organizational tools, aiding users in structuring their progress through the application process. Within this framework, users can delineate their progression by delineating steps and marking them as completed as they move forward. These steps act as guiding milestones toward the completion of a formal application, which must be submitted via the official channels outlined by the scholarship provider. Additionally, users have the option to enable or disable notifications for each application individually, providing them with control over their communication preferences. They can also cancel the application.

See Step (Logged-in user)

Users have access to detailed information for each step within the application process, including the step description and its corresponding date.

Add Step (Logged-in user)

Users can add new steps to the application process. This allows for customization and flexibility in the application process to suit the needs of different scholarships or programs.

Edit Step (Logged-in user)

Users can edit existing steps in the application process. This allows for updates or changes to be made as needed, ensuring that the application process remains accurate and up to date.

Complete Step (Logged-in user)

Once users have fulfilled the requirements of a particular step, they can mark it as completed. This helps users keep track of their progress through the application process and ensures that all necessary steps are completed in a timely manner.

Delete Step (Logged-in user)

This feature allows logged-in users to remove a specific step from their application process. Once a user decides to delete a step, it is permanently removed from their profile. This can be useful if a user no longer needs to complete a certain task or if they mistakenly added a step that is not applicable to their situation.

Scholarship Recommendations (Logged-in user)

Users are provided with personalized recommendations for scholarships that closely align with their profiles. These recommendations are tailored to match users' educational level, province, and other relevant criteria.

Delete Account (Logged-in user)

Users have the option to delete their account at any time. Before proceeding with the deletion process, users are prompted to confirm their identity by entering their password. This additional step ensures the security and integrity of the account deletion process and helps prevent accidental or unauthorized deletions. Once the password is entered and verified, the account deletion proceeds, and all associated data and information will be permanently removed from the platform.

Tutorial (Visitor/logged-in user)

Users have access to an interactive tutorial serving as a comprehensive guide to navigating the platform's functionalities. Users will be guided through key features such as login procedures, scholarship search, chat functionality and more.

Suggestions (Visitor/logged-in user)

Users are empowered to contribute by submitting recommendations for scholarships they are aware of, yet not featured on our platform. They are prompted to

complete a form where providing the scholarship name is mandatory. Optionally, they can include a link and any comments they find relevant. Once submitted, we receive an email containing this valuable information, allowing us to conduct thorough research.

3.3. Non-functional requirements

Within this segment, we focus on the critical non-functional requirements that underpin the performance and sustainability of our platform. These requirements are crucial for maintaining the system's integrity and delivering a positive user experience.

Performance

The system must be able to handle a large number of concurrent users without significant performance degradation. This ensures that even during peak usage periods, our platform remains responsive and efficient, providing a perfect experience for all users.

Security

User data, such as passwords and personal details, must be protected by encryption and appropriate security measures. Ensuring robust security measures not only safeguards sensitive user information but also instills trust and confidence in our platform.

Availability

The system must be available 24/7, with minimal downtime. This high availability is fundamental to ensuring uninterrupted access to critical scholarship information.

Usability

The user interface should be intuitive and easy to use. A user-friendly interface enhances the overall experience, making it straightforward for users to navigate, interact with the platform, and access the information they need effectively.

Response Time

The system must provide quick responses to user queries, such as searches and notifications. Swift response times are essential for delivering a dynamic and responsive user experience, ensuring that users can efficiently access information and services.

Maintenance

The system must be easy to maintain and upgrade to add new features or fix bugs. Maintenance processes are key to the platform's adaptability and growth, allowing us to continually enhance its functionality and address any issues promptly.

Reliability

The system should exhibit high reliability, minimizing the occurrence of system failures or errors. Reliability is crucial for maintaining user trust and confidence in the platform's performance and availability.

3.4. Chapter conclusions

This process has brought us closer to understanding how the application will be used in real-world scenarios and has enabled us to explore its full range of possibilities. By basing our requirements on user scenarios, we have gained valuable insights into the practical needs and expectations of our users. The requirements outlined form a basis upon which we construct our project, assuring that we not only meet but exceed our users' expectations by delivering excellent performance, security, and usability.

Chapter 4 – Tools and methodology

During any research endeavor, the thoughtful selection of tools and methodologies is essential. This chapter serves as a bridge between the theoretical basis of our work and its practical implementation.

This section discusses the tools chosen for our project, emphasizing their significance in achieving our research objectives. Additionally, we will meticulously outline the methodology employed, offering insight into the framework guiding our investigation.

4.1. Tools

Visual Studio Code

Visual Studio Code (https://code.visualstudio.com/) stands out as a versatile and lightweight source code editor supported on multiple operating systems, including Windows, macOS, and Linux. This has unified our work, allowing us to undertake it on both Windows and Linux platforms, given our team of three participants. Its cross-platform compatibility enhances collaborative development efforts among team members using different environments.

It provides a user-friendly interface for efficient coding and supports a broad spectrum of programming languages. One notable feature contributing to effective collaboration is its built-in GitHub integration. Visual Studio Code comes equipped with a GitHub extension, simplifying version control and collaboration processes.

GitHub

GitHub (https://github.com/) is a web-based platform designed for version control and collaborative software development. It functions as a repository where developers can manage and monitor changes to their source code, fostering effective teamwork. GitHub supports distributed version control, enabling multiple contributors to work on a project concurrently. Noteworthy features include issue tracking, pull requests, and branching, all of which enhance workflow and coordination within development teams.

The platform is widely used for open-source projects and offers integrations with various development tools, making it a central hub for code hosting, collaboration, and project management.

GitHub Desktop

GitHub Desktop (https://desktop.github.com/) is a user-friendly graphical interface for Git, a distributed version control system widely used in software development. Key features we used are: users can create, manage, and visualize branches effortlessly. This is crucial for parallel development, enabling teams to work on multiple features simultaneously without conflicts. It also simplifies the process of making and managing commits, allowing users to track changes and add meaningful commit messages. In addition, it assists in resolving merge conflicts, a common challenge in collaborative development.

Miro

Miro is a versatile online collaborative whiteboard platform that facilitates visual collaboration and communication among teams. As we explained in section 1.3, we shared it with our tutor to organize the project planning. In addition, we have utilized this tool to create flow charts, diagrams, and interface sketches.

XAMPP

XAMPP (https://www.apachefriends.org/es/index.html) is a free, open-source, cross-platform software package that facilitates the setup of a local web server environment on a personal computer. It provides a convenient way for developers to create a local server environment for testing and developing dynamic web applications on their own machines. It includes all the essential components needed for web development, such as a web server (Apache), a database server (MySQL), and programming languages (PHP, Perl, or Python).

phpMyAdmin

phpMyAdmin is a free and open-source web-based application designed to provide a graphical user interface (GUI) for managing and administering MySQL or MariaDB databases. Developed in PHP, phpMyAdmin allows users to interact with their

databases through a web browser, offering a convenient and user-friendly way to handle various database-related tasks.

Google Sheets

Google Sheets is an online spreadsheet application developed by Google. It allows users to create, edit, and collaborate on spreadsheets much like Microsoft Excel, but with the advantage of being accessible from any device with an internet connection and enabling real-time collaboration among multiple users. It is highly useful for creating CSV (Comma-Separated Values) files and organizing data efficiently. Users can easily import existing CSV files or export Sheets data into CSV format.

Android Studio Jellyfish

Android Studio Jellyfish (https://developer.android.com/studio) is the latest version of Android Studio, the official integrated development environment (IDE) for Google's Android operating system. It provides a set of tools and resources to streamline the entire app development process, from coding to testing and deployment. With features such as a robust code editor, visual layout editor, debugging tools, and seamless integration with the Android SDK and other development frameworks, Android Studio Jellyfish empowers developers to create high-quality Android apps efficiently.

Filestash

Filestash is a file management platform designed to simplify the organization, accessibility, and collaboration of files across various cloud storage services. It serves as a centralized hub, it integrates multiple storage providers, allowing users to manage files from different sources within a unified interface. It empowers users to efficiently manage their data, facilitating teamwork and ensuring the protection of sensitive information.

4.2. Methodology

This phase encapsulates the systematic and strategic blueprint guiding our team of three through the intricate process of designing, coding, and refining the digital landscape we envision.

We have chosen to merge two Agile methodologies: Scrum and Kanban.

Scrum Methodology

Empowering Collaboration and Adaptability

Scrum encapsulates the essence of collaboration, adaptability, and structured project delivery. With three team members, including one working remotely, Scrum provides a structured framework that accommodates distributed teams. The iterative and incremental approach of Scrum enables us to break down our project into manageable sprints, each culminating in a potentially shippable product increment.

Key to our Scrum implementation are weekly Scrum meetings, which serve as the cornerstone of transparent communication. The Scrum framework not only promotes transparency and effective communication but also empowers each team member to contribute their skills and insights, fostering a collaborative and dynamic work environment.

Kanban Methodology

Workflow Optimization and Quality Focus

Complementing the dynamism of Scrum, we have incorporated the Kanban methodology, focusing on workflow improvement and high-quality delivery. A pivotal aspect of Kanban is the limitation of work in progress (WIP), preventing work overload and optimizing the delivery of tasks across multiple teams.

Our implementation of Kanban adheres to six core practices: visualizing the workflow, limiting work in progress, managing flow, making process policies explicit, applying feedback loops, and improving collaboration. As detailed in our Work Plan phase, we utilize a Kanban board to visually represent different work stages. Columns within the board signify the stages "to do", "in progress" and "done", while visual cards denote individual tasks and their respective due dates.

By merging the structured iterations of Scrum with the visual workflow management of Kanban, our methodology achieves a balance between adaptability and optimization. This integrated approach not only ensures that our team remains agile and responsive but also maintains a relentless focus on delivering a high-quality platform in an efficient and transparent manner.

4.3. Chapter conclusions

Our choice of tools in the project is grounded in familiarity and comfort, opting for those we have previously worked with to ensure confidence and efficiency. We also learned how to use Android Studio Jellyfish and FIlestash so we could move the local project into an Android app and a real website.The selected methodologies, a blend of Scrum and Kanban, prioritize collaborative efforts and the delivery of a high-quality outcome. This strategic approach allows our team of three to navigate the complexities of design and coding systematically, fostering adaptability and transparency.

Chapter 5 – Solution Architecture

Our web application consists of three main components: the client, the server, and the database.

5.1. Architecture Diagram

In *Figure 4: Architecture diagram,* we can observe this architecture and its relationships:

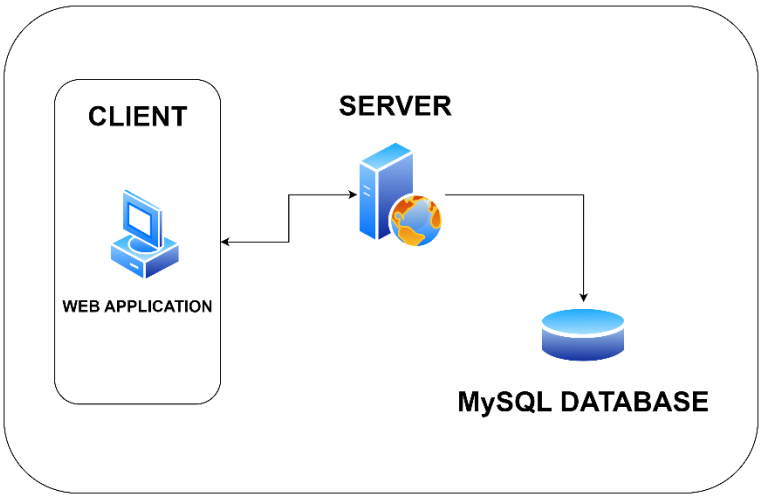

Figure 4: Architecture diagram

5.2. Client (Web)

The client, or web interface, is the user-facing component of our application. It is built using HTML, CSS, and JavaScript, providing an interactive experience for users.

It communicates with the server to request and receive data, ensuring real-time updates and dynamic content.

5.3. Server

PHP is employed on the server side, serving as a scripting language known for its versatility and effectiveness in web development.

Handling pivotal operations such as processing business logic, managing authentication, and delivering dynamic content to the client, PHP plays a crucial role in server-side functionality.

We employ an Apache server using XAMPP (X: Any operating system, A: Apache, M: MySQL, P: PHP). The Apache server, in combination with XAMPP, provides the infrastructure needed for hosting and serving web applications locally.

5.4. Database

The MySQL database is employed for storing and retrieving application data, ensuring a structured and efficient approach to data management.
phpMyAdmin serves as the graphical user interface for managing our MySQL database, providing a convenient way to interact with and administer the database.
PHP scripts interact with the MySQL database using queries, ensuring the smooth retrieval and storage of data based on user requests.

5.5. Interaction Flow

1. The client initiates requests to the PHP server for specific actions or data.
2. PHP processes these requests, executes necessary operations, and interacts with the MySQL database through phpMyAdmin for data retrieval or storage.
3. Processed data is sent back to the client, updating the user interface in real-time.

5.6. Security Considerations

- HTTPS protocols secure data transmission between the client and the PHP server.
- PHP incorporates security measures, including input validation and output sanitization, to prevent common vulnerabilities.
- User authentication mechanisms are implemented to control secure access to application features.

- Password encryption for enhanced data protection.

5.7. Software architecture

Class Structure and Database Representation

Our software follows an object-oriented approach, utilizing classes to represent each of the main entities in our database. This provides an organized and modular structure for efficient data management.

Multilayer software architecture

We have implemented a multilayer software architecture to ensure modularity, scalability, and maintainability. This architecture is divided into three layers: Presentation Layer (or User Layer), Business Logic Layer, and Data Access Layer.

The presentation layer manages the user interface and interactions, handling the rendering of HTML pages, capturing user input, and presenting information to the users. It consists of the following files *about*, *addStep*, *characters*, *editData*, *editPassword*, *editStep*, *errorPage*, *faq*, *index*, *login*, *newPassword*, *personality*, *privacy*, *profile*, *register*, *resetPassword*, *searchFilters*, *searchResults*, *seeApplications*, *seeFavorites*, *seeScholarship and waitForEmail*. Each of these files represents a specific view or interface that users interact with.

The business logic layer contains the application's logic and processing, it encapsulates essential components such as configuration, classes, and processing logic. This layer consists of these files: *processAddFav*, *processAddStep*, *processApplication*, *processChangePassword*, *processCompleteStep*, *processDeleteAccount*, *processDeleteApplication*, *processDeleteFav*, *processDeleteStep*, *processEditData*, *processEditStep*, *processFilters*, *processLogin*, *processLogout*, *processMessage*, *processNewPassword*, *processPersonality*, *processRegistration*, *processResendEmail*, *processResetPassword*, *processSearch*, processSuggestion and *processToggleNotification*. Each of these files contains the logic to interpret user actions and execute corresponding business rules and coordinating interactions between the presentation layer and the data access layer.

The data access layer is responsible for managing and storing data and interacting with the database. It includes classes such as *App*, *Application*, *Chatbot*, *Country*, *Favorite*, *Province*, *Scholarship*, *Step*, *Token*, and *User*. These classes encapsulate database operations such as querying, inserting, updating, and deleting data and abstract away the details of the database structure and provide an interface for the business logic layer to interact with the data. Each of these classes corresponds to a database table with the same name.

In *Figure 5: Layers*, *Figure 6: Interactions with User* class, *Figure 7: Interactions with Token class*, *Figure 8: Interactions with Scholarship* class, *Figure 9: Interactions with Province* class, *Figure 10: Interactions with Favorite* class, *Figure 11: Interactions with Country* class, *Figure 12: Interactions with Application* class and *Figure 13: Interactions with Step* class we show the different layers, its components and interactions:

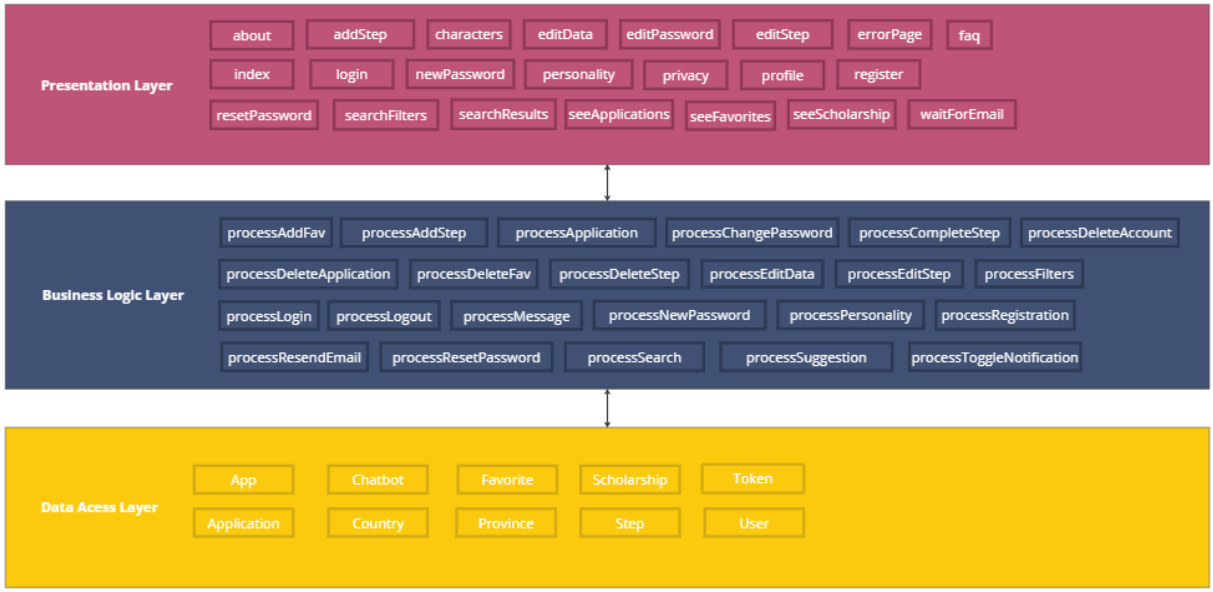

Figure 5: Layers

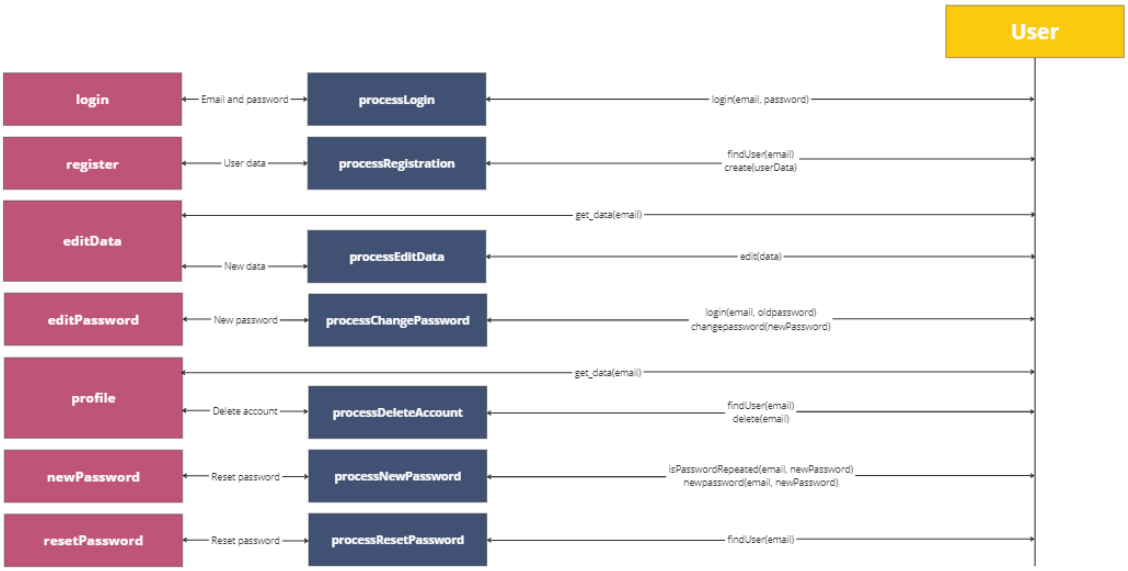

Figure 6: Interactions with User class

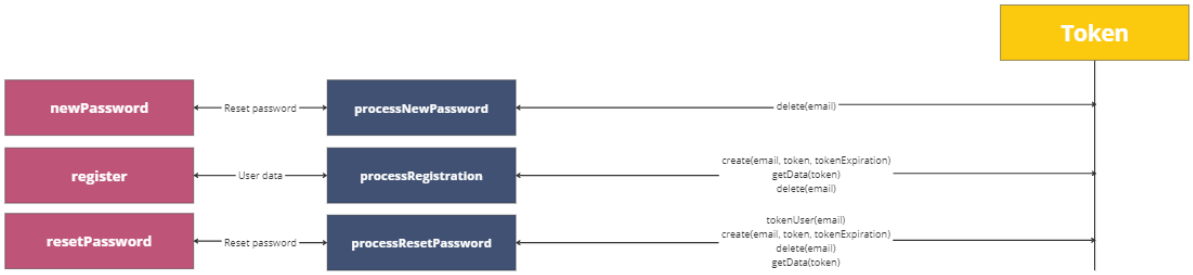

Figure 7: Interactions with Token class

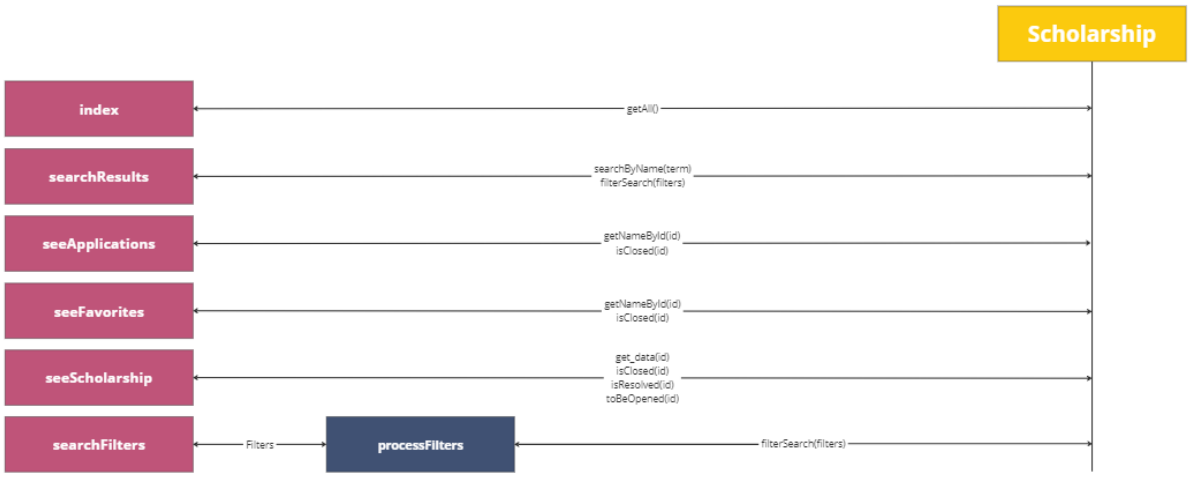

Figure 8: Interactions with Scholarship class

Figure 9: Interactions with Province class

Figure 10: Interactions with Favorite class

Figure 11: Interactions with Country class

Figure 12: Interactions with Application class

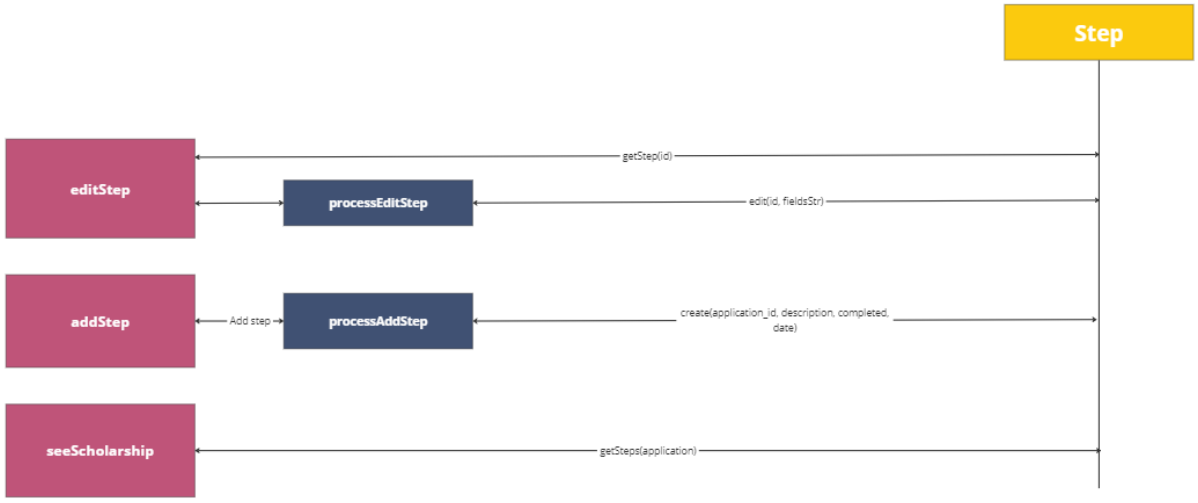

Figure 13: Interactions with Step class

5.8. Chapter conclusions

Our web application comprises three main components: the client, server, and database. The client interacts with the Apache server for real-time updates.

Our implementation of a multilayer software architecture ensures a structured approach to modularity, scalability, and maintainability. Through distinct responsibilities, such as managing user interface interactions, executing business logic, and handling data operations, each layer contributes to the efficiency and effectiveness of our system. This architecture promotes seamless communication between components, simplifies maintenance tasks, and supports future scalability and expansion efforts. This separation makes it easier to update and expand the application in the future.

Chapter 6 – Detailed design

In this section, we will examine the structure of our databases, the interfaces that enable connectivity, and the diagrams that help visualize the flow of interaction.

6.1. Data

We provide an overview of the databases' tables and their fields, noting that the primary key in each table occupies the first position. Fields employing an integer "ID" are indicative of a unique numerical value generated by the system, guaranteeing the distinct identification of each entry within the database structure.

Users

Table containing information about registered users. The email address serves as the primary key, uniquely identifying each user within the system. Additionally, the table stores various details including the user's name, a hashed version of their password for security, phone number, date of birth, gender, photo (selected from multiple options featuring the mascot), nationality, province, level of education, indication of disability status, whether they belong to a large family, and an option to personalize the color of the mascot image.

Scholarships

Table containing information about scholarships. The ID serves as the primary key, uniquely identifying each scholarship. The table stores details including the name of the scholarship, a link to more information, contact phone number and email address, publication date of the scholarship, province where it is available, description of the scholarship, monetary amount offered, a string representation of the monetary amount, number of available places, start and end dates of the scholarship, resolution date, duration of the scholarship measured in months, string representation of the duration, education level required for eligibility, string representation of the education level, an image associated with the scholarship, indication of whether the scholarship is intended

for individuals from big families or those with disabilities, and specific requirements for applying.

The fields represented as both "Integer" and "String" serve dual purposes in the scholarship database. These fields utilize integers for efficient filtering and numerical comparison, while employing strings to present user-friendly textual representations, ensuring clarity and ease of understanding for scholarship details.

Favorites

Table containing information about users' favorite scholarships. Each entry in the table is uniquely identified by an integer ID. The table stores details such as the user's email, the scholarship's identifier, and a boolean value indicating whether the user has enabled notifications for updates regarding the scholarship.

Applications

Table containing information about scholarship applications started by users. Each application is uniquely identified by an integer ID. Details include the applicant's email, the ID of the applied scholarship, the application date, and a boolean value indicating whether the user has enabled notifications for updates regarding their application.

Provinces

Table containing information about provinces and their corresponding autonomous communities. The province serves as the primary key, uniquely identifying each entry in the table. Additionally, we store the autonomous region for each province.

Countries

Table containing a list of countries. We use the country as the primary key.

Tokens

This table manages tokens utilized in email links sent to users, ensuring their expiration within one hour. Each entry is uniquely identified by the user's email address. Alongside, it records the token and its expiration time. These tokens facilitate both password reset and user registration functionalities.

Chatbot

Table containing queries and corresponding replies for the chat system. It provides predefined question options to the user and stores the response to each. Each entry is uniquely identified by an integer ID. It also includes fields for the user's query and the chatbot's response.

Step

Table containing details about the steps required for each application process. Each step is assigned a unique identifier (ID) as an integer. It includes the application's identifier, a description of the step, a boolean indicating if the step is completed, and the date it was assigned, stored as a date.

Figure 14: Database relationships, illustrates the relationships between various tables and fields within the database.

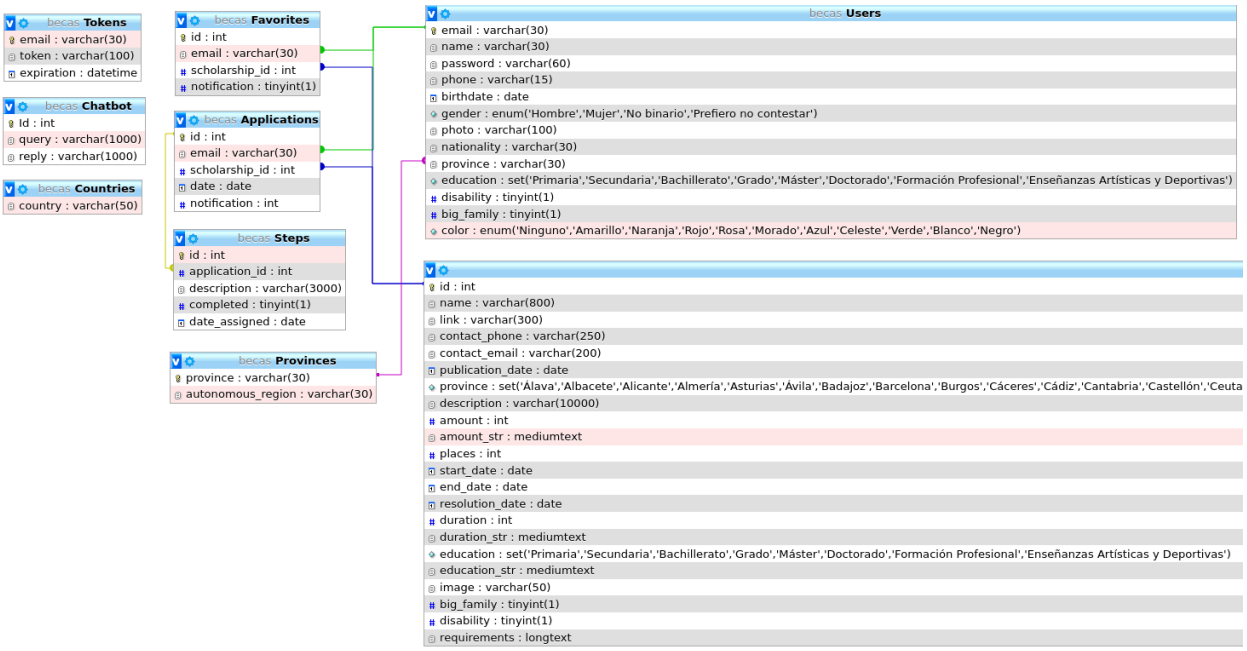

Figure 14: Database relationships

6.2. *Flow charts*

In this section, we present flowcharts that illustrate the various actions within the different functionalities of the app. We used Miro tool to create them.

Login and Register

In *Figure 15: Login and register flow* chart, we depict the flowchart for the login and registration process, considering whether the user has an account, checking if the session is already active, verifying the correctness of credentials and the possibility of forgotten password.

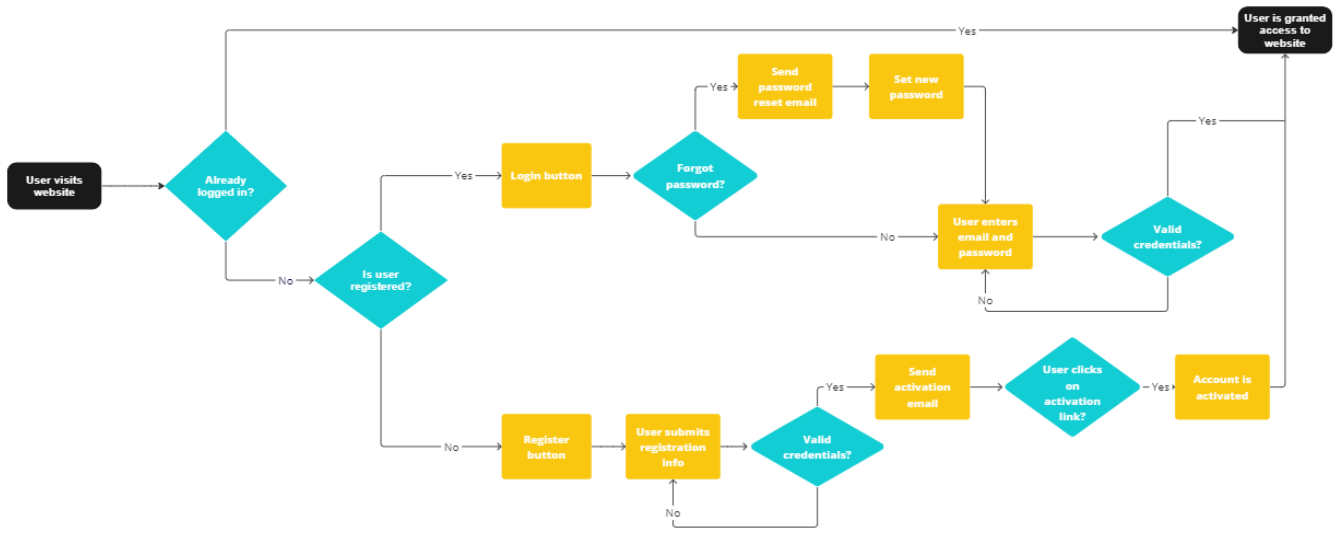

Figure 15: Login and register flow chart

Edit password

In *Figure 16: Edit password flow* chart, we illustrate the flow for editing passwords, supposing an already logged in user and asking for their current and desired new passwords. We verify the accuracy of the current password and ensure the new password meets security standards. To prevent mistakes, users confirm the new password twice.

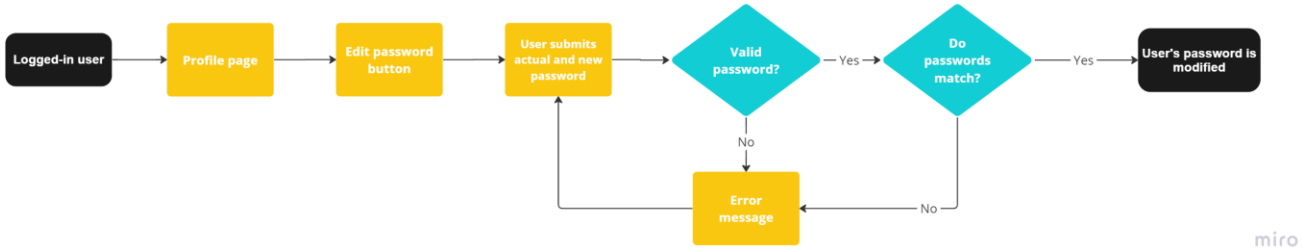

Figure 16: Edit password flow chart

Delete account

In *Figure 17: Delete account flow chart****¡Error! No se encuentra el origen de la referencia.***, we outline the process for account deletion. Upon selecting the 'Delete Account' button, users are prompted with a confirmation message and if they confirm,

a verification email is sent and the user's account is permanently removed from our system.

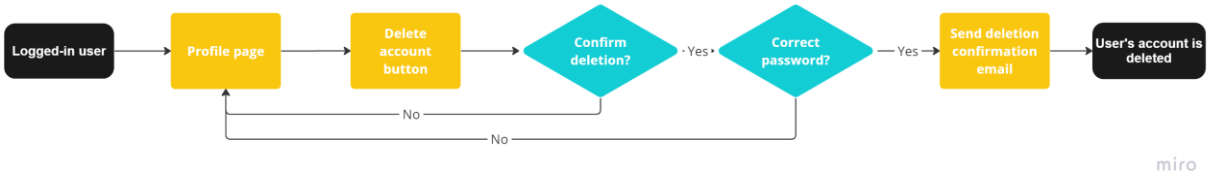

Figure 17: Delete account flow chart

Edit data

In *Figure 18: Edit data flow chart*, we describe the process for editing account details, in which users can update their data using a form and the changes are validated before modifying the account, prompting an error message if they do not meet the criteria.

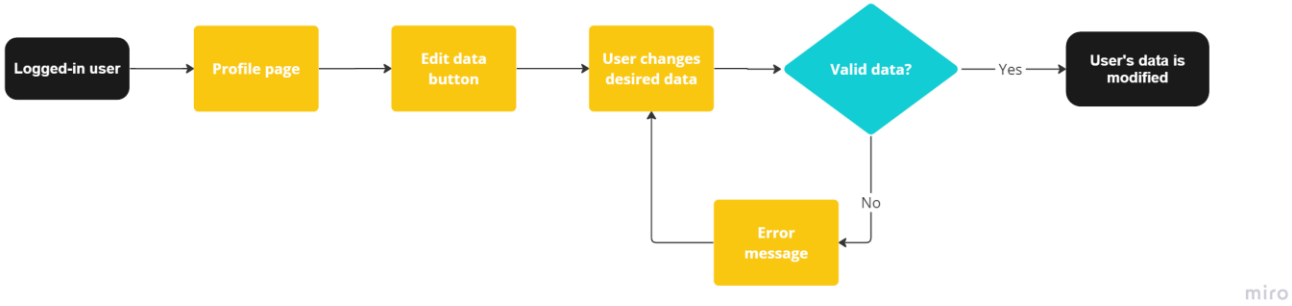

Figure 18: Edit data flow chart

See favorites

In *Figure 19: Favorites flow* chart, we depict the process of favorites scholarships upon selecting the 'Favorites' option, accessible to logged-in users. If the user has favorite items, they are promptly shown. However, if the user hasn't marked any items as favorites yet, a message is displayed indicating that there are no favorite scholarships. Users can also delete from favorites.

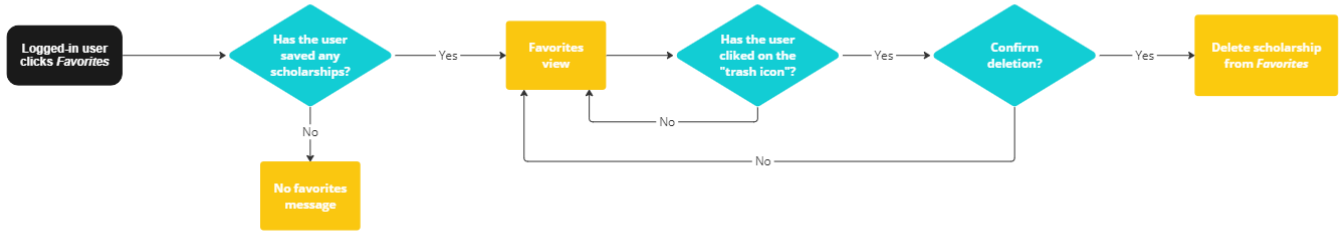

Figure 19: Favorites flow chart

Search

In *Figure 20: Search flow chart*, we outline the search process. If the user opts to use filters, the filter form is displayed and it can also be used the search-by-term input. Once the search is initiated, it is processed and if there are scholarships that meet the search process they are presented. If no scholarships meet the criteria and the term doesn't need to be corrected, a page is displayed featuring recommendations and a suggestions form, as well as the most applied-for scholarships. If it can be corrected, the search is reprocessed.

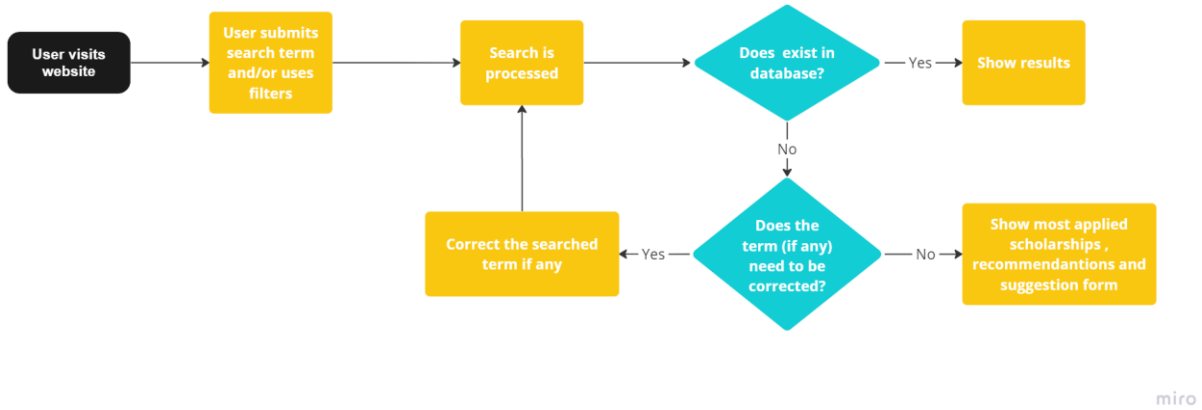

Figure 20: Search flow chart

See scholarship

In *Figure 21: See scholarship flow* chart, we show the scholarship viewing: on the individual scholarship page, if the user is logged in and has saved the scholarship as

favorite, they are presented with an option to remove it from favorites (clicking removes it) and another to view their list of favorites. If they hadn't saved it as favorite, they see an option to add it and clicking adds it to the user's favorites list.

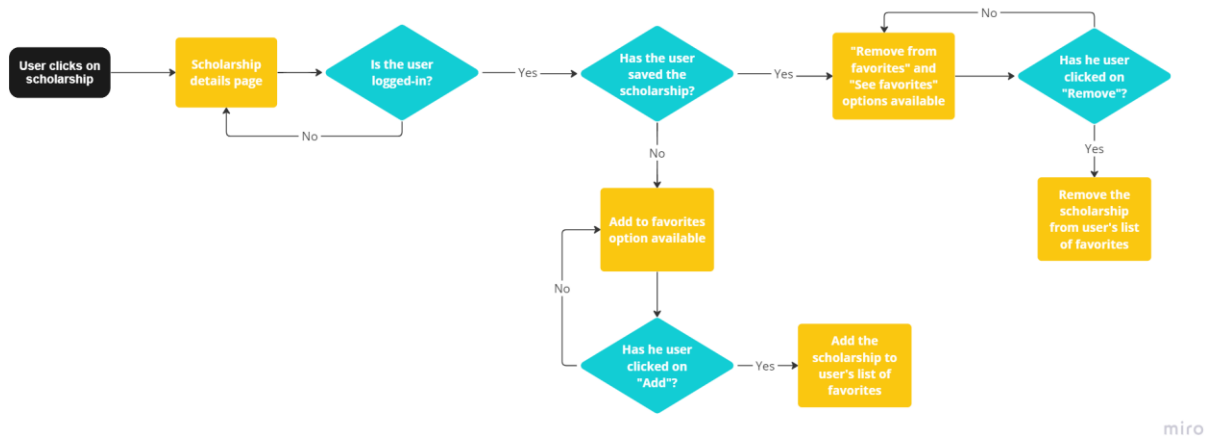

Figure 21: See scholarship flow chart

Toggle Notifications

In *Figure 22: Notifications toggle flow* chart, we depict the process users follow when they want to enable of disable notifications by email of a specific scholarship.

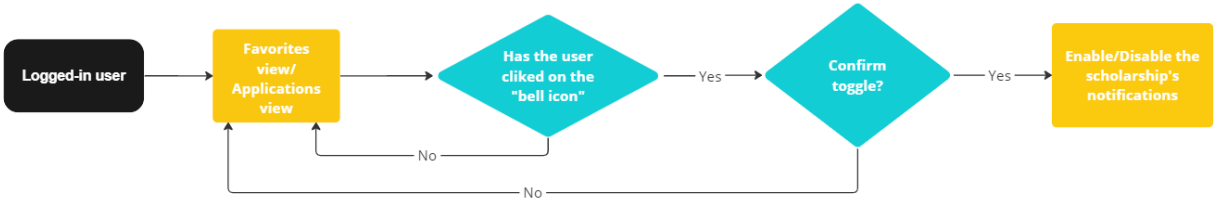

Figure 22: Notifications toggle flow chart

See Applications

In *Figure 23: See applications flow* chart, we show how users can see their applied scholarships, as well as deleting them from their applied scholarships list by clicking on the trash icon.

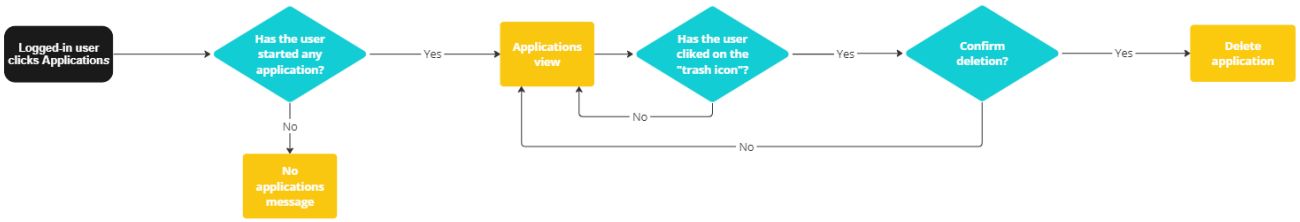

Figure 23: See applications flow chart

Personality test

In *Figure 24: Personality test flow* chart, we depict the way users can complete the personality test and de different actions they can take after viewing the results, such as updating the profile photo (based on the result they get) or seeing the rest of the characters.

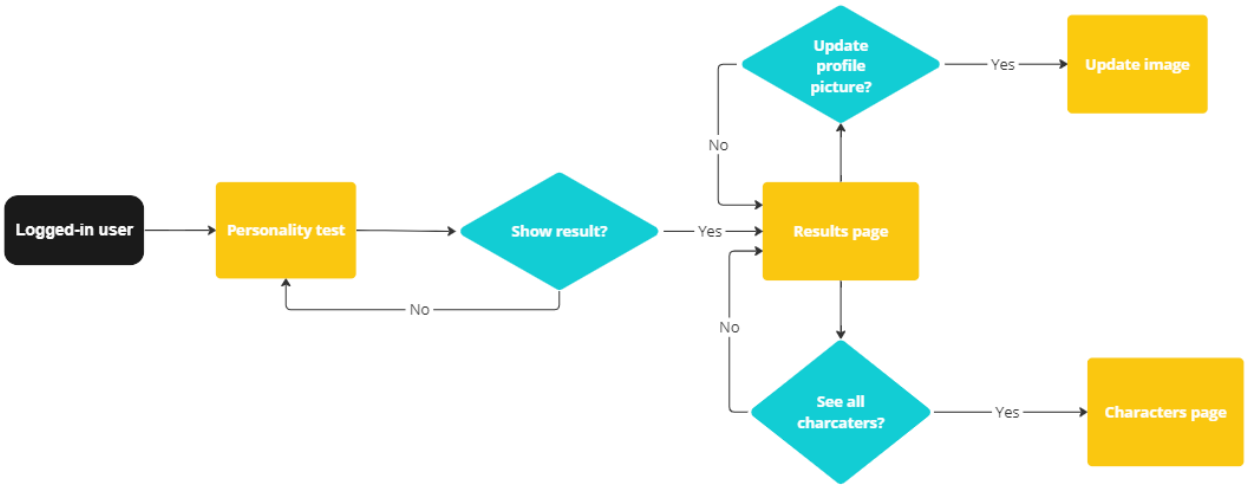

Figure 24: Personality test flow chart

Steps

In *Figure 25: Steps edition flow* charts, we outline the different processes for adding, editing, marking as complete and deleting a step of a particular applied scholarship. The data when adding or editing a step must be valid.

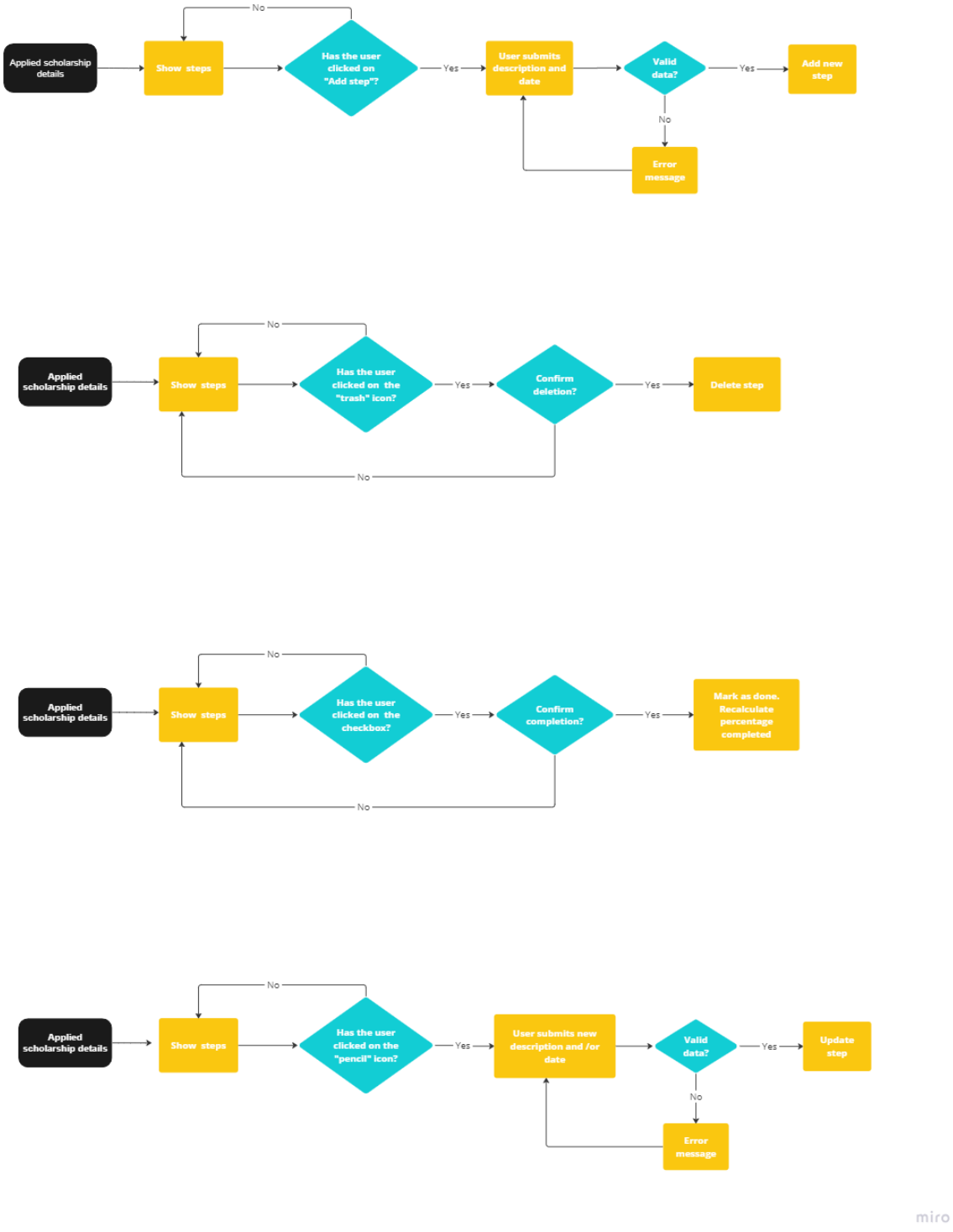

Figure 25: Steps edition flow charts

Chatbot

In *Figure 26: Chatbot flow* chart, we show the way users can interact with the chat. They can use the default options or type their doubts as input. The chat (mascot Bequi) will then show the corresponding answer message or a no response message if we don't have an answer for that question.

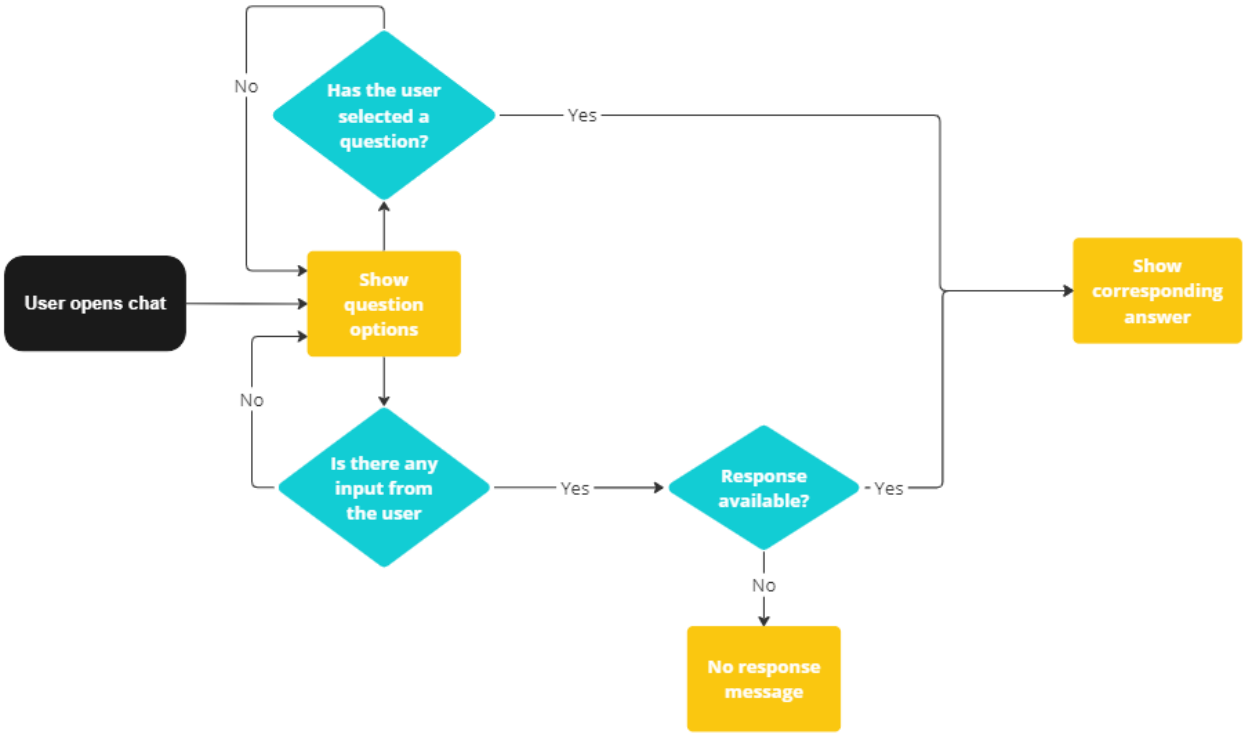

Figure 26: Chatbot flow chart

6.3. *User interface sketch*

We present the initial sketches of the most important views of the interface, utilizing basic shapes and text to convey a simplistic representation. We used Miro to create them.

In *Figure 27: Index initial* sketch, we show our first idea for the main view of our website, which is very similar to the final interface, showing the search bar with filters, the sections on what BuscaBecas is, how it works and questions/faq, the scholarships we manage and several squares to use for recommendations or something similar.

Figure 27: Index initial sketch

In *Figure 28: User account initial* sketch, we show how the user's profile page would look like, showing the photo, details and the applied favorites and scholarships buttons.

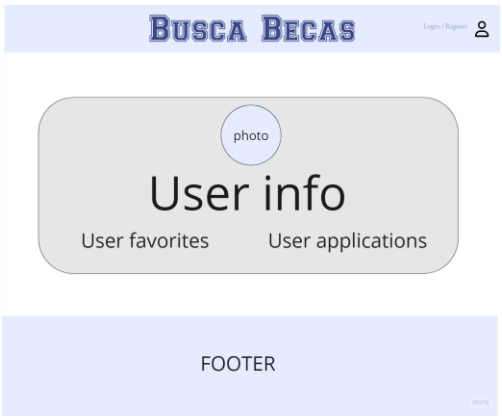

Figure 28: User account initial sketch

In *Figure 29: Scholarship details initial* sketch, we depict the idea to show the details of each scholarship, which includes the photo, name, description, requirements and steps to follow.

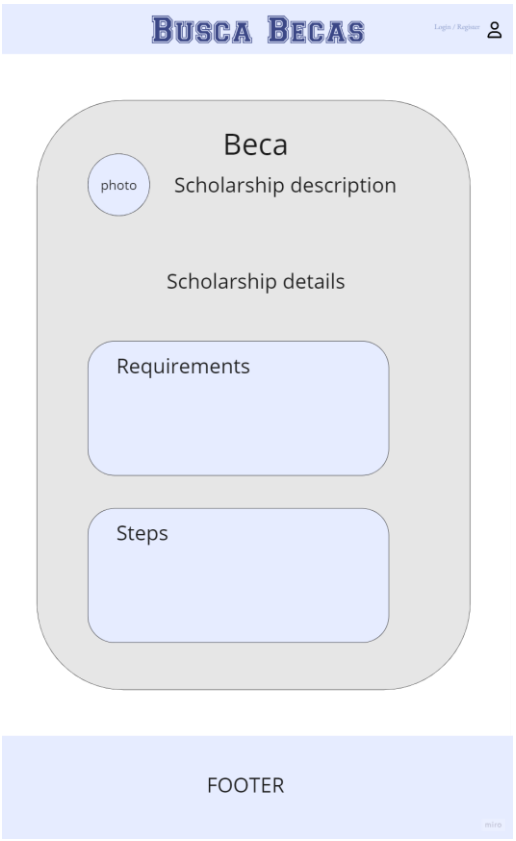

Figure 29: Scholarship details initial sketch

6.4. Final user interface

Below, we display the final interface, developed from the initial sketches, featuring views of both a logged-in user and a visitor encapsulating the ultimate design and functionality of the website.

Visitor

In *Figure 30: Visitor-index, Figure 31: Visitor-faq, Figure 32: Visitor-about us, Figure 33: Visitor-bequis, Figure 34: Visitor-tutorial, Figure 35: Visitor-chat, Figure 36: Visitor-login, Figure 37: Visitor-register, Figure 38: Visitor-filters, Figure 39: Visitor-closed scholarship, Figure 40: Visitor-open scholarship, Figure 41: Visitor-term correction* and *Figure 42: Visitor-forgot password*, we include the interface of our website as viewed by a user who isn't logged in.

Figure 30: Visitor-index

Figure 31: Visitor-faq

Figure 32: Visitor-about us

Figure 33: Visitor-bequis

Figure 34: Visitor-tutorial

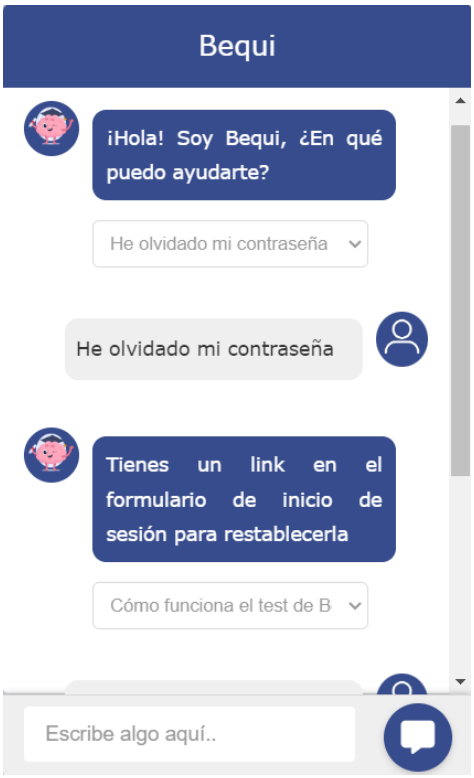

Figure 35: Visitor-chat

Figure 36: Visitor-login

Figure 37: Visitor-register

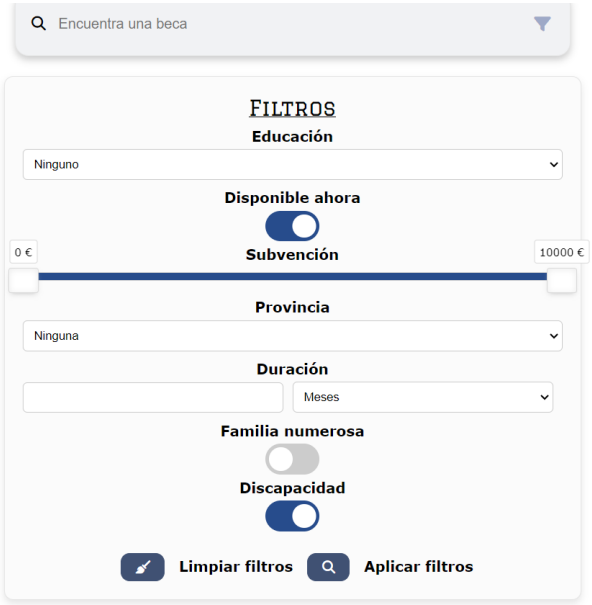

Figure 38: Visitor-filters

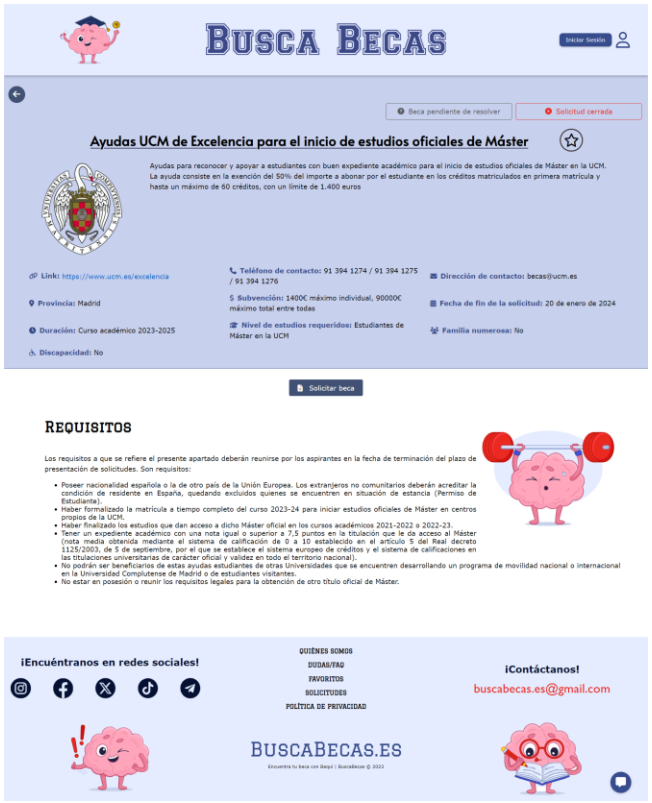

Figure 39: Visitor-closed scholarship

Figure 40: Visitor-open scholarship

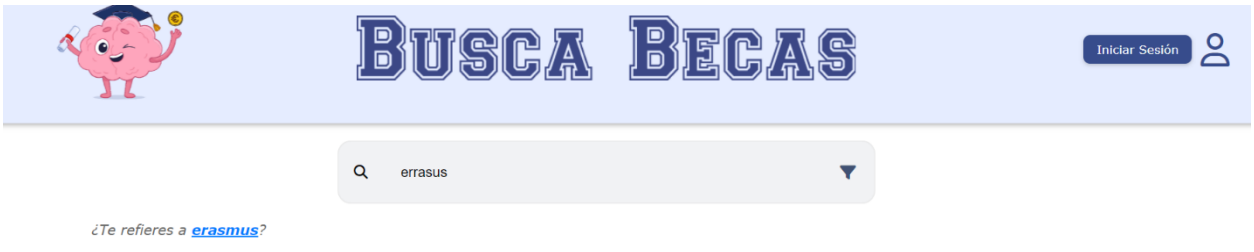

Figure 41: Visitor-term correction

Figure 42: Visitor-forgot password

Logged-in user

In *Figure 43: Logged-index, Figure 44: Logged-profile, Figure 45: Logged-personality test, Figure 46: Logged-test result, Figure 47: Logged-edit data, Figure 48: Logged-change password, Figure 49: Logged-scholarship, Figure 50: Logged-application, Figure 51: Logged-edit step, Figure 52: Logged-favorites, Figure 53: Logged-applications, Figure 54: Logged-delete account, Figure 55: Logged-save favorite, Figure 56: Logged-toggle notifications* and *Figure 57: Logged-chat* we include the interface of our website as viewed by a user who is logged in. These figures specifically highlight views that differ from those previously illustrated for visitors.

Figure 43: Logged-index

Figure 44: Logged-profile

Figure 45: Logged-personality test

Figure 46: Logged-test result

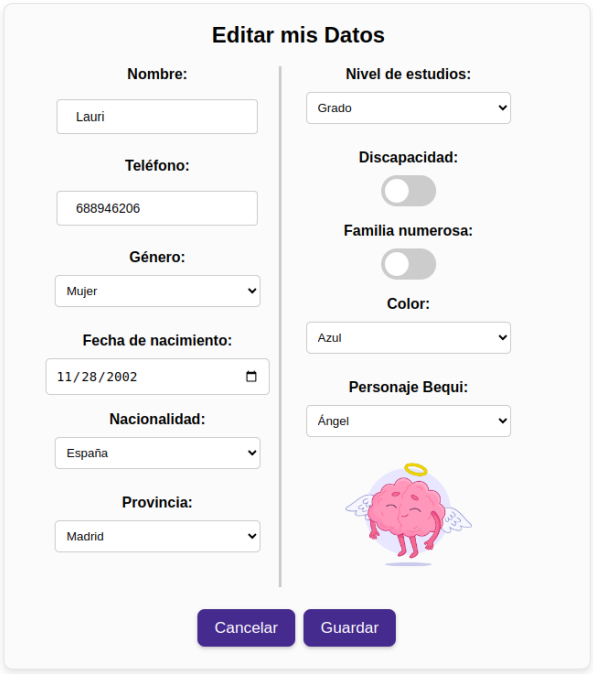

Figure 47: Logged-edit data

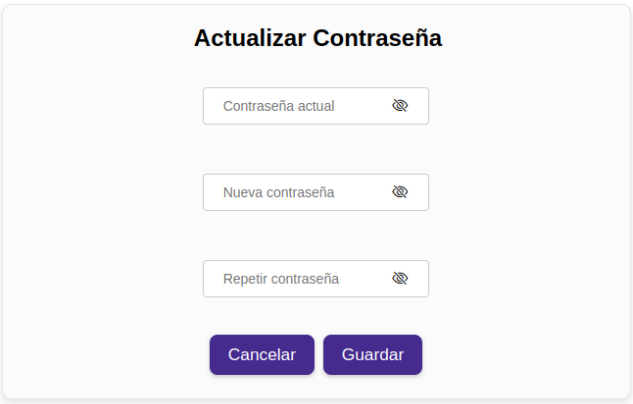

Figure 48: Logged-change password

Figure 49: Logged-scholarship

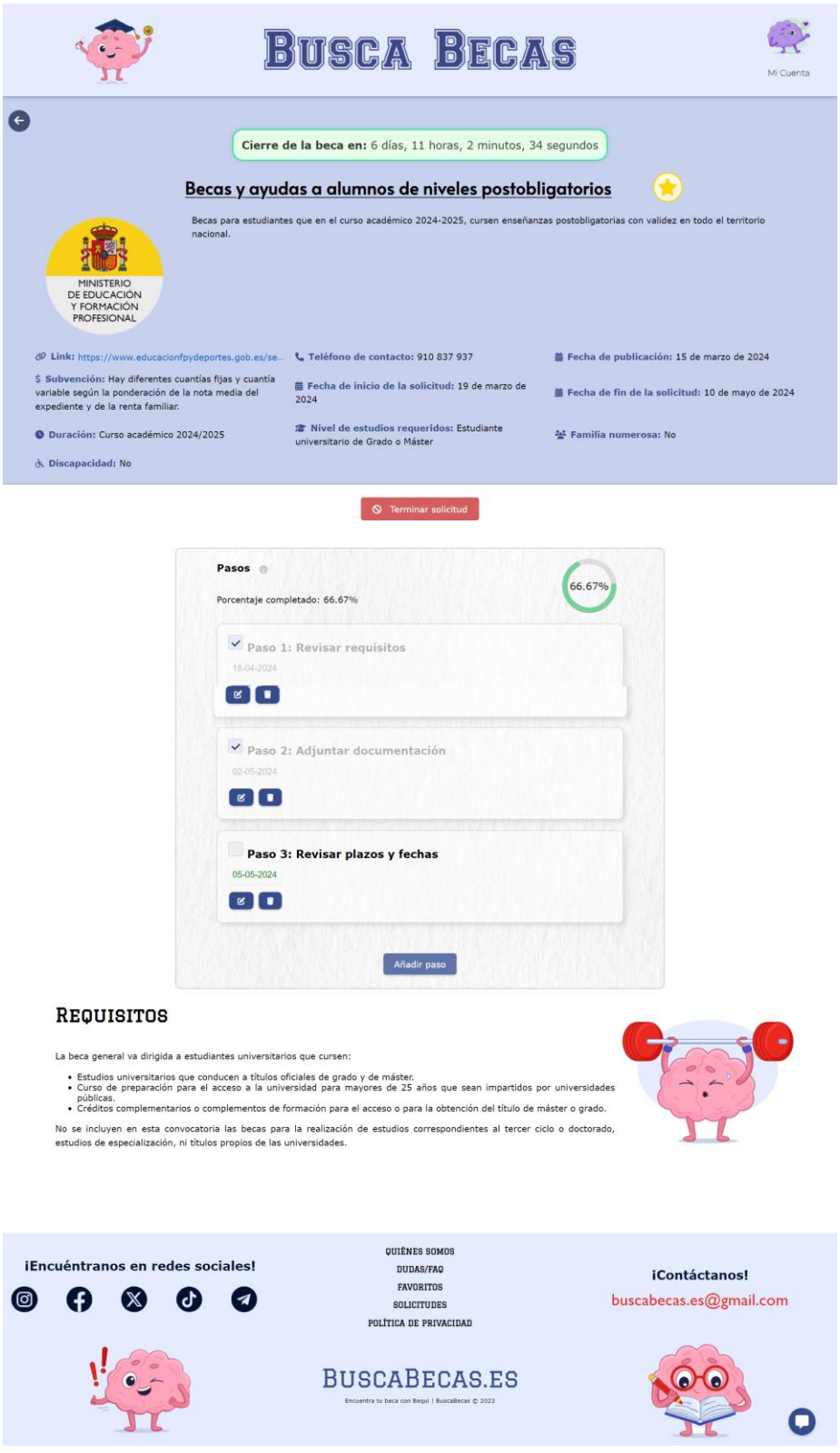

Figure 50: Logged-application

Figure 51: Logged-edit step

Figure 52: Logged-favorites

Figure 53: Logged-applications

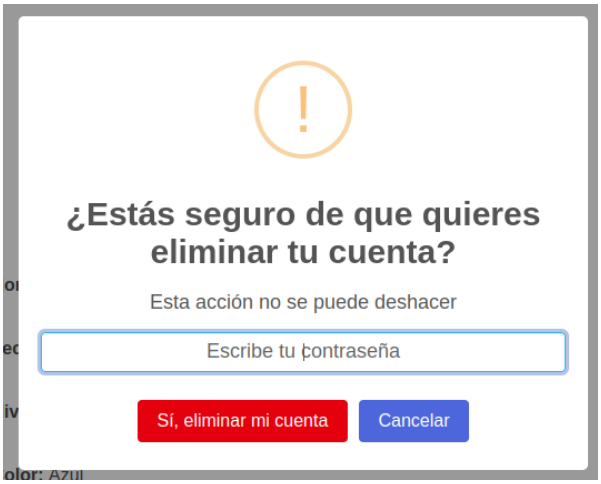

Figure 54: Logged-delete account

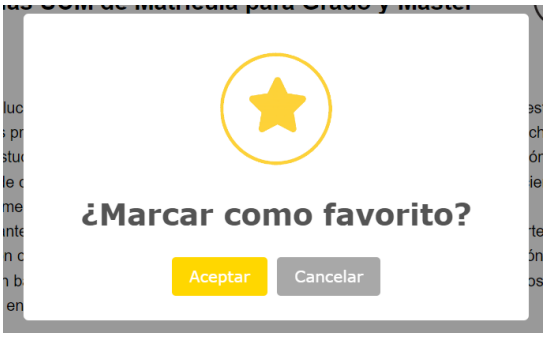

Figure 55: Logged-save favorite

Figure 56: Logged-toggle notifications

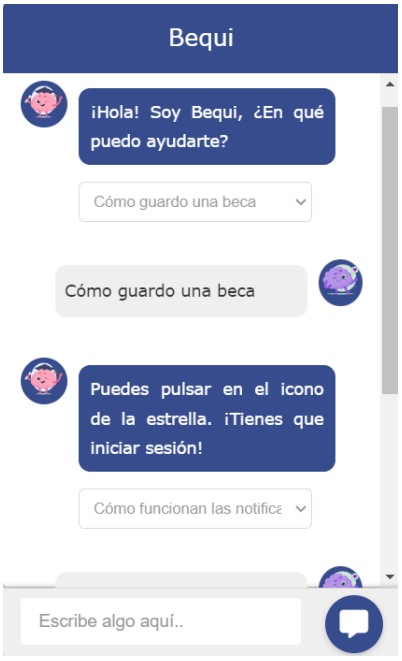

Figure 57: Logged-chat

6.5. Navigation between interfaces

We offer a visual representation to illustrate the navigation, created using Miro.

In *Figure 58: Interfaces* navigation, actions available to any user are represented in black, while those exclusive to registered users with an active session are highlighted in blue.

As illustrated in the diagram, certain functionalities are inaccessible to visitors unless they are logged in. These include personalized features that rely on user data, such as recommendations or the use of the "for you" filter, and account-specific functions like saving favorites or starting applications. User registration serves two main purposes: firstly, it allows for the utilization of individualized data to provide personalized features, ensuring that users receive recommendations and tailored content based on their preferences. Secondly, registration enables the platform to store and link user-specific actions to their accounts.

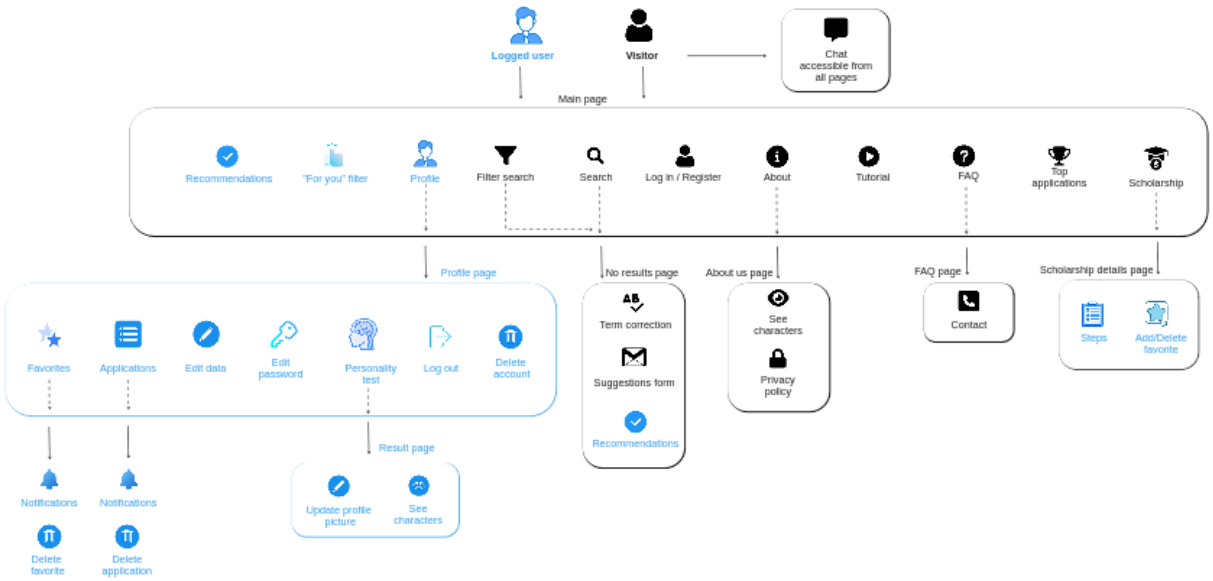

Figure 58: Interfaces navigation

6.6. *Chapter conclusions*

To conclude, the meticulous design of databases establishes a solid foundation for efficient data storage and management. A well-thought-out database structure is crucial for the implementation of functionalities, encompassing considerations such as field definitions, data types, and relationships between entities. By carefully planning these aspects, we can streamline the development process, minimize errors, and lay the groundwork for scalable features that align with our platform's objectives.

Flowcharts play a crucial role in our development process by providing a visual representation of the sequential steps and decision points within our system. This visual aid helps us recognize important considerations that otherwise could have been overlooked, ensuring that all relevant factors are taken into account during the development process.

An intuitive interface is crucial in ensuring a positive user experience. It serves as the primary point of interaction between users and the system, significantly influencing their perception of usability and satisfaction. By designing clear and consistent layouts with easily identifiable elements, such as buttons, menus, and forms, users can quickly comprehend the functionality and purpose of each component. Additionally, intuitive

navigation between views enhances user efficiency and engagement, allowing smooth transitions between different sections or tasks within the platform.

Chapter 7 - Conclusions and future work

Conclusions

In conclusion, our project has been dedicated to addressing a critical gap in the scholarship landscape of Spain: the absence of a centralized platform encompassing all available opportunities.

Throughout our development process, we implemented a range of features designed to enhance the user experience and streamline the scholarship search and application journey. Among these features are the filtered search functionality, allowing users to refine their search criteria to find the most relevant scholarships. Additionally, the personalized agenda creation feature empowers users to track their progress and stay organized throughout the application process.

Moreover, our incorporation of interactive elements such as the chat feature and the mascot, Bequi, serves to make the platform not only informative but also engaging and enjoyable to use. By integrating social media channels and a notification system, we aimed to increase the platform's reach and ensure that users are informed promptly about new opportunities and updates.

By providing a centralized hub for scholarship information and application management, we aspire to empower students to pursue their academic and career aspirations with confidence and ease. We believe that our platform has the potential to make a meaningful impact on the educational landscape of Spain, facilitating greater access to opportunities.

Future Work

In looking ahead to the future of our website, there are exciting ideas and improvements we aim to implement. This section highlights some of the key features and enhancements we plan to integrate to further boost the user experience and functionality of our platform.

Moreover, we believe that establishing a robust backup system is crucial for safeguarding the integrity of our platform and the data it hosts. We will seek a platform that ensures daily backups of the website and secure storage of its data.

Also, to improve user engagement and interaction, we intend to introduce in-website notifications. These notifications will keep users informed about important updates, new scholarships... This method aims to simplify communication and guarantee users promptly receive notifications, lessening dependence solely on email, which can occasionally become overloaded with messages.

An upcoming feature on our website will notify users when scholarship information is updated, particularly when a new scholarship overwrites a previous one. This notification will be sent to users who have bookmarked or started applications for the previous scholarship, ensuring they are aware of the change and can take appropriate action.

In addition, enhancing the visibility of our website in search engine results is crucial for attracting more users. We will focus on Search Engine Optimization (SEO) techniques to improve our website's ranking on search engine results pages, thereby increasing organic traffic.

Finally, implementing a recommendation system and a chat feature powered by machine learning are exciting prospects for our platform. By analyzing user preferences and behaviors, we can provide personalized scholarship recommendations and offer real-time assistance through an intelligent chat interface, enhancing the overall user experience.

Personal contributions

In this section, we showcase the distinctive contributions made by each member of our group towards our collective goals. Everyone's unique skills, insights, and efforts have played a crucial role in shaping the outcomes of our project. Through this examination, we aim to recognize and appreciate the diverse talents and perspectives that have made our teamwork stronger.

Throughout the development process, we have leaned on each other for support and guidance, readily offering suggestions and assistance whenever one of us encountered obstacles. Our dedication to effective communication played a crucial role in ensuring the uninterrupted progression of the project. Regular updates and status meetings helped us stay aligned with our objectives and deadlines. It's key to point out that our project has been a real team effort, characterized by a unified effort rather than strict divisions. While some team members may have taken on greater responsibilities in certain aspects, we've all come together and mixed our skills and know-how working together.

Daniel Martín

Daniel Martín excels in design, user experience, marketing, and all aspects related to corporate branding and identity. His strengths lie in creating visually appealing interfaces that prioritize user engagement and satisfaction, while also aligning with the strategic goals of the brand. Daniel's ability to "hook" users and keep them engaged throughout their interaction with the brand underscores his understanding of user behavior and his commitment to delivering exceptional digital experiences. Additionally, Daniel is recognized for his innovative thinking and his ability to approach challenges with creativity, making him a valuable asset to our team.

It's important to acknowledge the origin of this project's idea. It was him who initially proposed the concept, fueled by the frustration of searching through numerous websites for scholarships.

Daniel's primary task was the interface, first dedicating himself to conceptualizing and creating it in Miro, selecting a color palette, typography, layout, and other visual elements. Once he had a final design, he took on the task of implementing it, including the creation of the header and footer components. He also incorporated Lottie animations into the platform, bringing movement to various icons and adding dynamism and charm to the interface. Throughout this process, Daniel actively sought input from the entire team, ensuring that important decisions were always discussed collaboratively. Additionally, he took the initiative to gather feedback from external sources, further enriching the design process.

He developed the "*template.php*" file, which served as a foundational component used across all visual files. This template ensured consistency in design and layout throughout the platform, optimized the development process, and maintained a cohesive user experience.

Daniel's creative way of getting users involved is showcased by his suggestion to center the website around a character, our mascot Bequi. Recognizing the power of personalization in fostering user connection, he implemented the feature of allowing users to customize Bequi with their preferred colors. Additionally, Daniel developed a personality test featuring Bequi's various personalities, allowing users to find their match and further enhancing their engagement with the platform. He also oversaw the implementation of a page where users can explore all sixteen personalities. Moreover, he assumed responsibility for developing the website's tutorial, which features Bequi showcasing its main functionalities and corresponding buttons to users. The tutorial consists of multiple parts, allowing users to advance to the next step or conclude the tutorial at any time, offering flexibility.

In addition to his work on the visual aspects of the interface, Daniel has also focused on ensuring the website's responsiveness. He dedicated time to ensuring that the interface adapts to various screen sizes, including mobile devices. By prioritizing responsiveness, Daniel ensures that users have a consistent and enjoyable experience regardless of the device they are using.

He also undertook the task of creating and managing social media accounts across various platforms, including Instagram, Facebook, Twitter, TikTok, and Telegram, adding the links to each social media account conveniently in the footer of the website.

Another of his contributions has been implementing user feedback messages, designed to disappear after ten seconds, ensuring smooth communication with the users. These feedback messages appear as pop-ups, providing information about the success or failure of user actions and they are accompanied by a picture of Bequi to personalize the experience.

Daniel has also been instrumental in creating the FAQ page for the platform. This page serves as a comprehensive resource for users, featuring a user-friendly interface where questions are visible, and users can expand each question to view its corresponding answer with the click of a button.

Furthermore, he handled resolving the scrolling issue. We aimed to address the inconvenience experienced when the page would reset its position upon reloading, disrupting the user experience. Implementing the solution was not an immediate task, as it required thorough analysis of the underlying code and user interactions. Employing JavaScript, he found a solution to address the issue. Furthermore, this solution had to be responsive, adding an additional layer of complexity to the task.

Moreover, Daniel conducted extensive testing, initially approaching the platform as an ordinary user and then deliberately seeking out potential flaws that standard tests might overlook. He performed actions outside the typical user flow or expectations to identify any vulnerabilities or unexpected behaviors. This meticulous testing process ensured that the platform was capable of handling various scenarios, ultimately enhancing its reliability and user satisfaction.

Additionally, Daniel suggested adding a feature where both logged-in users and visitors can suggest scholarships if they cannot find them on our website. This enhancement will empower users to contribute to our scholarship database, ensuring that our platform remains comprehensive and up to date with the latest opportunities.

One of the most significant achievements is that Daniel has successfully transformed our website into an Android mobile application using advanced technologies and modern development tools. This process has included the configuration of frameworks, the integration of plugins, and optimization for mobile devices: He achieved this by leveraging Ionic Framework for cross-platform development with Angular and Node.js. He also used Capacitor Ionic and Cordova Framework to convert the web app into a native Android APK, enabling access to device features through plugins such as Cordova InAppBrowser and Cordova Network Information. This approach has ensured integration with Android devices while maintaining the core web functionalities.

Lastly, we want to acknowledge Daniel's dedicated efforts in researching the process of publishing our website on the internet. He has been actively exploring domain name options and investigating various hosting solutions. After evaluating several options, he has decided to host the website with Nominalia (https://www.nominalia.com/). They offer reliable services and excellent support, making them the best choice for our needs. Thanks to his hard work, the website has finally been published and can now be accessed from any device, ensuring that it is available for everyone to use, regardless of whether they are on a mobile phone, tablet, or computer. This accessibility helps ensure that the scholarship information is widely available to all potential users.

Inés Palero

Inés Palero brings a wealth of expertise in programming, and exploration of tools and techniques previously unfamiliar to our team. Her proficiency in coding languages, ranging from frontend to backend development and her diligent approach to investigating new methodologies have been instrumental in the development of our project. Inés's keen interest in exploring technologies and her ability to adapt quickly to new challenges have enabled us to incorporate innovative solutions into our website. Her dedication to continuous learning and her proactive approach to problem-solving make her an invaluable member of our team.

Inés took the lead in developing the platform's search functionality. Her efforts were concentrated on creating a comprehensive search system tailored to diverse user

needs. This system enabled users to search by keyword, apply various filters, or combine both methods to refine their results. It was one of the most challenging tasks, requiring extensive problem-solving and rethinking of implementation strategies. Inés successfully ensured that after viewing the search results, both the search term and applied filters were saved, allowing users to modify either or both afterward. Additionally, she ensured integration with result pagination, ensuring easy navigation through search results. Furthermore, she implemented a "clear filters" button to allow users to easily reset any applied filters and start a new search without any constraints. This feature proves especially useful when users apply multiple filters simultaneously, given the seven available filter options, improving the search experience even further. She also achieved displaying a counter indicating how many filters are currently selected, providing users with clear visibility of their filtering choices. This counter feature is particularly valuable as it helps users remain aware of their selected filters, preventing potential oversight or forgetfulness.

Inés also conducted research on the implementation of PHPMailer, leading to the creation of the "*mailer.php*" file. This file simplifies the process of sending emails from our platform by providing the necessary configuration, including server settings and port specifications, and declaring the function used throughout other files. It has become a crucial tool used across various functionalities of the website, facilitating communication with users.

She set up a Gmail account specifically for the website, which serves as the designated email address for communication with users and which is accessible both in the contact form in the located in the "about" page and the footer of the webpage. It's worth mentioning that we encountered security issues when attempting to send emails via Gmail, as relying solely on username and password authentication can pose challenges due to Gmail's security measures. However, Inés found a solution by creating the account with an application-specific password, which bypassed these security hurdles and enabled successful email authentication and sending, while also facilitating the two-step verification process.

She researched the web scraping tools we used and developed a Python file to provide us with alerts regarding the scholarship websites we relied on as sources of information. This enabled us to stay informed of any changes that occurred, allowing us to update our website's information accordingly. She ensured that we received an email notifying us of the modified page along with a list of the changes made, effectively keeping us up-to-date and enabling us to maintain accurate information on our platform.

Inés assumed responsibility for all aspects of the "steps" feature, from conceptualization to implementation. This included designing the database structure, developing functionalities for seeing, adding, editing, completing, and deleting steps, as well as establishing their relationship with the "applications" table. Consequently, when an application is deleted, the associated steps for that application are also removed. This prevents duplication of default steps in scenarios where a user applies for a scholarship, cancels the application, and re-applies, ensuring an efficient user experience. Additionally, she implemented a feature to display the total percentage of completed steps to the user, providing them with clear progress tracking.

She contributed to implementing the chat feature, starting with thorough research into various methods of implementation. She managed to ensure accessibility across most pages of the website while providing users with the option to both type messages and choose from a menu of predefined options. The chat operates using AJAX technology, enabling asynchronous communication with the server. This means that messages are sent and received without the need to reload the page. It facilitates a real-time user experience where user messages are dynamically added to the chat, and chatbot responses are displayed instantly. Utilizing AJAX also ensures uninterrupted user interaction with the chat, even in environments with less reliable internet connectivity.

In addition, Inés managed data validation for the platform's forms using JavaScript. She ensured that users entered data accurately, checking that email addresses included the necessary components, verifying phone numbers for proper length, and confirming that dates were logically consistent based on the specific context of each form. Moreover, she enhanced the forms that presented password fields by

adding useful elements, such as the eye icon for toggling visibility and a notification alert for uppercase input, providing users with a more intuitive and secure input experience.

To conclude, Inés brainstormed solutions for potential user issues. She designed an error page in case the website malfunctioned, ensuring users saw a personalized page from our website during such occurrences. Additionally, she crafted a registration email waiting page, offering users a button to resend the email if necessary; a proactive measure to prepare for potential errors that she anticipated could occur. Notably, this button automatically deactivates for five minutes, preventing users from excessively clicking it.

Laura San Martín

Laura San Martín excels in content management, strategic communication, and project organization. She is a meticulous professional who closely monitors deadlines and established tasks, ensuring that the team stays on track towards our goals. Her expertise in efficient programming complements her ability to implement technological solutions that optimize the performance and functionality of our website. Laura also stands out for her clear and concise communication, facilitating coordination among team members and ensuring that everyone is aligned with the project's vision and objectives. Her organized approach and ability to adapt to challenges make Laura a cornerstone of our team's success.

One noteworthy achievement is the implementation of email notification systems for critical events related to scholarships. Laura meticulously configured the system to send notifications when a favorite scholarship's application period starts on the same day or ends the following day. Additionally, she ensured that notifications are sent when a deadline for a step within an applied scholarship is set for the next day. To consolidate these processes, she developed scripts to automate the generation and sending of these notifications, thereby enhancing user engagement, and providing timely updates. The script takes into consideration the notification settings for each scholarship, allowing users to customize their notification experience based on their individual needs and interests.

Another significant enhancement overseen by Laura is the refinement of search term correction functionalities. Initially, Laura explored the feasibility of employing pspell for spell checking purposes. However, recognizing the complexity of installing pspell on Windows, she opted for an alternative approach. Subsequently, Laura devised a solution utilizing a CSV file containing scholarship names as a dictionary. Leveraging Jaccard similarity with a threshold of 75%, Laura's implementation offers suggested corrections for search terms, thus enriching the search functionality of the website and ensuring users receive relevant results even amidst minor misspellings.

She also developed the functionality of the "For you" filter available for registered users. This filter retrieves the relevant user profile characteristics that match one of the filters available. Then, it automatically applies these filters, allowing users to view results without the need for manual selection. With just a click of a button, users can see tailored results based on their relevant profile attributes.

A similar functionality is the recommendations feature, which she also developed. Registered users can view recommendations for scholarships either on the index page, or when their search yields no results. In line with the "For you" filter, these recommendations utilize the shared characteristics between user profiles and scholarships stored in our database. By comparing these shared attributes, the system suggests the most relevant options to the user. Unlike the 'For you' filter, which requires strict matching, these recommendations prioritize similarity, offering users a range of potentially suitable options based on their profile. Moreover, recommendations exclude scholarships that the user has already marked as favorites or for which they have initiated an application, ensuring users discover new scholarships they may not have encountered before.

In addition to her technical expertise, Laura has implemented robust security measures to protect user accounts and information. She introduced token-based authentication for email links, enhancing user privacy and security. These tokens have a one-hour expiration, strengthening the security of actions like password resets and user registration. Laura developed the necessary scripts to manage and remove expired tokens, ensuring the integrity of the authentication system and safeguarding user data.

When a user initiates an operation requiring token creation, a unique token specific to that user is generated and subsequently embedded within the link sent to their email. This ensures that only the intended recipient can use it. For token creation, the system uses a strong security protocol by hashing the user's email and the current time using the SHA256 algorithm. This process ensures that each token is unique and securely associated with the user's account, improving both security and token uniqueness. Additionally, she ensured that the passwords selected by users during registration, password reset, and when editing them post-account creation were adequately secure, adhering to criteria including a minimum of 8 characters, at least one uppercase letter, and at least one special character.

Furthermore, Laura's proficiency extends to front-end development, where she programmed JavaScript-based confirmation dialogs for various user actions, such as account deletion, application termination, and removing favorites or steps. These confirmation dialogs provide users with clear prompts and ensure that significant actions are deliberate and intentional, reducing the likelihood of accidental actions and enhancing the overall user experience. In implementing these confirmation dialogs, Laura utilized the Swal library. This choice was driven by the library's ease of use and flexibility in customizing icons, making it easy to align with the visual aesthetic of our website.

Moreover, Laura has played a pivotal role in sourcing scholarships from Spain, a task that presented various challenges due to the diverse structures and formats of scholarship pages. Each scholarship website often presented information in different layouts, making it challenging to extract and organize data consistently. She undertook the challenging task of organizing and structuring the CSV file to store scholarship information efficiently. She encountered numerous obstacles along the way, including the inconsistency of data formats, missing or incomplete information, and the need to navigate through multiple pages or files to gather relevant data. Despite these challenges, Laura remained steadfast in her efforts and ensured the accuracy and completeness of the stored information.

In addition to organizing the data, Laura developed a script to insert this information into the database seamlessly. This involved parsing and extracting data from the CSV file, handling data transformations and validations, and efficiently populating the database tables.

Teamwork

In creating functions like Registration, Login, Favorites, Profile, Edit personal information, Edit password, See details, Start application, and Delete account, we relied on our past experience from other projects. We had already worked on similar features before, so we used what we knew to speed up the work on this project. By building on what we'd done in the past and adjusting it to fit this project, we made the development process smoother and ensured everything worked together well. We also collaborated closely on establishing the database structure and ensuring perfect connectivity.

Bibliography

[1] Diego Movilla Gayoso. (2021). *Web application development for the complete management of leasing apartments*: *Desarrollo de una aplicación web para la gestión integral de pisos en alquiler*. Docta Complutense. https://docta.ucm.es/rest/api/core/bitstreams/c2d5241b-5c67-4e00-b17a-3875997b4495/content

[2] Carmen Serrano Avilés. (2020). *HiBeauty! Recomendaciones para la piel*. Docta Complutense. https://docta.ucm.es/rest/api/core/bitstreams/1bf5f963-ff64-4a0b-8694-97dfba01f4fb/content

[3] JavaScript Tutorial. (s.f.). *How to Toggle Password Visibility*. https://www.javascripttutorial.net/javascript-dom/javascript-toggle-password-visibility

[4] ConfiguroWeb. (2022, Mayo). *Chatbot Sencillo en PHP y MySQL*. https://www.configuroweb.com/chatbot-sencillo-en-php-y-mysql/

[5] Marcus Bointon. (2024). *PHPMailer*: *The classic email sending library for PHP*. https://github.com/PHPMailer/PHPMailer

[6] FLATICON. (s.f.). *Brain sticker pack*. https://www.flaticon.com/free-sticker/brain_7650352

[7] PINE TOOLS. (s.f.). *AJUSTAR GAMMA EN LOTE ONLINE*. https://pinetools.com/es/ajustar-gamma-imagen-lotes-serie

[8] jsDelivr. (s.f.). *bootstrap-icons*. https://cdn.jsdelivr.net/npm/bootstrap-icons@1.3.0/font/bootstrap-icons.css

[9] Cloudflare. (s.f.). *font-awesome*. https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.5.1/css/all.min.css

[10] jsDelivr. (s.f.). sweetalert2. https://cdn.jsdelivr.net/npm/sweetalert2@11

[11] Cloudflare. (s.f.). *moment.js*. https://cdnjs.cloudflare.com/ajax/libs/moment.js/2.29.1/moment.min.js

[12] Cloudflare. (s.f.). *noUiSlider*. https://cdnjs.cloudflare.com/ajax/libs/noUiSlider/14.7.0/nouislider.min.js

[13] Cloudflare. (s.f.). *noUiSlider*. https://cdnjs.cloudflare.com/ajax/libs/noUiSlider/14.7.0/nouislider.min.css

[14] Iconify. (s.f.). *icons*. https://icon-sets.iconify.design/

APPENDIXES

Appendix A - Installation and Runtime Environment Configuration Instructions

Installation and running the project

To run the application, the installation of XAMPP is recommended, which provides Apache, MySQL, and PHP, the essential tools for execution.

1. Once XAMPP is installed, launch it either from the Start menu or the desktop shortcut.
2. In the XAMPP control panel, make sure that the Apache and MySQL modules are activated (it is recommended to switch on first Apache and then MySQL to avoid problems). This can be done by clicking the "Start" button.
3. Once both modules are up and running, open a web browser and navigate to "http://localhost/phpmyadmin".
4. Log in to phpMyAdmin using the default credentials (username: "root", password: ""). If you've set a password during installation, use that password instead.
5. Create a new database named "becas" and import the "*becas.sql*" file located in the "mysql" folder of our project.
6. Grant all permissions to the "becas" user for the "becas" database, ensuring it has all necessary privileges. These credentials can be found in the "*config.php*" file located in the "includes" folder of our project.
7. Save the project in the "htdocs" folder within the Xampp directory.

Once the database is configured and the project is downloaded in *htdocs*, the application can be accessed through a web browser using the address "http://localhost/**path to directory of the project inside "htdocs"**/index.php".

As something worth mentioning, our database employs table names with the first letter capitalized. This detail is noteworthy as we've observed its impact on system compatibility. Specifically, on Windows platforms, where case sensitivity isn't a concern,

our system operates without interruption regardless of whether table names in the "*becas.sql*" file are in lowercase or uppercase. However, on Linux systems, adhering to uppercase table names within the file is essential to ensure smooth functionality. If necessary, this link (https://deepakmysqldba.wordpress.com/2022/04/08/procedure-to-change-lower_case_table_names-1/) can be used.

Users created

There are already three pre-existing user accounts in our system, each containing personal information, favorite scholarships, and saved applications. The login credentials for these accounts are as follows:

User 1: danmar25@ucm.es, Password: Danypass*

User 2: ipalero@ucm.es, Password: Inespass*

User 3: lausanma@ucm.es, Password: Lauripass*

Appendix B – Additional files

In addition to the main project files, there are several additional files within the project directory that play important roles in its functionality.

Scripts

- *expirationTokens.php*: This script updates the tokens table to remove expired tokens.
- *importChat.php*: Facilitates easy updating of the chat table using data from the *chatMessages.csv* file.
- *importData.php*: Simplifies the updating of the scholarships table using data from the *infoScholarships.csv*.
- *sendNotificationsApplication.php* and *sendNotificationsFavs.php*: These scripts are responsible for sending email notifications to users regarding their applications and favorite scholarships.

Template

- *template.php*: This file serves as the base code for all view files in the project, ensuring consistency in structure and facilitating the generation of information in each file.

Mailer

- *PHPMailer* folder: Folder with necessary files for sending emails through PHPMailer technology.
- *mailer.php*: The configuration file for phpmailer, enabling the sending of emails from our email account.

Config

- *config.php*: This file contains the necessary configuration for database connection.

Py

- *py* folder: Contains the necessary files for web scraping to keep us informed of updates on various web pages.

Styles

- *styles.css*: The stylesheet file for the page.

Javascript

- *js* folder: Contains JavaScript files.

Resources

- *resources* folder: Contains images used for scholarships, Bequi, icons, logo, etc.

Error

- *errorPage.php*: File that is displayed when the variable *$mainContent* has not been properly loaded and there is nothing to show. An example of when this can happen is when you have edited a step, then deleted that step, and try

to go back, but the website cannot reload a form for editing a step that no longer exists.

Emails

- *mail_message*s folder: This folder contains HTML files used as templates for creating email messages.

Appendix C – Social media

For our website, we've expanded our reach by establishing active profiles on various social media platforms, including Instagram, Facebook, Twitter, TikTok, and Telegram. These channels serve as dynamic hubs for fostering community engagement, disseminating timely updates, and sharing valuable resources.

You can find us on:

- Instagram: https://www.instagram.com/buscabecas
- Facebook: https://www.facebook.com/buscabecas.es
- Twitter: https://twitter.com/buscabecas
- TikTok: https://www.tiktok.com/@buscabecas
- Telegram: https://www.t.me/buscabecas

Appendix D – Website and app

BuscaBecas is available online and can be accessed from a variety of devices, including mobile phones, tablets, and computers. Users can visit the website at www.buscabecas.es. Additionally, we have created an APK file, enabling users to install the website as an application on Android devices. This ensures that users can easily and conveniently access all scholarship information in Spain, addressing the previous lack of a centralized platform for such resources.