



**Mobile application for procedures of the academic union of the UJED**

*Universidad Juárez del Estado de Durango*

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# **INTRODUCTION**

The following document is the summary of a term-long professional residence as part of the normal course in the Software Engineering career.

In today's rapidly changing educational landscape, the call for individuals prepared to address global challenges with ethical responsibility and a dedication to human well-being is more pronounced than ever. We firmly believe that fostering innovation in education is paramount to meeting these demands.

The continual progression of technology presents a unique opportunity to transform education and enhance accessibility. Recent events, notably the pandemic, have underscored critical issues such as equal access, the digital divide, content digitization, new teaching strategies, assessment methodologies, and teacher training. These challenges require collaborative solutions through experimentation and entrepreneurial initiatives.

In alignment with this vision, we are excited to introduce a mobile application tailored for the University Juárez of the State of Durango (UJED). This application gives the UJED student community a space to identify and report issues within campus facilities by capturing and submitting photos directly to the maintenance and construction teams.

Our objective with this application is to streamline communication between the UJED community and dedicated maintenance personnel. Leveraging the convenience of mobile technology, users can seamlessly document and report encountered issues, ensuring a prompt and efficient response from the university's maintenance and construction teams.

Through this application, we aspire to cultivate a collaborative approach to maintaining and enhancing the campus infrastructure at UJED. Together, we can create a conducive learning environment that adheres to the highest standards of quality and safety.

# **CHAPTER I REFERENTIAL FRAMEWORK**

## **1.1 Company overview**

The Universidad Juárez del Estado de Durango (UJED) stands out as an educational institution committed to academic excellence and the comprehensive development of its students. Located in the heart of Durango, Mexico, the UJED stands as a fundamental pillar in the training of competent professionals and citizens committed to society. This 2024 has the vision of becoming an integrated University and solidly linked to the socioeconomic and environmental development of the State, with wide recognition and international prestige, committed to the professional training of its students as ethical and competent citizens; generator and transmitter of knowledge, culture, art and sport, under a framework of transparency and accountability.

## **1.2 Current situation of the process/activity**

Currently, there is no reliable way for the student and worker body to set a report about different unconformities found in the school such as building maintenance issues, administrative problems, or the general state of the everyday mobiliary.

**1.3 Statement of the problem**

The problem stands for the lack of feedback under the current filing methods and the long waiting periods of the approval of the forms used currently, leading to disconformity on behalf of the student body.

**1.4 Rationale or Justification of the study**

The utilization of a tool that’s always available for everyone is could be crucial to break the gap between the users and the administration, leading to a higher satisfaction rate amongst the students.

This tool would be separated into 2; The first part will be meant for use within and by the school staff and students, with the second half meant to work as a window for a designated administrator to see, read, and approve user submitted reports.

***Advantages***:

User centered tool:

* Brings a dedicated space for anyone who wants to file a report or complaint easily at any moment and quicker than before
* Accessibility planned for this half could mean the development of a mobile app for the 2 most used OS in smartphones
* The possibility to implement a space for photo evidence and pinpoint the location from within the application to better highlight the issue
* Notification to the user when their report has been seen/addressed to increase the feedback on behalf of the institution

Administration centered tool:

* Utilization of a central database that keeps a digital record of the records sent, approved, and rejected. Easier for archival purposes
* The information could be reviewed twice during the approval process in order to correct information or verify the validity of the information given
* Generation of a virtual document with the information gathered that can be shared and preserved much more than physical files
* A direct means of communication towards the department or third party designated that could help or solve the issue

Necessity:

As stated previously, the school’s high profile makes it one of the first options for plenty of new students year-round. With the multiple campus under the UJED umbrella that cover a vast array of fields, going from cultural, scientific and social specialties, it is imperative that options that focus on the improvement of their services and the experience of those affiliated with the institution are put to the foreground. In this case, the way reports and complaints are handled through physical files could no longer prove sufficient going forwards, and the implementation of a centralized database that functions a mechanical and archival purpose could help the school to meet the demands of their ever-growing student and worker base.

## **1.5 General Objective**

This project aims to develop an app divided in 2 parts; A mobile module for users to highlight their reports and the area of the finding alongside visual evidence of the issue through their cellphone camera, and a desktop module aimed for administrators to see the user generated reports, read and modify the data and generate a new issue report that can then be assigned to a responsible party directly.

## **1.5.1 Specific Objectives**

* **Design the visual elements for the administration tools:** The features of the tools have to be indicated clearly to the user through the interfaces.
* **Designate easy-to-use interfaces for the navigation of the tool:** The visual language of the tool has to be mindful of the end users and attain to their respective needs in a non-intrusive way.
* **Collaborate in the planification of the application and testing processes:** Due to the nature of the tool, communication between the front and back end is vital for a seamless experience on the user’s end.
* **Analyze previous reference material and create assets for their use in the administration tools:** In case it is required, assets will have to be modified or created from scratch in order to implement different features into the tool.

# **CHAPTER II THEORETICAL FRAMEWORK**

This chapter refers to everything there is behind this project’s objective: the use of administrative control software for improving UJED’s report filing processes.

Administrative controls are essential for maintaining efficiency, effectiveness, and compliance with different regulations and policies; in this case, the responsibility of the students and directives to keep an environment where education can be successful.

Our theoretical framework will be grounded in the principles of project management, with a focus on the use of administrative controls to manage project risks, costs, schedules, and quality. We will review the relevant literature and identify the key concepts and theories related to project management and administrative controls. We will also examine the existing models and frameworks that have been used to study this topic and determine the best approach for our study.

## **2.1 Educative Sector**

High schools and colleges face significant challenges in building maintenance, impacting both infrastructure and educational quality. Aging facilities with crumbling structures and outdated amenities divert resources from academic programs, hindering student learning. This neglect fosters apathy among students and faculty, compromising safety and well-being. Educators struggle with substandard working conditions, hampering their ability to deliver quality education. Additionally, a deteriorating environment may deter prospective students and staff, exacerbating institutional challenges. Urgent action is required to ensure that these institutions provide a conducive environment for learning and innovation, safeguarding the future of education.

## **2.2 Archiving process**

High schools and colleges face challenges with their physical report/complaint archival system, leading to extended waiting periods and impracticality with a growing student base. Manual filing and sorting result in delays in issue resolution, compounded by the increasing volume of reports each year. Transitioning to a digital system would streamline the process, reducing wait times and fostering a culture of accountability and responsiveness within the educational community.

## **2.3 Administrative control**

Administrative control software is a technology solution designed to optimize and streamline a designated process under a directive scrutiny; in this case, the filtering of reports, their approval, the modification of the information and their classification. This software provides a centralized platform to manage the incoming reports, arranging them by maintenance, mobiliary or administrative. By automating routine administrative tasks, such as document management and communication, we can improve the efficiency, minimize errors, and increase satisfaction rates as part of the UJED community.

## **2.4 Software development methodologies**

Software development methodologies are frameworks used by software development teams to guide the development process. These methodologies outline the steps and processes involved in developing software, from conceptualization to deployment. There are several different software development methodologies, including Agile, Waterfall, and Scrum, each with their own unique approach to software development. Agile methodologies, for example, emphasize flexibility and adaptability, with continuous feedback and iteration throughout the development process. Waterfall methodologies, on the other hand, follow a linear, sequential approach to development, with each phase of development following the previous one. Scrum is a popular agile methodology that emphasizes cross-functional teams, frequent progress updates, and a focus on delivering value to the customer. Ultimately, the choice of software development methodology will depend on the specific needs and goals of the development team and the project at hand.

## **2.5 Database design**

Database design is the process of designing the structure and organization of a database system. It involves identifying the data that needs to be stored, defining relationships between different data elements, and creating a schema that will be used to store and retrieve the data. A well-designed database can improve data accuracy, reduce data redundancy, and increase data consistency, making it an essential component of any successful software system. Database designers must consider many factors when designing a database, including the data types needed to store the data, the expected volume of data, and the performance requirements of the system. They must also consider the security and access control mechanisms required to protect the data, and the backup and recovery mechanisms needed to ensure data availability in case of system failures. Ultimately, a well-designed database can provide a robust and reliable foundation for any software system.

## **2.6 User interface design**

User interface design is the process of designing the visual and interactive elements of a software application or website to provide a seamless and intuitive user experience. It involves designing the layout, color scheme, typography, and other visual elements to create an interface that is visually appealing and easy to use. User interface designers must also consider the user's goals, needs, and expectations when designing an interface. They may conduct user research and usability testing to ensure that the interface is easy to understand and navigate. User interface design is an essential aspect of software development, as it can greatly impact the success of a product by enhancing usability and improving user satisfaction. A well-designed user interface can also reduce user error, increase productivity, and contribute to the overall success of a software product.

## **2.7 Information management**

Information management refers to the process of collecting, organizing, storing, and utilizing information efficiently and effectively. In today's digital age, information management has become more critical than ever as organizations generate and collect vast amounts of data. Effective information management can help organizations improve decision-making, enhance productivity, and gain a competitive advantage. The process of information management involves identifying the types of information that are relevant to an organization, developing strategies for collecting and storing that information, and implementing tools and technologies that support the management of this information. Information management also involves ensuring the accuracy, security, and availability of information, as well as developing policies and procedures to govern the use of this information. Ultimately, effective information management can help organizations make better-informed decisions and achieve their goals more efficiently.

## **2.8 Software testing**

The testing process involves different steps with the goal of tuning the software for their correct use. One of the key challenges in software testing is identifying and addressing all possible defects or bugs in the software. It is essential to test the software thoroughly to identify any issues that may arise in different usage scenarios. This requires creating an effective test plan, designing test cases, and executing them systematically. Another challenge in software testing is ensuring that the software meets the desired quality standards. This requires setting clear quality objectives and metrics and measuring the software against them.

## **2.9 Hosting**

One of the key factors to consider when choosing a hosting provider is uptime. Uptime refers to the amount of time that a website is available to users without experiencing downtime or interruptions.Another important factor to consider is security. Hosting providers should take measures to ensure that their servers are secure and protected from cyber threats. This includes regular software updates, firewall protection, and other security measures.

## **2.10 Backend**

One of the critical aspects of backend development is the ability to handle large amounts of data efficiently. This involves designing and implementing a database schema that can handle medium-to-large data volumes while ensuring data consistency and integrity.

Another critical aspect of backend development is security. Backend developers need to design and implement robust security measures to protect user data from unauthorized access or attacks. This includes encrypting sensitive data, implementing user authentication and authorization, and implementing secure communication protocols such as HTTPS.

Backend developers also need to optimize the performance of web applications. This involves tuning the server configuration, optimizing database queries, and implementing caching strategies to reduce the response time of web applications.

## **2.11 Databases**

There are several types of databases, including relational databases, NoSQL databases, and graph databases. Relational databases are the most common type of database and are based on a table structure that is composed of rows and columns. NoSQL databases, on the other hand, are designed to handle unstructured or semi-structured data, such as social media posts or sensor data. These databases do not use a fixed schema, allowing for greater flexibility and scalability. Graph databases are designed to manage and query complex relationships between data. One of the key benefits of databases is their ability to improve data consistency and accuracy. By storing data in a structured and organized manner, databases can help to ensure that data is accurate, up-to-date, and consistent across multiple applications and systems. Another important benefit of databases is their ability to support data sharing and collaboration. By storing data in a centralized location, databases can be accessed and shared by multiple users and applications, making it easier to collaborate and share information across different departments and teams.

## **2.12 SQL**

One of the key features of SQL is its ability to perform complex queries on large datasets. SQL also supports a variety of data manipulation operations, such as inserting, updating, and deleting data from tables. These operations can be performed using SQL statements, which are written in a syntax that is easy to learn and understand. Another important feature of SQL is its ability to ensure data consistency and integrity. SQL includes several mechanisms for enforcing data constraints, such as primary and foreign keys, which help to prevent data corruption and ensure that data is accurate and reliable.

## **2.13 PostgreSQL**

One of the key features of PostgreSQL is its ability to handle large volumes of data. PostgreSQL also supports a wide range of data types, including arrays and JSON, which makes it a powerful tool for working with structured and unstructured data. Another important feature of PostgreSQL is its support for advanced indexing and query optimization techniques. PostgreSQL includes a variety of indexing methods, including B-trees, hash indexes, and GiST (Generalized Search Tree) indexes, which help to improve query performance and reduce query execution time. PostgreSQL includes a powerful set of security features, such as role-based access control and row-level security, which help to ensure data privacy and security.

## **2.14 Clip Paint Studio**

Clip Studio Paint is a digital painting and illustration software developed by Celsys. Initially meant for illustrations, animation, and comic creation, it can also be used to illustrate with vectors over transparent layers, enabling for clean, resizable icons that can later be exported in multiple formats and in a variety of ways easily adjustable for any purpose, making for a valuable asset management/creation tool.

## **2.15 Figma**

Figma is a web-based design and prototyping tool that is widely used by designers and teams to create high-quality designs, prototypes, and mockups, in no small part due to its collaborative design that allows designers and developers to work together in real-time, no matter where they are located.

One of the key features of Figma is its vector editing tools, which allow designers to create scalable designs and graphics that can be easily resized without losing quality. It also includes a range of drawing tools, including shape and pen tools that enable designers to create custom icons and graphics from scratch.

Figma also includes powerful prototyping features, which make it easy for designers to create interactive prototypes of their designs. With Figma, designers can add clickable links, animations, and transitions to their prototypes, allowing them to simulate the user experience and test their designs before development.

# **CHAPTER III PROJECT DEVELOPMENT**

## **3.1 Initial Ideas**

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## **3.2 Prototype**

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## **3.3 Coding**

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**3.4 Defining the methodology**

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## **3.4 Learning and capacitation**

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# **CHAPTER IV**

## **4.1 Conclusions**

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