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Design of a web application for the registration and control of the research projects at CORPOSUCRE

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Abstract. This project aims to support the University Corporation Antonio José de Sucre-Corposucre, because it will develop an application to keep a record and control of the different documents generated from the projects, emerged of the academic activities carried out in the subjects with an investigative approach, within the Faculty of Engineering of the Institution. This project began with a stage of analysis of the current situation of the faculty of engineering science of Corposucre, in the way of carried out the storage of research projects, which is done in magnetic devices without any backup and control, which can generate deterioration or loss of information. It is important to highlight that with this work the programming methodology Extreme Programming or XP was used with the objective of giving a solution in the less possible time, maintaining a permanent collaboration among all the team members. The result of this work will be a web-based software, which will allow to digitally storing the information of all those research projects that have been developed by the students throughout their professional careers, such as Classroom projects, degree thesis, among others. This in order not only to help its preservation and prevent its deterioration, but also to constitute a source of valuable information for other students and/or teachers who see on this platform a means to draw on, when they need to support their researchs or some work where they are participating. This coupled with this tool will give more visibility to the investigative work of our academic community.

1. Introduction

Information is the basis of all activities carried out in organizations, so it is convenient to design systems to produce and manage it in order to ensure that it is reliable, accurate and available at the right time and the best decisions can be made.

Computer systems have been becoming a fundamental element for all organizations in different sectors of society. These allow to carry out processes more quickly, controlled and organized, improving the levels of productivity of the employees and the competitiveness of the same companies, thanks to the effective treatment of information.

These modern systems involve the intensive use of information and communication technologies (ICT) to capture, process, and distribute data and information throughout the organization. ICT are a set of hardware and software elements and communications applied to the automatic processing of this input, which is as important for organizations as information is.



Consequently, an information system will be effective if it provides the necessary information for the organization and do so at the appropriate time, and it will be efficient if it is carried out with the least possible technological, human, temporary and economic resources [1].

All the above is framed within what is known as the new information society, where the automation represents one of its fundamental pillars, radically changing the nature of work, the number of jobs, working conditions and even the organizational model. Embodying more power in the capacity to store, manage, distribute and create information.

The education sector does not escape from this reality and this is why many higher education institutions in Colombia make use of these systems to support their administrative and decision-making processes. According to the Ministry of National education, Strong and reliable information systems contribute to the transformation and modernization of the sector, and are a strategy within the efficiency policy drawn up in the National Government's educational revolution.

Contextualizing a bit in the University Corporation Antonio José de Sucre, although this has many technological tools that serve as support to many internal processes both academic and administrative does not have an application for the registration and control of the research projects developed by the students of the faculty of engineering, that allows to carry out a detailed follow-up of different phases of this process: inscription, reviews, dates of delivery, among others. Currently this work is done in a manual way making it difficult to control and follow up the work done in this regard by students and teachers.

The importance of systematizing the registration and control of research projects lies in the possibility of organizing and consolidating information in order to promote the search for it and thus facilitate the development of successive studies by the community student. In addition, it will allow to conserve digital resources: documents, source files, programs, etc. Thus avoiding its deterioration or loss.

This is how this technological product will be useful because it will significantly reduce the expenses of these projects because it is cheaper to store information in digital format than on paper. It'll improve and expand the information offer to the student population, eliminate temporary barriers between support material and students, favour independent learning and self-learning, and offer new possibilities for the guidance and tutoring of students.

2. Research and development methodology

This research is based on a technological development with a non-experimental qualitative approach, in which it seeks to solve the need of the Faculty of Engineering Sciences of the Antonio José de Sucre University Corporation - CORPOSUCRE in the organization and systematization of its scientific production at Through the proposal of a virtual repository, as the first stage of the research was designed through the XP programming methodology (Xtreme Programming), so when gathering the user stories of the different dependencies that generate scientific content, the platform that could solve the need that the organization has. The user stories act as an open questionnaire that establishes the requirements that the user needs to have the software to meet their needs, so it is used as a qualitative information collection tool. In the future it is expected to carry out a second stage where the repository is implemented to take it to a research with a quantitative approach.

There are numerous methodological proposals that affect different dimensions of the development process. On the one hand, it gives credence to those more traditional proposals that focus especially on the control of the process, rigorously establishing the activities involved, the artefacts to be produced and the tools and notations to be used [2].

For the process of accomplishment of this project we used the Agile development methodology, motivated by the idea of obtaining a quality product in the shortest time possible, giving priority among other things to a good and fluent communication with the customer and a notorious emphasis on delivering visible increments of software rather than handling excessive documentation during the engineering process.

The following illustration shows the most important phases and activities of the XP methodology. This approach is showing its effectiveness in projects with highly changing requirements and when it is

demanded to drastically reduce development times, while ensuring high quality in the conception of software architecture [3].

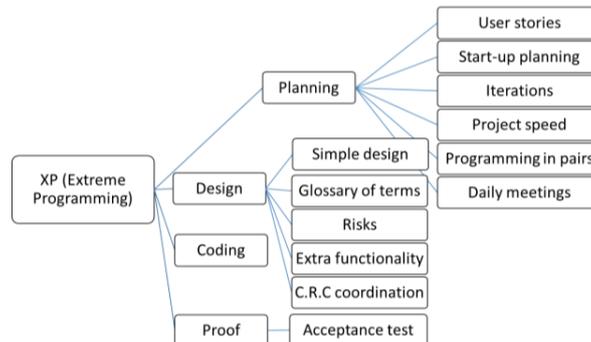


Figure 1. Structure of the XP methodology [4].

The project is divided into several stages, where the first one consisted in the analysis of the requirements of the dependencies of research and social projection of the corporation's engineering program, where the bibliographic research content is produced, so by the. So by the analysis of the requirements using the user stories as instrument of data collection in this phase, a mass of user stories were obtained, where the requirements that would have to comply the software were embodied. Such histories were categorized and assigned to them: a priority based on the importance involved and also an estimated time of duration based on the effort required to be developed. Then a series of iterations were raised, which would include a group of user histories, which should be developed, reviewed and integrated with the rest of the system, proceeding later with the application of the tests of usability necessary for the evaluation of the application, the work team can take note of the possible errors and difficulties encountered by users.

Then a series of iterations were considered, understanding these as the design process of each of the requirements as the platform develops. The iterations would include a group of user stories, which had to be developed, revised and integrated with the rest of the system, proceeding later with the application of the necessary usability tests so that the application was evaluated, being able the work team to take note of the possible errors and difficulties with which the users were found.

As a result of these iterations are obtained the different deliverables that are perceived as increments or advances in the final Product. Computer systems have been becoming a fundamental element for all organizations in different sectors of Society. These allow to carry out processes more quickly, controlled and organized, improving the levels of productivity of the employees and the competitiveness of the same companies.

The education sector does not escape from this reality and this is why many higher education institutions in Colombia make use of these systems to support their administrative and decision-making processes.

3. Proposed solution

The Web application for the registration and control of Corposucre's research projects used free software, highlighting XAMPP as a development package, which incorporates among its tools: PHP, Mysql and Apache.

3.1. PHP

It is a server-side programming language that arises within the current called Open Source. It is characterized by its versatility, robustness and Modularity. As with other similar languages, programs are integrated directly into the HTML Code [5].

3.2. *Mysql*

It is a relational database management system, being used by many large and popular Websites. Used to create the database, along with tables, where useful information is stored for Users.

3.3. *Apache*

Open source and Cross-platform HTTP Web server, has wide acceptance on the web and is used by a number of programmers around the world.

These programs are oriented to the development of applications based on the client server Architecture. In which the client is the software that makes the requests to the server, which in this case includes the resources like web pages, files etc. The server is responsible for answering the requests made by the Clients. The latter access the services provided by the server through remote procedure calls using a request-response protocol, such as the HTTP protocol on the WWW [6].

On the other hand, it is worth mentioning that for the development of this project has been used a Web development methodology with access to data base called Model Vista Controller (MVC), whose model represents a software architecture that divides the code in Three components: (i) Model: encapsulates a set of functions that work directly with a database, so that it allows its invocation from other parts of the Application. (ii) view: A view encodes and preserves the final presentation to the user, i.e. it allows to present information and outputs to the user in some defined format, not only in web format; (iii) Controller: A controller is responsible for linking models and views, as well as other modules required for the generation of Results [7].

The following figure illustrates the operation of the MVC Model.

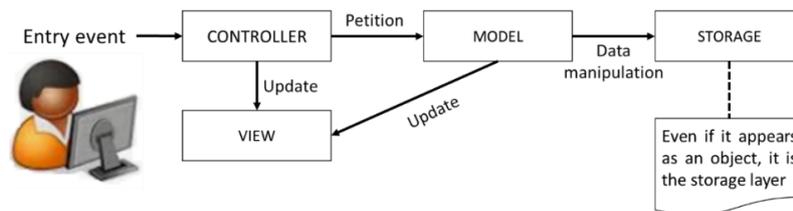


Figure 2. MVC architecture

The flow following the pattern of the MVC architecture is usually as follows:

- The user interacts with the user interface, for example, by pressing a link. This point corresponds, in the pattern, to the VIEW.
- The controller receives (through the INTERFACE) notification of the action requested by the user; That is, the handler manages the event that arrives from the view, produced by a user.
- The controller accesses the model, either in order to query or update data, possibly modifying appropriate to the action requested by the User.
- The handler delegates, to the objects in the view, the task of deploying the user Interface. The view gets its data from the model to generate the appropriate interface for the user, reflecting the changes in this. The model should not have direct knowledge about the VIEW.
- The user interface expects new Interactions.

4. Results

The purpose of this project is to develop a web platform for the registration and control of Corposucre's research projects. By means of this proposal, it is sought that the information is organized to avoid its loss, improve searches and disseminate the information of the projects that are leading in research of the institution.

Initially, the design of a relationship entity model was carried out, in which the logical architecture of the database is captured, through the identification of a set of objects called entities with their respective attributes or characteristics and the relationships that they exist between them. This modeling process performed with the relationship entity model will allow us to perform the abstraction of the most important data of the system in a simplified and organized way.

The diagram that results from applying the model entity relationship is as follows:

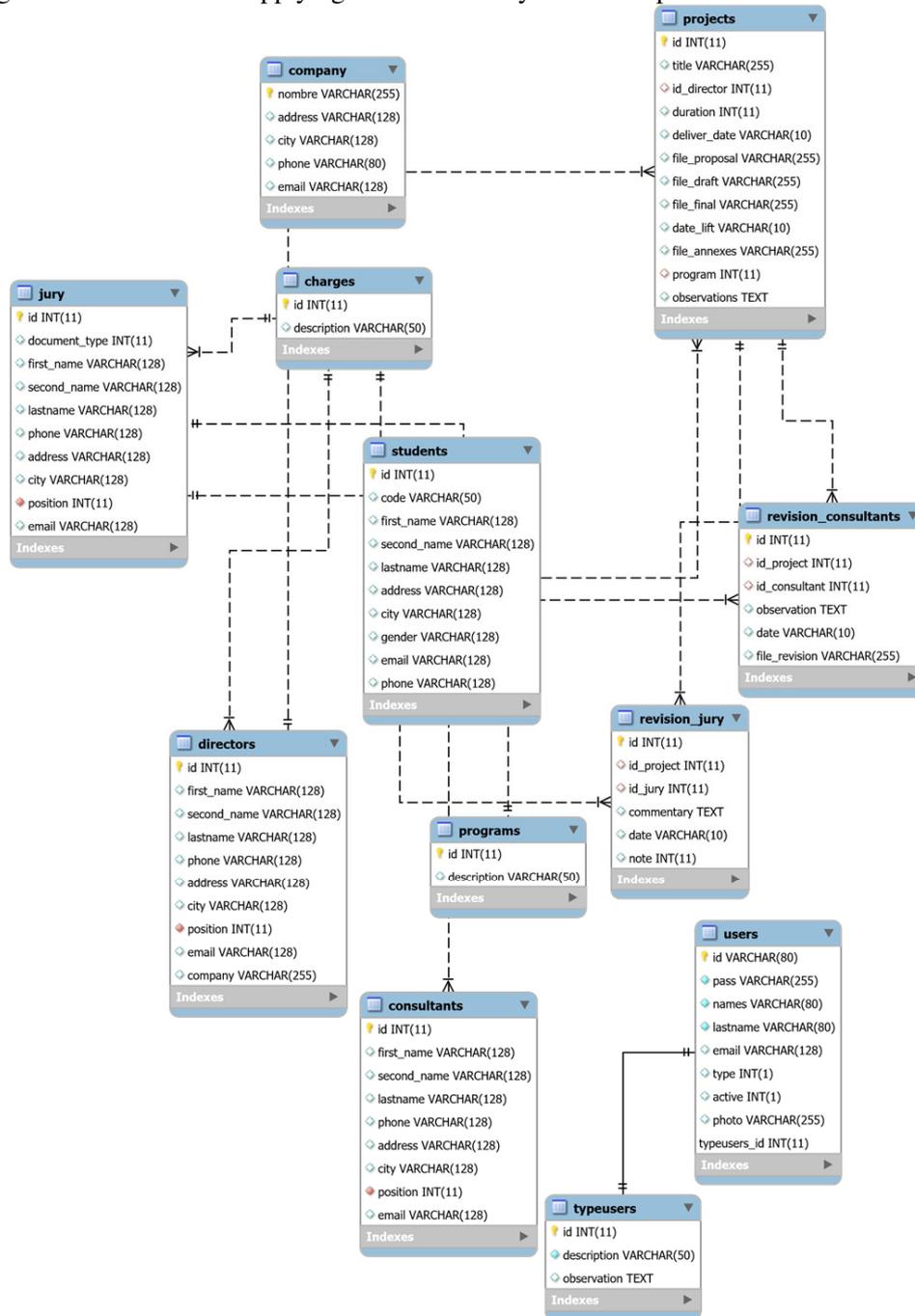


Figure 3. Relationship entity model

In the following images, the application in operation is Evident:

a) *Login interface*: This website is designed to guarantee secure access to the software, allowing only authorized persons can access to the options offered by the system.



Figure 4. User login

b) *Main interface*: Provides the user with access to the different modules offered by the program such as: students, agenda, projects, teachers, reviews, among others. Among other things, it also shows a list of the last loaded projects and according to the privileges that the user has, it lets perform different management actions on them.

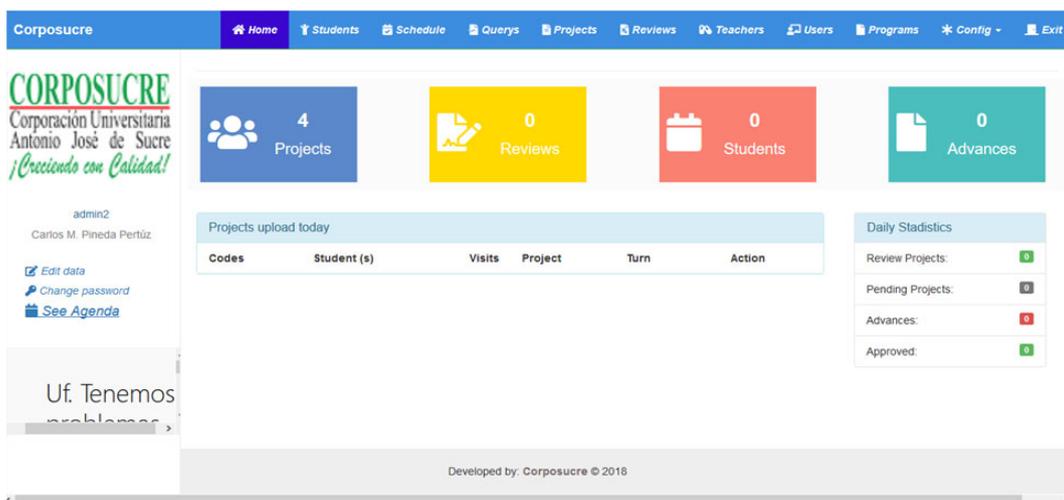


Figure 5. Main interface

c) *User management interface*: This page is used to register new users to the system, as well as delete, modify and consult existing ones.

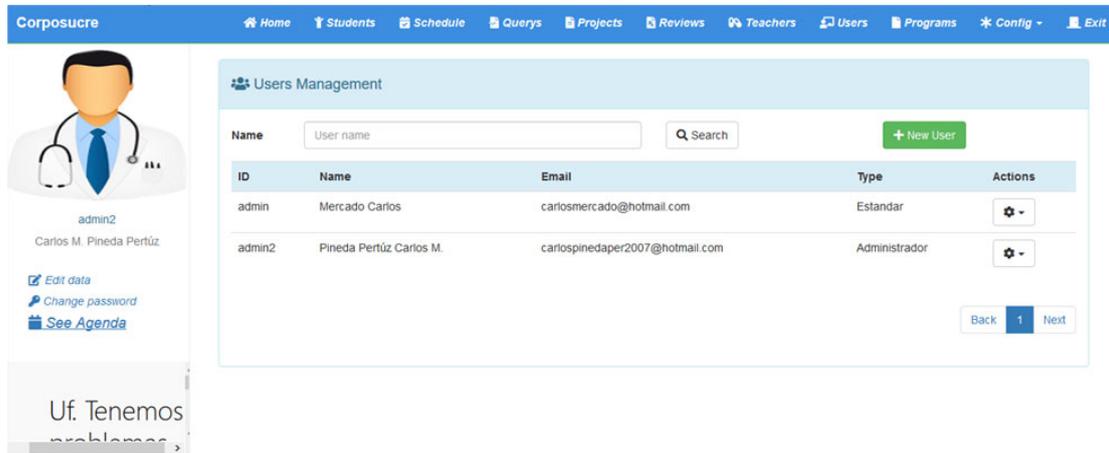


Figure 6. User Signup

d) *Project management interface*: With this interface the user can perform different actions on the projects registered in the database, such as: make revision, modify, consult, delete among others.

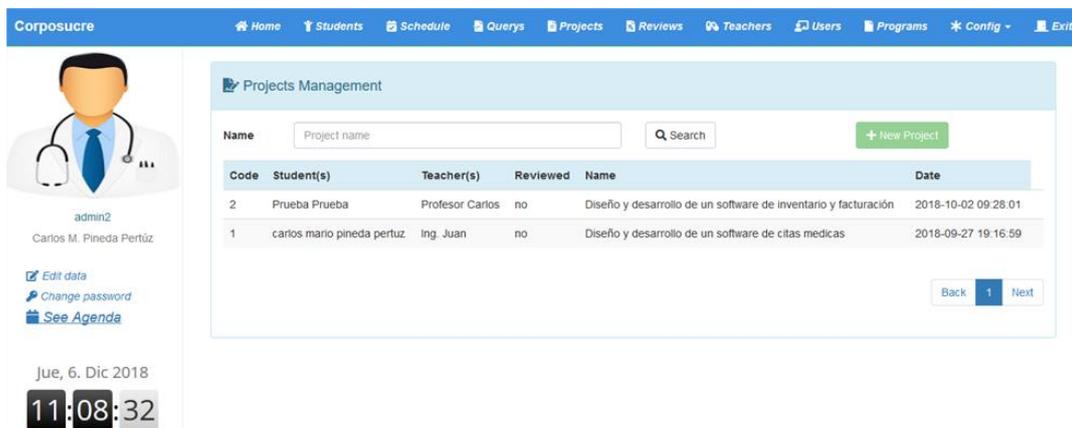


Figure 7. Project Consulting

5. Conclusions

Based on the specific objectives of this research work, the following can be concluded:

Identified the needs presented in the Faculty of Engineering from the collection, analysis and selection of useful information, process that it allowed to understand the current situation of the institution and then propose an optimal solution.

With the implementation of this IT solution will be able to improve the processes of registration and control of the research projects, by making that these are done in a more efficient and efficient way, giving place to that the operations are faster, reliable and Easy to Execute.

This Project has enabled the Agile XP development methodology, something that has turned out to be a novelty for the majority of the members of the work team, since until now they had only faced projects using only the methodologies Traditional.

As future work will be sought to promote the use of this application in other institutional programs, taking into account the positive impact within the faculty of Engineering.

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