

IMPLEMENTATION OF AN APPLICATION FOR LIBRARY MANAGEMENT INSTITUTE OF TECHNOLOGY SUPERIOR "JOSÉ CHIRIBOGA GRIJALVA"

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Summary

In Ecuador is living an accreditation process that determines the degree to which there is a higher education institution in the country. The Higher Technological Institute in an effort to provide quality education technologists and get a good assessment implemented new spaces within their facilities; one of them is the library that has many documents that will be helpful for students and others. With the creation of the library this institution has a plus in the accreditation process but it must have a system allowing rapid management of it, for that reason was the need to deploy a web application that can manage library with the main features that must possess to improve processes within the library.

Keywords

Web Application Management Library, Dewey Code, RUP Methodology and Framework CodeIgniter

Introduction

The Technological Superior "José Chiriboga Grijalva" Institute is a center for higher education, which has 15 years of providing services in Ibarra. Currently nationwide institutional selection process for colleges and universities of higher learning you live, this process is performing by the CEAACES. The purpose of this assessment is best higher education for all citizens.

So Technological Institute "José Chiriboga Grijalva" aims to achieve a rating that reflects the interest offered within their classrooms to attain an excellent education. For it must meet certain parameters which are developed within the institute.

It is for this reason that the creation of software within the institution is an important priority and that this can be achieved accreditation and continue with normal operation of the institution.

Problem

The Technological Superior "José Chiriboga Grijalva" Institute proceeded with the creation of a library which has books, theses, digital documents, etc. But it's still lacks a management system for systematizing all processes needed for the proper functioning of the Library. Furthermore since the process is about the same check by the CEAACES.

Creating a web application is essential because without it first did not comply with the rules established by CEAACES making it more difficult accreditation and second the fact continue handling library manually without any reduction in the processes.

"The university library should be active in seeking bridge, delivery, development of information and knowledge of the university and its environment. Must maintain a systematic update on the study of information technology and communications, and be creative to enrich their work." [1]

In the country's higher education institutions are undergoing a process of academic reform, one of the points is the creation of the library with software that allows its management, so creating a web application that allows management it will be a great contribution and benefit for the accreditation of the institution and in turn to all who are part of it.

"Many libraries have been actively involved in quality management in the last twenty years, but the pace has accelerated since more recently, to be able to compete for funding must demonstrate the quality of their performances and results. In order to have the necessary resources have to create competitive services and base their assessments on data, which means that the workforce

of the library must be flexible, committed to lifelong learning and highly trained. In summary should make more and better services, while the reduced resources. "[2]

Justification

Impacts

□ **Economic Impacts:** the development of this project is of great economic benefit within the institution, as the institution conducted many expenses in order to meet certain parameters CEAACES such as improving facilities, equipment and other expenses.

When this project as degree work was a great addition as it will help meet both objectives in the budget of the institution as well as complying with the regulations of the CEAACES.

□ **Technological Impact:** to develop this project was provided for the proper management of processes within the library of the institution, this helps each process by administrative and students and teachers is done quickly and immediately, demonstrating. This a technological solution can cooperate to better perform the functions of each user. Besides the realization of this project contributes to research tools such as CodeIgniter, PHP and MySQL.

□ **Educational and Social Impact:** to develop this project contributed greatly to the study of this framework PHP together with the manager MySQL database, which are being widely used in development of Web applications, increasingly get done more web applications in the world, which it intends to perform faster processes and access from anywhere, that's why this project serves as a reference for future thesis projects that may have the same for tools.

General Purpose

Create a web application that allows the management of the Library of Higher Technological Institute "José Chiriboga Grijalva".

Specific Objectives

1. Recognize the current situation in the Superior Institute of Technology Library "José Chiriboga Grijalva".
2. Justify theoretically to make the application.
3. Raise processes to implement better management in the library.
4. Develop an application that can streamline management in the library using the RUP methodology.

Scope

The application is web and developed exclusively for the Instituto Tecnológico Superior "José Chiriboga Grijalva".

This project will be done with the following modules.



Figure 1 Modules Library Management System for Higher Technological Institute "José Chiriboga Grijalva"

Source: Own

Modules

In the model of institutional evaluation for technical and technological colleges ISTT by the CEAACES, No. 29, 30, 31, all parameters must have the library, regarding the software must possess the following are mentioned:

- Availability for consultation with students
- Account books and original videos
- Students and teachers can access the computer and application queries through internet
- Teachers and Students can suggest books

As this application modules are four: Inventory, Loans and Returns, Bibliographical Search and Bibliographic suggestions.

- **Inventory Module**

The inventory module has the function to perform a complete inventory of books, theses, magazines, etc. The inventory of each document will contain important parts.

- **Module Loan and Returns**

In the module loans and repayment serves to make record loans of any document, this is done using a form of loans with user data and Dewey code of the publication of the document, with these data and proceed to delivery the copy of the document and change the status of the book (active to passive), as is done when returning the document using the Dewey code example.

- **Module Bibliographic Search**

In the Bibliographical module serves to provide information on all documents that are in the library, and

also provide the same data, which are used in the lending process.

- **Module Bibliographical Suggestions**

Bibliographical suggestions module has the function of recording bibliographic suggestions of different types of users belonging to the institution, which in the end is recorded in a report with suggestions.

Tools

For the project the following tools were used:

Herramientas		¿Por qué?
Base de Datos	MySQL	Es un gestor de Base de Datos libre, también es muy manejable. Se utiliza dentro de la institución
Lenguaje	PHP	Es un lenguaje muy ágil en programación y existe mucha compatibilidad con MySQL, también se tiene mucha información sobre él. Se utiliza dentro de la institución
Framework	CodeIgniter	Es un framework PHP fácil de manejar y posee mucho soporte e información. Se utiliza dentro de la institución

Table 1 Development Tools to use

Source: Own

Development

Document Categorization

The CDD categorization created by Melvil Dewey who created a decimal number system consisting organize books by transforming a thematic identifier to a specific number.

The ten main classes are:

1. 000 General
2. 100 Philosophy and Psychology
3. 200 Religion
4. 300 Social Sciences
5. 400 Languages
6. 500 Natural sciences and mathematics
7. 600 Technology (Applied Sciences)
8. 700 The arts, Fine and Decorative Arts
9. 800 Literature and Rhetoric
10. 900 Geography and history

And these are divided into subcategories each. For example:

- 800 Literature
- 830 Literature of Germanic Languages
- 832 German Theater
- 636.1 Germanic Works
- 636.2 Germanic Characters

The feature usually this categorization is accompanied by putting on the label sticks to the book as follows:

- First three letters of the name of the author
- The year of publication
- The bibliographical book
- Number of inventory with barcode



Figure 2 Encoding Dewey of a Book

Source: Library UCV

Framework CodeIgniter

The Library management system will be web-based so it will work as language PHP, a framework is working with CodeIgniter PHP, and is the framework with which this work will be developed Grade.

CodeIgniter is a freely distributed framework for web applications in PHP language, has the advantage of being a framework known worldwide for being agile development also can find much documentation on it in different languages.

Is a framework has an MVC architecture model for interacting with the database, the view is responsible for contain all the visual part of the project and the controller handles the business logic of the application. CodeIgniter can read and write SQL statements because it has a patent Active record that makes it easier to write SQL statements with pure PHP, improving interaction with the database and if you want to change manager database the same statements despite the change is preserved.

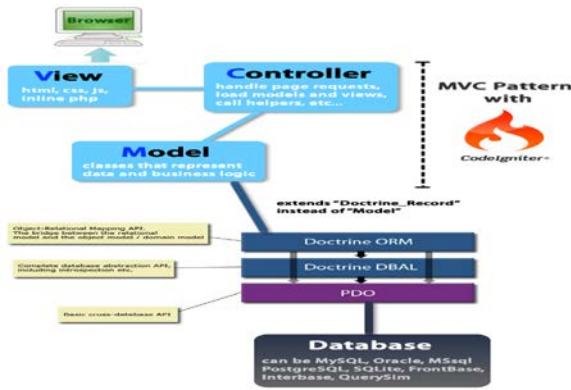


Figure 4. CodeIgniter MVC Doctrine Record

Source: Techno Jurnal

"CodeIgniter also comes with a number of useful libraries and other sets of functions that help you build applications. This allows the focus to the part of creating the application, instead of worrying about everything right project." [3]

The reason for choosing this framework for the realization of this paper grade is that within the IT department of "José Chiriboga Grijalva" Technological Institute work with the same framework; and in turn because it is agile development.

Development Methodology

Rational Unified Process, or RUP is a software methodology that was created by a company that had the same name but is now owned by IBM. Although a development methodology IBM, this does not put any price for its use and application.

The RUP methodology has four phases, each of which has activities to do.

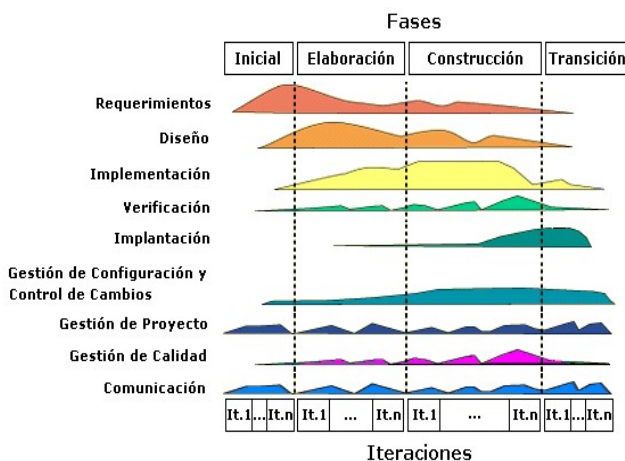


Figure 5 Phases and Activities of the RUP Methodology

Source: IBM

• Inception

Development Planning Software

Within it an overview of the Web application to be performed is shown.

Vision Document

It is a document in which the main features and functions of the web application is plasma.

Requirements

Are all functional and non-functional requirements that must have Project.

• Elaboration

Use Case Model

Use cases of each module will possess the web application will be made, taking into account each user role that the application has.

Model of Architecture

The overall architecture of the web application, module integration, database and activity diagrams are described.

Design

Schemes and prototypes of Web pages system modules will be made.

• Construction

At this stage all construction application so within it the database schema, the major codification of each module and contains validations are performed.

• Transition

At this stage all tests with real data necessary for the Web application will be made, according to the corresponding module. The formal delivery of web application documentation and training required of it will also be conducted.

Timeline

The following schedule shows the activities to be performed following the RUP methodology, in order to complete the project on time.

Nro.	ACTIVIDADES	Inicio			Elaboración		Construcción			Transición
		Mes 1	Mes 2	Mes 3	Mes 4	Mes 5	Mes 6	Mes 7	Mes 8	Mes 9
1	Recepción y Análisis de Requerimientos	■								
2	Visualizar y Analizar la Base de datos Actual		■	■						
3	Diseñar la arquitectura de hardware y software de la aplicación.		■	■						
4	Revisar a profundidad las herramientas a utilizar			■						
5	Creación de usuarios y roles				■	■				
6	Creación de Casos de Uso				■	■				
7	Diseñar interfaces de Usuario				■	■				
8	Diseñar la base de Datos para la nueva aplicación, y la unión con las otras tablas del sistema						■	■		
9	Implementar la base de datos						■	■		
10	Desarrollar los Módulos de la Aplicación web						■	■	■	
11	Elaboración de Controles y Validaciones de datos						■	■	■	
12	Implementar la Aplicación Web									■
13	Elaboración de manuales									■
14	Capacitación al usuario final									■
15	Entregar el proyecto									■

Table 2 Project Schedule by RUP phases

Source: Own

Results

It is possible to obtain a web application that allows complete management of the library of the "José Chiriboga Grijalva" Technological Institute.

The achievements were:

- systematic management of all essential processes of the library.
- Better organization of library documents
- Savings or investment budget for institutional accreditation process
- Reduce pollution saving on paper.
- Contribute to the study of the methodology and development tools.

Conclusions

- The choice of tools like MySQL and CodeIgniter were excellent for the development of each project phase as they are very agile development tools and have features and functions that help communication between them are very fast and effective.

- Have advanced knowledge development tools allow further established schedule, which does not delay the project.

- Choosing the RUP methodology for this project was appropriate because it allowed the development stages to be followed and documentation of the project by interested persons was in the best shape you have.

- Have the integration with the database of the institution is very important for communication between the tables that will be needed as for tables that will be created, since it has no affect during the development and implementation of the application web.

- The application promises to be of great help in the process of accreditation of the institution as a Web application quality was performed.

- Any user can access the application via the Internet and any computer without installing any library or component prior.

- Training for the use of the web application for any user role was successful, since all users could handle the application well and were satisfied with it.

Acknowledgements

Firstly thank God that gave me the intelligence and wisdom to finish this project.

I also thank the people who make the Systems Department at the Instituto Tecnológico Superior "José Chiriboga Grijalva" who offered me their help and cooperation in carrying out the project.

I also thank my dear Technical University Northern and my fellow engineers that accompanied my whole study period.

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