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# Automated notification management: Case study Advertising Agency CC2México

# Gestión automatizada de notificaciones: Caso de estudio Agencia De Publicidad CC2México

ALTAMIRANO-CABRERA, Marisol†*, JIMENEZ-HALLA, Johann Francisco, DIAZ-LARA, Carlos Alberto and ZARAGOZA-FARRERA, Luis Angel

*Tecnológico Nacional de México – Instituto Tecnologico de Oaxaca*

ID 1st Author: *Marisol, Altamirano-Cabrera* / **ORC ID**: 0000-0001-5800-9655, **CVU CONACYT ID**: 657390

ID 1st Co-author: *Johann Francisco, Jimenez-Halla* / **ORC ID**: 0000-0003-4104-8126

ID 2nd Co-author: *Carlos Alberto, Diaz-Lara* / **ORC ID**: 0000-0002-1782-1900

ID 3rd Co-author: *Luis Angel, Zaragoza-Farrera* / **ORC ID**: 0000-0003-3904-5567

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**Abstract**

The project presented is based on the implementation of a web system with a mobile application for the management of work orders in the CC2México Advertising Agency. Which it will allow customers to register, learn about the services offered and set up a customized service (at no cost, for a limited time) and in which they can generate their ODTs by this means. Once the period is over, a company advisor will follow up with the client, offering various plans. It is considered an innovative project due to the incorporation of technology through five modules that streamline the entire management process, guaranteeing the coordination of the actors in the process and the optimization of their activities. For the development, the incremental agile methodology was used, coding with a JavaScript and Ionic framework for the development of hybrid applications. The added value in this project is the integration of a RestFull API software architecture that will allow this application to connect to the rest of the CC2 Mexico corporate ecosystem and to third parties in a secure manner to continue exchanging data.This application will have a positive impact on the company and will allow managers to make the best decisions through relevant consultations.

**Web System, ODT, Automation, Development, Coordination**

**Resumen**

El proyecto presentado se basa en la implementación de un sistema web con una aplicación móvil para la gestión de órdenes de trabajo en la Agencia de Publicidad CC2México. El cual permitirá que los clientes se registren, conozcan los servicios que se ofrecen y establezcan un servicio personalizado (sin costo, por un tiempo limitado) y en el cual podrán generar sus ODTs por este medio. Una vez finalizado el periodo, un asesor de la empresa hará un seguimiento del cliente, ofreciéndole diversos planes. Se considera un proyecto innovador por la incorporación de tecnología a través de cinco módulos que agilizan todo el proceso de gestión, garantizando la coordinación de los actores del proceso y la optimización de sus actividades. Para el desarrollo se utilizó la metodología ágil incremental, codificando con un framework JavaScript y Ionic para el desarrollo de aplicaciones híbridas. El valor agregado en este proyecto es la integración de una arquitectura de software RestFull API que permitirá que esta aplicación se conecte con el resto del ecosistema corporativo de CC2 México y con terceros de manera segura para seguir intercambiando datos.Esta aplicación tendrá un impacto positivo en la empresa y permitirá a los directivos tomar las mejores decisiones a través de consultas pertinentes.

**Sistema Web, ODT, Automatización, Desarrollo, Coordinación**

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* Author's Correspondence: (marisol.altamirano@itoaxaca.edu.mx)
† Researcher contributing as first author.

 

## Introduction

Automation has acquired enormous potential for the advertising sector, especially in process management. This project describes the functionality of a management system for the CC2México Advertising Agency, which is dedicated to designing advertising campaigns, advertising articles, media dissemination and direct marketing through digital marketing strategies for different brands.

Being a company with a national presence at times, it is impossible to give due attention to potential clients who request quotes from the administrative area where the account executives raise the requirements that the client needs; and subsequently carry out the assignment, download, distribution and monitoring of service orders. When done with various applications such as spreadsheets, electronic formats or email and as requests and customers grow in size, complexity also increases and that is why automation of the commercial area is proposed through a web application and an application mobile, which will integrate all the information and allow the various users to verify at any time the status of the open request, the material to be used and the final delivery time. The added value is defined at this stage, since currently the authorization of a quote requires waiting for the manager's approval before starting the work, which can often cause delays if they are out of the office. With the implementation of this project, the approvals will be immediate, once the responsible people of the company receive the notification to their mobile device, they will be able to review it, authorize it or reject it as the case may be (GCFGlobal, 2021).

All this innovation will mainly reduce human errors that are made when manually entering and manipulating data or sharing files; which generate costs that can be very high for the business and result in losses for it, not to mention that the fact that manual data entry tasks are automated leads to greater productivity, a fact that will also allow an increase in quarterly indicators and logically well-founded business decision-making by managers when they access accurate reports that can be updated in real time, if any of the data associated with it is modified, creating transparency for the benefit of the CC2México Advertising Agency (Latino, 2021).

The document presented is organized into sections that range from the theoretical foundation that guided the development of the case study, the activities carried out during the phases defined by the incremental software development methodology (Méndez & Garrido, 2006) ; with four increments that include the stages of: Communication, Planning, Modeling, Coding and Deployment.

Finally, the results obtained are shown, through the interfaces, system tests, the conclusions obtained with the implementation of the system and the impact on the automated processes that contribute to the achievement of the general objective when developing a web system and mobile application for the management of the work orders in the CC2México Advertising Agency, the thanks given to the National Technological Institute of Mexico, the Technological Institute of Oaxaca and finally, the references consulted in the preparation of the following article.

## 1. General objective

Develop a mobile application and web system for the administration of work orders (ODT) of the company CC2México.

## 2. Specific objetives

- Analyze the service offering process by account executives.
- Apply the incremental software development methodology for the control and monitoring of ODTs in CC2México.
- Incorporate a tool that allows monitoring and notification of ODTs.
- Incorporate a tool to notify clients about the requested quotes.
- Incorporate a tool to notify coordinators of a new ODT in their area.
- Analyze tools for the development of multiplatform mobile applications.

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## 3. Methodology

Once the analysis of at least 4 methodologies has been carried out and taking into account the development time, the use of the Incremental Model is proposed, for the realization of this project because it establishes partial deliveries through a predefined calendar with the client (Beck, 2000); through which, the evolution of the product and the requirements with which it was built will be followed up; this phase called increment, will have new functionalities that will be added to the previous product to make way for another increment and so on until the final product is obtained. In the present work, each increase has been achieved following the marked stages or phases, namely: Communication, Planning, Modeling, Construction and Deployment. Figure 1.

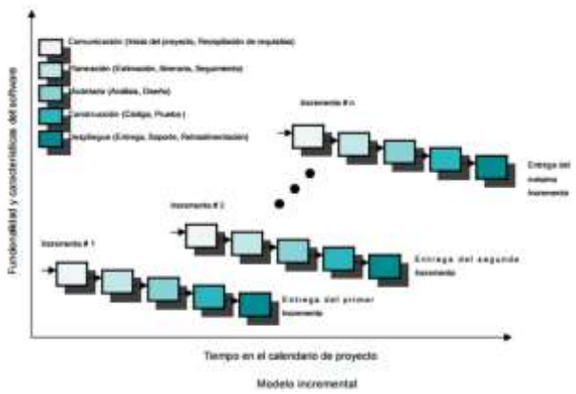


**Figure 1** Phases of the incremental methodology
*Source: (Pressman, 2010)*

## 4. Development

This section shows the development of the project that includes the description of the development environment, description of the activities and their results. Given the needs of the CC2México Advertising company and for the development of this web solution, the directors and expert staff ask the project developers to allow changes to the requirements at any point in the project, because it guarantees them to have a closer approach (Swattwer, 2021). realistic, and not invest efforts in the control of changes.

The system in general aims to automate and streamline the processes according to the problem statement and the scope is included in the following modules:

- Customers
- Employees
- Payments
- Service Orders (ODT)
- Quotes
- Reports
- Services

Therefore, once the expected objectives have been defined and the scope and limitations of the project have been identified; through linear communication, the stages and processes considered for the achievement of the project were integrated (Prunn, 2020), and which are described below:

### a. First increment

In meetings held, it was agreed to use various components for the development environment, which are indicated below:

- WEB server: Node JS: Event-based server-side javascript environment used as the system's web server.
- Express.js development framework: Web framework for Node.js used to program the system logic.
- Non-relational database: Mondo BD. Document-oriented NoSQL database in JSON format used to store system information
- Below is Table 1 for the planned user story master list for the project.

| Number of history list | Task name |
|---|---|
| 1 | Interface design to register an ODT. |
| | ODT data validation. |
| | Adaptation of the database. |
| 2 | Design and implementation to consult an ODT. |
| 3 | Updating the data of an ODT. |
| 4 | Design and implementation to eliminate an ODT. |
| 5 | Interface design to register a Client. |
| | Customer data validation. |
| | Adaptation of the database. |
| 6 | Design and implementation to consult a Client. |
| 7 | Update of customer data. |
| 8 | Interface design to register a Quote. |
| | Validation of the data of a Quotation. |
| | Adaptation of the database. |
| 9 | Design and implementation to consult a Quote. |
| 10 | Updating the data of a Quotation. |
| 11 | Design and implementation to eliminate a Quote. |
| 12 | Interface design to add an employee. |

| | |
|---|---|
| | Validation of employee data. |
| | Adaptation of database for the employee. |
| 13 | Update of employee data. |
| 14 | Design and implementation for an employee consultation. |
| 15 | Design and implementation to terminate an Employee. |
| 16 | Assignment of roles for employees. |
| 17 | Notifications to coordinators when an ODT is assigned to their department. |
| 18 | Notify customers by email of your quote. |
| 19 | Hybrid application programming. |
| 20 | Manage services. |
| 21 | Manage tasks. |

**Table 1** User history master list
*Source: Own Elaboration*

User stories encompass a series of specific properties that must be met for their execution, once all user stories have been defined. After the analysis of the user stories and a brief feedback with the main actors and with the coordinator of the company's web development department, the interfaces are made with the Mockflow WireframePro tool. Figure 2 and 3.

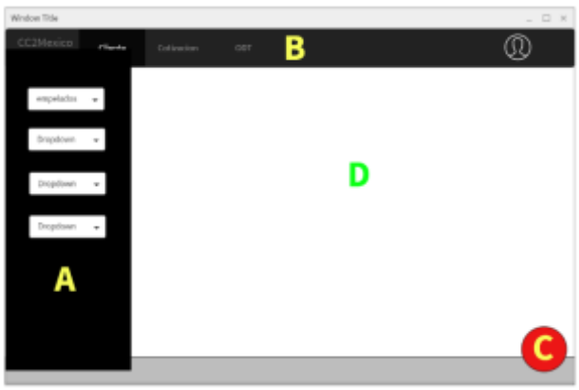


**Figure 2** Dashbord planned view
*Source: Own Elaboration*

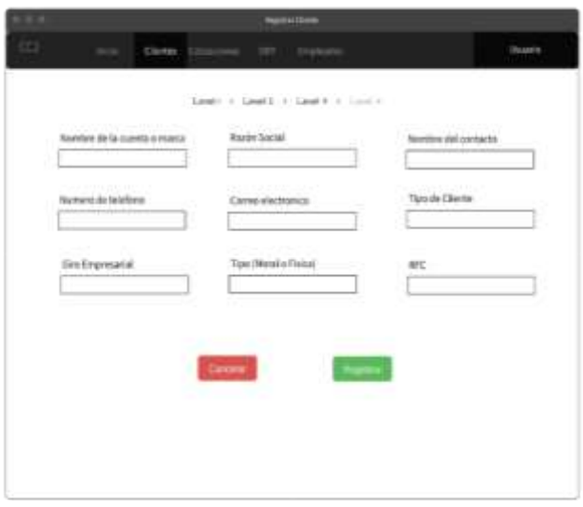

**Figure 3** Customer form view
*Source: Own Elaboration*

Once designed and accepted by the client, they were coded in the selected language. For the performance tests, in this increase, black box tests were carried out on the first modules developed, which are described below:

– **Customer Interface:** Module that is responsible for inserting and editing customer data.


**Figure 4** Successful registration message
*Source: Own Elaboration*

– **Customer Table:** Module that is responsible for listing all customers and contains a button that takes us to the edit view.

– **ODT Interface:** Module that is responsible for inserting new work orders, in addition to searching for the approved quote for which the ODT is created.


**Figure 5** Warning message for empty fields
*Source: Own Elaboration*

– **Table: ODT:** Module that is responsible for listing the work orders that have been registered, it contains a menu with two options to show them according to their status (execution, finished), where we find buttons to edit and finish the work order.

– **Quote Interface:** Module that is responsible for inserting and editing quote data.


**Figure 6** Message indicating requeried fields
*Source: Own Elaboration*

– **ODT:** Module that is responsible for consulting, editing, and subsequently updating the status of the quote (sent, approved, completed or cancelled). here we find the data of the work order, such as the ID of the quote to which the ODT will be associated, start and end dates, and a table where the tasks to be performed will be attached, each with a detailed specification.


**Figure 7** Registering post order
*Source: Own elaboration*

## b. Second increment

Once the first increment has been completed and validated, managers are presented with the functionality of each of the modules, integrating the phases of the methodology to verify correct data and suggestions for pertinent changes; giving guidelines for the integration of the activities of the second increment, whose objective is to create the employee management module that includes the consultation of registered users and the form for the creation of new users and which are described below:

– **Planning:** In this phase, the master list of user stories, requirements and the master list of tasks (activities) to be carried out are described, as shown in tables 2 and 3.

| Sec. number. | User history | Priority |
|---|---|---|
| 12 | Add employees. | High |
| 13 | Update Employee. | High |
| 14 | Consult employee. | Medium |
| 15 | Delete employee. | Medium |
| 16 | Assign permissions to each type of user. | High |

**Table 1** Second increment user history master list
*Source: Own Elaboration*

| Task number | User history | Task name |
|---|---|---|
| 18 | 12 | Interface design to add an employee. |
| 19 | | Validation of employee data. |
| 20 | | Adaptation of database for the employee. |
| 21 | 13 | Update of employee data. |
| 22 | 14 | Design and implementation for an employee consultation. |
| 23 | 15 | Design and implementation to terminate an Employee. |
| 24 | 16 | Assignment of roles for employees. |

**Table 3** Second increment master task list
*Source: Own Elaboration*

– **Modelling:** After analyzing the user stories, the low-fidelity interface layout is performed using the online WireframePro Mockflow tool, as shown in figure 8.

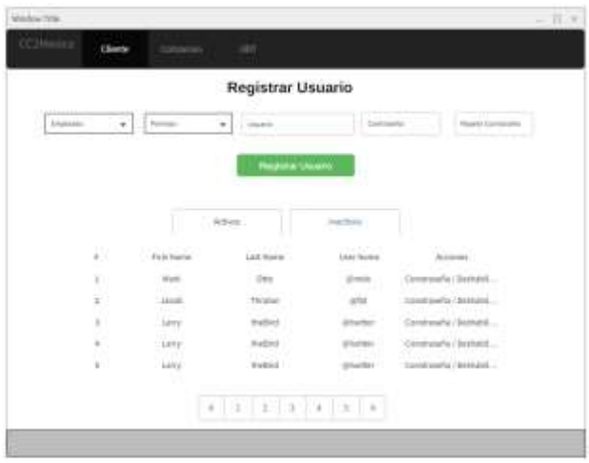


**Figure 8** Proposed view, user creation
*Source: Own Elaboration*

– **Coding and tests:** Captures of the tests carried out on each of the components are shown, its rendering, speed and weight for the virtual DOM are tested, in addition to evaluating the main functions. As shown below.


**Figure 9** Test view registering employees
*Source: Own Elaboration*

## c. Third increment

The main objective of this increase is the creation and configuration of notifications to employees and clients when they generate a work order, which implements a traffic light that connects the client with the area coordinator for follow-up. A notification management module is included that will allow the status of the notification to be changed automatically within the system until the request for the requested service is completed. The management of ODT and Quotations is included, in addition to specific reports. The interface is shown below:


**Figure 10** Generating a quote
*Source: Own Elaboration*

For work orders and when the ODT is created, notifications are sent to the coordinator of the assigned department, who will be responsible for updating the status. Figure 11.


**Figure 11** Closing a quote
*Source: Own Elaboration*

## d. Fourth increment

The primary objective of this increase is the creation and configuration of the mobile application in which the services offered are managed, in a productive environment; The implementation process of the finished prototype, in addition to simplifying the process to generate and authorize quotes, was designed to meet the needs of the company by offering third-party proposals and integrations. Finally, unit tests were carried out on the functionalities and performance, recovery and fault tolerance tests on the web and mobile application. See figure 12.


**Figure 12** Main menú in the app
*Source: Own Elaboration*

## 5. Results

The results obtained here indicate the conclusion of the planned activities in each increment. In this work, two applications were obtained as a result of the requirements set by the client: The Web System and the mobile application. Both have the requested modules, as well as the incorporation of established business rules, in friendly and intuitive interfaces (Virtual, 2021). Among the results obtained we can list the following:

a. The application of agile development methodologies leads to greater interaction between clients and developers, and therefore faster results are presented. Optimizing development time and improving project deadlines and costs.

b. The implementation of the project called Automated Notification Management: Case Study Advertising Agency CC2México is considered successful because it provides considerable benefits to the company, mainly economic in the management of its processes.

## 6. Gratefulness

We thank the National Technological Institute of Mexico - Oaxaca Technological Institute, for the facilities granted to carry out the project.

## 7. Conclusions

It is concluded that the project called Automated Notification Management: CC2México Advertising Agency Case Study manages to have the planned scope and expectations due to the implementation of dynamic and easy-to-use processes; that allow the company to meet the request of its customers effectively.

Due to the foregoing, the developed tool becomes fundamental because it supports the stage of attention to online quotes and work orders, giving an opportunity to the effective closing of budgets and sales prospects and saving time for the collaborators who attend to these requests. so that they can be integrated into other priority tasks of the company.

The Web and Mobile applications are already in production, fully incorporated into the company's comprehensive platform (Torres, 2021), in the first phase in the city of Oaxaca, considering that with the results obtained it can be replicated in other entities in which CC2México has a presence.

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