













# Application of Information Technology in the improvement of administrative processes: Web-based system for activating and monitoring surveys

## Aplicación de la Tecnología de la Información en la mejora de procesos administrativos: Sistema Web para la activación y control de encuestas

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### Abstract

Currently, websites play a fundamental role in data collection and information access. An online presence has become a key factor in the success of projects, organizations, and businesses. A well-designed website enables efficient interaction between users and systems, facilitating the execution of processes in an organized and secure manner. To develop effective web solutions, it is essential to analyze users' specific needs and define technological tools that meet those requirements. In this context, the present project focuses on the development of a web-based survey management system aimed at replacing traditional methods or generic forms. The platform has been designed based on principles of usability, accessibility, security, and efficiency, in order to enhance user experience and ensure the integrity of the collected information.

### Resumen

En la actualidad, los sitios web desempeñan un papel fundamental en la recolección de datos y acceso a la información. La presencia en línea se ha convertido en un elemento esencial para el éxito de proyectos, organizaciones y negocios, un sitio web bien diseñado permite una interacción eficiente entre el usuario y el sistema, facilitando la ejecución de procesos de forma ordenada y segura. Para desarrollar soluciones web efectivas, es indispensable analizar las necesidades específicas de los usuarios y definir herramientas tecnológicas que respondan a dichos requerimientos. En este contexto, el presente proyecto se enfoca en el desarrollo de un sitio web orientado a la gestión de encuestas, con el propósito de sustituir métodos tradicionales o formularios genéricos. La plataforma ha sido diseñada bajo criterios de usabilidad, accesibilidad, seguridad y eficiencia, con el fin de optimizar la experiencia del usuario y garantizar la integridad de la información generada.

Objectives	Methodology	Contribution
Develop a website for survey management that replaces traditional methods	This project falls within the scope of applied research, as it seeks to address a specific problem related to survey management through the implementation of a website.	Development of a specialized website for survey management, which contributes to: <ul style="list-style-type: none"> <li>• Technology: development of a proprietary platform.</li> <li>• Practical impact: improves information management.</li> <li>• Institutional benefit: modernizes internal processes</li> </ul>

Objetivos	Metodología	Contribución
Desarrollar un sitio web para la gestión de encuestas que sustituya los métodos tradicionales	Este proyecto se enmarca dentro de una investigación aplicada, ya que busca resolver una problemática concreta relacionada con la gestión de encuestas mediante la implementación de un sitio web.	Desarrollo de un sitio web especializado en la gestión de encuestas. lo cual contribuye a: <ul style="list-style-type: none"> <li>• Tecnología: desarrollo de plataforma propia.</li> <li>• Practica: mejora la gestión de la información</li> <li>• Institucional: moderniza los procesos internos.</li> </ul>

### Website, User, Methods

### Sitio Web, Usuario, Métodos

**Area:** Development of strategic leading-edge technologies and open innovation for social transformation

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## Introduction

Nowadays, websites play a fundamental role in collecting data and obtaining information in real time, as they play an essential role in today's digital age, where online presence is a key component for the success of any project, organisation or business.

A well-defined website allows for adequate interaction between the user and access to system processes, so developing an effective website involves a series of steps ranging from conceptualisation and design to implementation and optimisation of functionalities.

Web applications facilitate the exchange of information between participants, accelerate decision-making and are therefore a relevant and important task, the quality of which is continuously improving.

For the development of web projects, it is necessary to carry out a needs analysis to identify the appropriate tool to execute processes efficiently and meet user requirements.

Currently, the Instituto Tecnológico Superior de Irapuato [ITESI], in the Computer Systems Engineering degree programme, does not have a system that facilitates the comprehensive management of surveys, a fundamental tool for obtaining valuable information from the community in relation to quality processes, administrative procedures and other relevant areas.

Thus, this project focuses on the creation of a website that meets the specific needs of users, ranging from the initial planning of survey processes to their implementation. To this end, key elements such as usability, accessibility and user experience are taken into account, as well as technical aspects related to service optimisation and information security, which will enable data to be collected efficiently within a unified system.

Therefore, the project aims to implement a survey system for a higher education institution, given that this process allows institutions to collect opinions, assess specific needs and analyse trends efficiently, seeking not only to optimise the experience during the application of surveys, but also to generate specific reports and secure the information generated, which is key to quality processes.

## Theoretical Framework

As part of the theoretical framework, the aim is to provide a theoretical basis for the key concepts, as well as to offer an analysis of previous studies that will serve as a basis for the development of the research, for which the following concepts are used:

### Net Framework

The .NET Framework is a managed execution environment that provides a variety of services to your running applications. It consists of two main components: the Common Language Runtime [CLR], which is the execution engine that handles running applications; and the .NET Framework Class Library, which provides a library of tested and reusable code that developers can use in their own applications. [Sinha, 2015]

The use of .Net Framework allows for the management of application execution and provides services such as memory and security management, facilitating interoperability between different programming languages, which allows developers to build high-performance applications for various environments. A study by Souza & Raniery [2019] analyses the impact of the .NET Framework on application development, highlighting its ability to improve developer productivity by integrating multiple programming languages into a single environment.

### Web API 2

This is a framework that is part of ASP .NET, designed to facilitate the creation of HTTP services. It facilitates communication between applications, as well as offering support for features such as routing, serialisation and action controllers, allowing developers to create scalable, high-performance applications for modern web environments. [Esposito, 2014]

### SQL Server 2019

This is a Relational Database Management System [RDBMS], where applications and tools connect to an instance or SQL Server database and communicate using T-SQL. [Microsoft Ignite, 2021] SQL stands out for its capacity and security and is widely used for applications that can handle large volumes of data.

## JavaScript

JavaScript is a programming language that developers use to make interactive web pages. JavaScript functions can improve the user experience on a website, and as a server-side scripting language, it is one of the main technologies of the World Wide Web. [AWS, 2024]

## JSON

JavaScript Object Notation is a text-based format for storing and exchanging data in a way that is human-readable and machine-parseable. It allows data to be transferred between a server and a web application and is frequently used because it simplifies the exchange of data between different technologies, facilitating fast, dynamic, and interactive web experiences. [Oracle, 2024]

## HTML.

HyperText Markup Language is a programming language that, unlike other languages, is not composed of instructions, but rather a set of tags that organise and declare the purpose of each piece of content in the document. In this sense, HTML is text written with a particular syntax that the browser is able to read and apply. [Gauchat, 2013]

## Bootstrap

It is a set of frontend tools used to create complete web pages, i.e. it has a set of ready-to-use components, thus prioritising the user experience. [Yoris, 2023]

## CSS

This is an abbreviation for Cascading Style Sheet, whose purpose is to define how HTML elements are to be displayed and in what style they are to be presented. Styles are normally stored in style sheets and added to the HTML coding. [García, 2007]

## Jquery

This is free and open-source software with a design that facilitates navigation within a document, providing web application developers with add-ons that streamline project development. [Parada, 2019]

## Advantages of use

Web technologies are essential for the development of applications accessible through browsers. These technologies cover various areas and protocols that enable a better online experience.

One of their main advantages is the possibility of global, real-time access, achieving collaboration and connectivity between users. The following advantages of the tools used in this project are described below [see Table 1].

### Box 1

**Table 1**

Table of advantages of JQuery and Bootstrap

JQuery		
Appearance	Advantage	Disadvantage
Ease of use	Simplifies simulation and event management	May be excessive for small projects
Compatibility	Offers solutions for compatibility problems	New browser versions reduce the possibility of using it.
Size	Reduces the code needed for functions e.g. animations	Adds weight to the code by including libraries for its use
Updates	It is stable and reliable for projects, with a large number of plugins and a large community for support.	Its popularity is beginning to be displaced by other tools.
Bootstrap		
Responsive Design	It offers a system that facilitates the development of responsive designs.	Can be limiting in the face of more customised designs
Components	Provides reusable components	The site can look generic if it is not properly customised.
Development	Speeds up initial development by offering predefined classes and styles	May lead to heavier projects due to unused predefined styles
Compatibility	Compatible with most browsers	Older functions may be incompatible with modern tools and approaches.

## Methodology

This project is part of applied research, as it seeks to solve a specific problem related to the management of surveys through the implementation of a website.

Therefore, a technological solution is proposed to optimise data collection processes, prioritising criteria of usability, accessibility, security and efficiency through the cascade life cycle [see Figure 1].

This cycle was chosen because the proposed system has clearly defined requirements from the initial stage, which allows progress to be made in a structured way through sequential phases. This approach facilitates the detailed documentation of each stage, the control of the project and an orderly implementation, characteristics that are especially relevant in an institutional environment where the aim is to guarantee quality, traceability and compliance with the established objective.

## Box 2

### Fases del desarrollo de software



**Figure 1**

Cascading life cycle

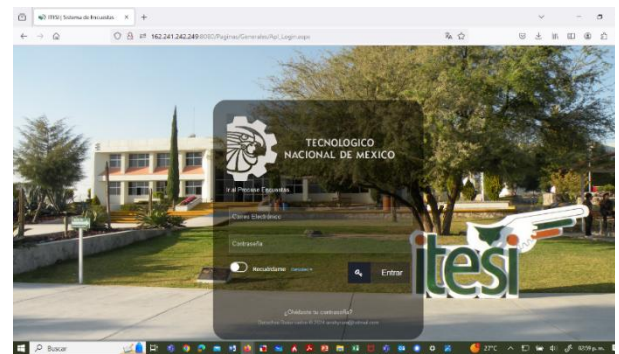
Source: Own elaboration

## Results

The implementation of a website that allows administrative procedures to be carried out represents a significant advance in terms of the optimisation of processes carried out in the traditional way, as it allows data collection, management and processing to be carried out in an agile and efficient manner. The functionality of the project is shown below.

In Figure 2, you can see on the left side the access to the website, where it is necessary to have a previous registration within the system to securely access the site, once inside the system you can see the options menu which is shown in Figure 3, in this you can have access to different options of the system such as survey configuration, questionnaire assignment, form programming, and the results of the evaluations.

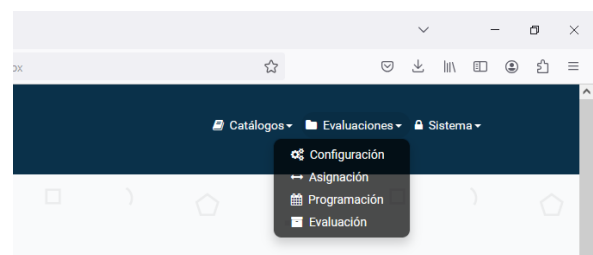
## Box 3



**Figure 2**

Home screen

## Box 4



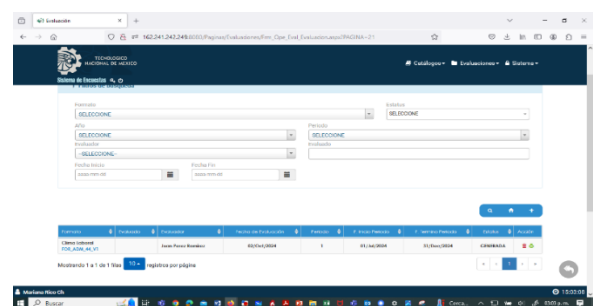
**Figure 3**

Source: Own elaboration

Figure 4 shows the list of questionnaires available for response, which were previously configured from the site's Configuration menu, allowing the administrator to define the content, validity and recipients of each survey.

Each item in the list includes the name of the questionnaire, its status [available or unavailable] and a visual indicator that indicates whether the user has already responded to the survey, which facilitates the monitoring of progress and compliance by the participants.

## Box 5



**Figure 4**

Survey information available

Once the user has completed the survey, the system generates a report in PDF format that presents the responses recorded in a structured and clear manner.

As shown in Figure 5, this report includes general data of the participant, such as gender, area, position and date of application, followed by the display of the survey sections with their respective questions, accompanied by the selected response options.

The format facilitates the individual review of the results, allowing the identification of trends, perceptions or areas for improvement from a personal or group perspective, depending on the objective of the analysis. This type of report is useful for decision-making and monitoring indicators in institutional processes such as exit surveys.

### Box 6

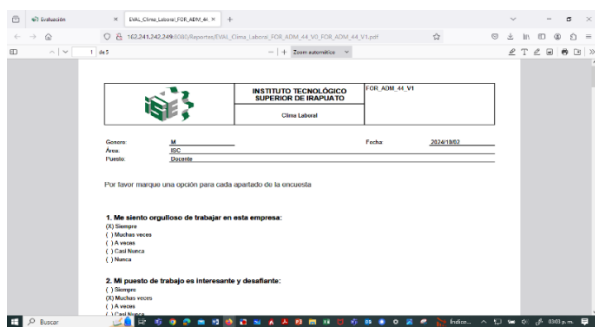


Figure 5

Survey information available

Source: Own elaboration

Figure 6 shows the Assessment Scheduling section, where you can manage and configure the different survey formats available in the system. This screen allows you to filter assessments by year and status, making it easier to search for specific records using the drop-down fields and the "Search" button. Below the filter, a list of previously configured survey formats is displayed, identified by their key and name.

### Box 7

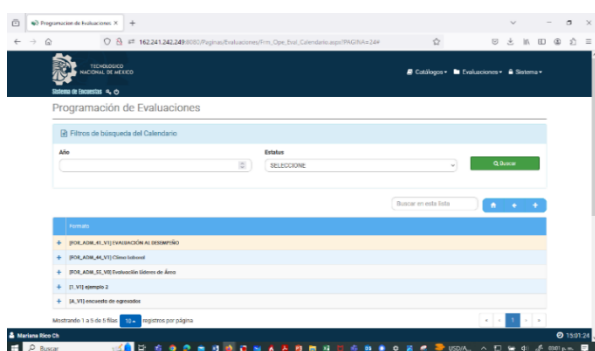


Figure 6

Evaluation scheduling

Source: Own elaboration

Figure 7 shows the Assessments section of the system, which provides the user with two main functions represented by visual and intuitive buttons. The first option, View, allows access to the results of previously administered assessments.

When selected, the system displays the generated reports, either individually or in a consolidated format, depending on the survey type and configuration. This feature is useful for reviewing performance, identifying patterns, or performing comparative analysis.

The second option, Evaluate, directs the user to the module where they can respond to or apply a new assessment. This section is designed to facilitate interaction with the digital forms, guiding the user through the different sections of the survey. Both functions are clearly defined and presented visually with icons that reinforce their purpose, contributing to simple and efficient navigation within the system.

### Box 8

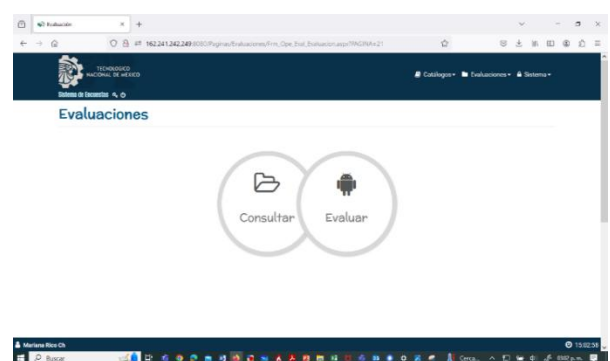


Figure 7

Evaluations and Consultations

Source: Own elaboration

## Conclusion

The creation of this website has evolved significantly, becoming an accessible and efficient process thanks to modern tools and innovative approaches. so websites are now proving to be an effective tool, as they allow administrative processes to be carried out efficiently.

Their intuitive design and customisable features enable users to easily create, distribute and analyse surveys, simplifying the analysis process and allowing information to be viewed in real time. However, it is crucial to maintain a balance between ease of creation and the technical quality of the site, with aspects such as security and user experience being a priority.

This is how websites have become a powerful tool that allows access to the digital world, contributing to the development of increasingly efficient environments.

### Declaration

### Conflict of interest

The authors declare that they have no conflict of interest. They have no known competing financial interests or personal relationships that could have appeared to influence the article reported in this article.

### Contribution of the authors

*Rico-Chagollán, Mariana*: I contributed to the project idea, development, research and editing.

*Rodríguez-Campos, Juan Carlos*: I contributed to the development of the project.

*Chacon-Olivares, Maria del Carmen*: Contributed to the development of the project.

### Availability of data and materials

For more information on the availability of data or programming methodology during this study, please contact the author.

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### Abbreviations

CSS	Cascading Style Sheets
HTML	Hypertext Markup Language
ITESI	Tecnológico Superior de Irapuato
MySQL	My Structured Query Language
PHP	Hypertext Preprocessor
TecNM	Tecnológico Nacional de México

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