# Sistema web para la entrega de evaluaciones y firma de registros: una solución tecnológica para instituciones educativas.

# Web System for Delivering Assessments and Signing Records: A Technological Solution for Educational Institutions

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**Abstract:**

The present work aims to develop a web system that allows optimizing the process of delivering grades and signing records in some educational institutions. The web system is designed to be accessible from any device with an Internet connection and a browser, thus facilitating the communication between tutors, students and academic authorities. The web system is currently in the validation and improvement phase, but has obtained good results in terms of efficiency and user satisfaction.

*Keywords:*

*Assessment's sign, control, web application, automation.*

**Resumen:**

El presente trabajo tiene como objetivo desarrollar un sistema web que permita optimizar el proceso de entrega de calificaciones y firma de actas en algunas instituciones educativas. El sistema web está diseñado para ser accesible desde cualquier dispositivo con conexión a Internet y un navegador, facilitando así la comunicación entre los tutores, los estudiantes y las autoridades académicas. El sistema web se encuentra actualmente en la fase de validación y mejora, pero ha obtenido buenos resultados en términos de eficiencia y satisfacción de los usuarios.

*Palabras Clave:*

*Firma de evaluaciones, control, aplicación web, automatización*

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## Introduction

In the educational field, it is important that tutors and students are informed of the final grades obtained in each subject or course. Likewise, it is necessary that both give their consent by signing a grade or record sheet, which certifies the academic result and allows the progress or completion of the curriculum. However, this process is usually slow and sometimes impossible for certain people given their geographical location or occupation, which generates inconveniences for both the interested parties and the institutions. Therefore, there is a need to implement a technological solution that facilitates and speeds up this process, taking advantage of the benefits offered by the use of the Internet and mobile devices.

In this sense, the development of a web system that allows tutors and students to consult their grades and sign their records from anywhere and at any time, as long as they have a device with an Internet connection and a browser, is proposed. The web system will also allow academic authorities to manage grades and records more efficiently and securely, avoiding the use of paper and reducing the time and cost of the process. To simplify the process of uploading grades, the web system will allow teachers or institutions to modify a CSV file, which can be opened from a spreadsheet processor, and upload it to the server. In addition, those teachers or institutions that use Classroom as an evaluation platform, will be able to download the grades and upload them to the server directly.

This software development has great importance to improve the educational quality and the satisfaction of the users involved in the evaluation process. By facilitating access to information and signing records, transparency, communication and feedback between tutors, students and academic authorities are fostered. Likewise, the use of material and human resources is optimized, time and money are saved, and the environment is cared for by reducing paper consumption.

## Objectives

*General*
- The general objective of this work is to develop a web system that allows optimizing the process of delivering grades and signing records in some educational institutions.

*Specific objectives*
- Analyse the functional and non-functional requirements of the web system.
- Design the architecture and interface of the web system.
- Implement the web system using the appropriate technologies.
- Validate and improve the web system through tests with real users.
- Evaluate the impact of the web system in terms of efficiency and user satisfaction.
- Simplify the process of uploading grades by using CSV files or integrating with Classroom.

## Concepts and definitions

*PHP*
PHP (recursive acronym for PHP: Hypertext Preprocessor) is a widely-used open-source general-purpose scripting language that is especially suited for web development and can be embedded into HTML.
Instead of lots of commands to output HTML (as seen in C or Perl), PHP pages contain HTML with embedded code that does "something" The PHP code is enclosed in special start and end processing instructions <?php and ?> that allow you to jump into and out of "PHP mode".
What distinguishes PHP from something like client-side JavaScript is that the code is executed on the server, generating HTML which is then sent to the client.
The best things in using PHP are that it is extremely simple for a newcomer, but offers many advanced features for a professional programmer [1].

*JavaScript*
JavaScript is a scripting language that enables you to create dynamically updating content, control multimedia, animate images, and pretty much everything else. A very common use of JavaScript is to dynamically modify HTML and CSS to update a user interface [2]. In a simple manner, it works as follows: the web browser receives the JavaScript code in its original text form and runs the script from that.

*Bootstrap*
Bootstrap is the most popular CSS Framework for quickly design and customize responsive mobile-first sites and nowadays is the world's most popular front-end open-source toolkit, featuring Sass variables and mixins, responsive grid system, extensive prebuilt components, and powerful JavaScript plugins [3].

*Database*
A database is a tool for collecting and organizing information. Databases can store information about people, products, orders, or anything else. Many databases start as a list in a word-processing program or spreadsheet. As the list grows bigger, redundancies and inconsistencies begin to appear in the data. The data becomes hard to understand in list form, and there are limited ways of searching or pulling subsets of data out for review. Once these problems start to appear, it's a good

idea to transfer the data to a database created by a database management system [4].

A database is usually controlled by a database management system (DBMS). Together, the data and the DBMS, along with the applications that are associated with them, are referred to as a database system, often shortened to just database.

Data within the most common types of databases in operation today is typically modelled in rows and columns in a series of tables to make processing and data querying efficient. The data can then be easily accessed, managed, modified, updated, controlled, and organized. Most databases use structured query language (SQL) for writing and querying data [5].

*Comma-Separated Value File: CSV*

A comma-separated value (CSV) file is a type of file used to exchange data between disparate applications, such as multiple spreadsheet programs.

Although there are several specifications and implementations for the CSV format, it has never been formally documented; that is, there is no existing specification and this allows for a wide variety of interpretations for CSV files [6]. The most recognized format is the one in which the rows are separated by line breaks, while the columns are separated by commas.

These files are often used as databases and due to their simplicity, anyone can create one with a text editor or a spreadsheet processor, the second option being more recommended as it allows applying a series of filtering operations., order and generate detailed reports from the available information. Files in this format will have the extension .csv.

*Web hosting*

Web hosting is a service that allows organizations and individuals to post a website or web page onto the Internet. A web host, or web hosting service provider, is a business that provides the technologies and services needed for the website or webpage to be viewed in the Internet. Websites are hosted, or stored, on special computers called servers [7].

Although hosting services usually have a cost, it is possible to obtain some for free with certain limitations such as: limited bandwidth, little storage space or advertisements of the provider.

## Methodology

- Download or create a CSV file based on school assessments

- Acquire or create a web hosting.
- Develop the code in PHP8 for backend.
- Develop the frontend using Bootstrap.
- Develop the functionality for capturing photographs using JavaScript.
- Create an intuitive and customizable interface for the user.
- Validate the proposed software.

## Results

The software was tested remotely and can be accessed from https://upeg.netsoftgro.com. To create the list with the assessments and names, some software systems as classroom make it easy to download the total grades in CSV format, so the file obtained from the above process can be opened using any spreadsheet software the obtained result will be similar as shown in Figure 1.



*Figure 1. CSV file opened with a spreadsheet software.*

After the file is done, is needed to get a web hosting service, once uploaded the main interface will be as shown in Figure 2.
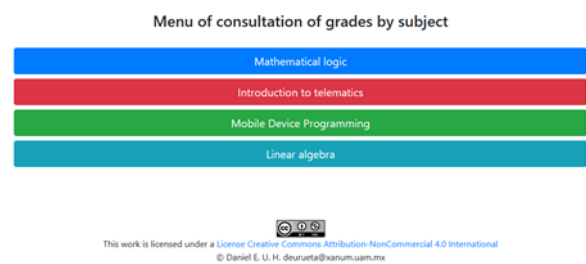


*Figure 2. Main interface.*

Once the user selects a subject option to consult, a new interface opens, as shown in Figure 3, where users can enter their personal email address.

*Figure 3. Search interface.*

Since the frontend was made using bootstrap, all the interfaces are responsible for example, the result of the search interface in a mobile browser will show something as in Figure 4.
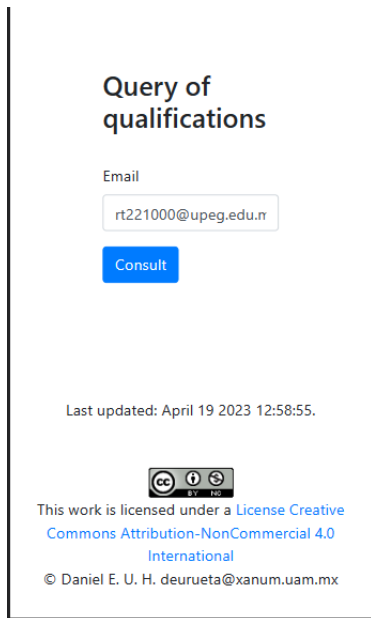


*Figure 4. Search seen from a mobile device.*

Depending on the type of device from which the system is being accessed, it will display the results using one type of view or another.



*Figure 5. Results interface seen from a computer web browser.*



*Figure 6. Results interface seen from a smartphone browser.*

Once authenticated into the system, the user will be able to see the option to sign their grades, indicating their acknowledgment and agreement with them (see Figure 7).



*Figure 7. Option to sign the user grades.*

After selecting the option, it will open a new window that will request permission to access the device's camera in order to capture a photograph.

*Figure 8. Interface to take a capture a photograph.*

The user will be able to capture as many photographs as necessary until satisfied with the results. Subsequently, they must select the blue button to return to the grades page and view their updated signature.
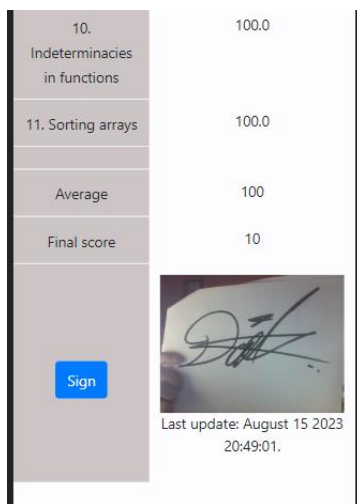


*Figure 9. System actualization after capture a signature.*

Currently, the described system is being implemented and validated in the Networks and Telecommunications Career of the Universidad Politécnica del Estado de Guerrero.

## Conclusions

The proposed software was correctly validated in terms of functionality, through usability and satisfaction tests with real users. This application allows the common users to have a free tool and, in few steps, to control and query school assessments. Thanks to the structure in which the project was developed, if the user needs to update the database, they can do it using excel or downloading the CSV file from classroom without the need to edit the code.

Therefore, this platform facilitates and speeds up the process of delivering grades and signing records, fostering transparency and communication between tutors, students and academic authorities. In addition, the software is flexible to modify the code according to the end user's needs. Likewise, this system has resulted in fewer students having doubts about their current grade and has allowed teachers to have a more private way of communicating final grades. One of the most innovative features of the software is that it allows signing records using a webcam on almost any device, which provides greater security and convenience to users. On the other hand, it is recognized that the software has some limitations in terms of visual design and multi-language support, which could affect the experience and accessibility of users.

As future work, it is expected to expand the scope of the software so that it can be used in all careers and educational levels that require a system of delivering grades and signing records. Likewise, it is expected to disseminate the software to other educational institutions that have similar problems and that can benefit from this technological solution.

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