










Web platform for the management and promotion of information about an ethnobiological garden

Plataforma web para la gestión y promoción de información de un jardín etnobiológico

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CONAHCYT classification:

Area: Engineering
Field: Engineering
Discipline: System engineer
Subdiscipline: Computing

 <https://doi.org/10.35429/JCT.2024.8.20.6.7>

History of the article:

Received: January 10, 2024





Accepted: December 30, 2024

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Abstract

The web platform aims to promote and safeguard information about the biological resources of the state of Tlaxcala, including flora, fauna, and the traditional knowledge of the region's communities, such as the use of medicinal plants. Additionally, events and resources generated by the Research Center for Biological Sciences at the Autonomous University of Tlaxcala will be promoted. A key aspect of the project will be to generate reports and centralize the isolated information from the different areas involved in the biotechnological garden project called "Tlaxcallan." Furthermore, the initiative seeks to create digital repositories to host books, manuals, brochures, and a photo library, with the purpose of preserving the biological resources and traditional knowledge of the indigenous communities.

Objectives	Methodology	Conclusión
 Organize data on plants from the Tlaxcala region, including detailed information on species, characteristics, and conservation status.  Design an intuitive and user-friendly interface that enables easy and accessible navigation through the web platform.  Implement search and filtering tools that allow users to efficiently access and consult information about natural resources of interest.	 The methodology includes the following phases: Requirements analysis Information analysis and gathering Information architecture design User interface design Platform development Testing and adjustments Implementation Evaluation	Designing and developing a web platform enables the efficient and centralized management of information about the natural resources in the ethnobiological garden of the state of Tlaxcala. This includes organizing data on plants from the region, as well as promoting planned events and activities, and providing resources such as photo libraries, articles, manuals, and more.

Resumen

La plataforma web busca fomentar y resguardar la información de los recursos biológicos del estado de Tlaxcala, incluyendo la flora y fauna, así como el conocimiento tradicional de los pueblos de la región, como lo es el uso de plantas medicinales. Además, se promocionarán eventos y recursos generados por el Centro de Investigación en Ciencias Biológicas de la Universidad Autónoma de Tlaxcala. Una parte primordial que tendrá el proyecto es generar reportes y centralizar la información aislada de las diferentes áreas involucradas en el proyecto del jardín biotecnológico denominado "Tlaxcallan". Asimismo, se busca crear repositorios digitales que alberguen libros, manuales, folletos y una fototeca, con el propósito de preservar los recursos biológicos y los conocimientos tradicionales de los pueblos originarios.

Objetivos	Methodology	Conclusión
 Organizar datos sobre plantas de la región de Tlaxcala, incluyendo información detallada sobre especies, características, y estado de conservación.  Diseñar una interfaz intuitiva y amigable para el usuario que permita una navegación fácil y accesible a través de la plataforma web.  Implementar herramientas de búsqueda y filtrado que permitan a los usuarios acceder y consultar de manera eficiente la información sobre los recursos naturales de interés.	 La metodología incluye las siguientes fases: Análisis de requisitos Análisis y recopilación de información Diseño de la arquitectura de información Diseño de la interfaz de usuario Desarrollo de la plataforma Pruebas y ajustes Implementación Evaluación	Diseñar y desarrollar una plataforma web permite gestionar de manera eficiente y centralizada la información de los recursos naturales presentes en el jardín etnobiológico del estado de Tlaxcala. Incluyendo la organización de datos de plantas de la región, así como la divulgación de eventos y actividades planeadas y recursos como fototecas, artículos, manuales, etc.

Ethnobiological, Platform, Web

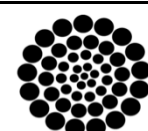
Etnobiológico, Plataforma, Web

Citación: Morales-Zamora, Vianney, Paredes-Xochihua, María Petra and Sánchez-Juárez, Iván Rafael. [2024]. Web platform for the management and promotion of information about an ethnobiological garden. Journal Computer Technology. 8[20]-1-7: e60820107.



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Introduction

In the heart of the beautiful state of Tlaxcala, you will find the 'Tlaxcallan' Ethnobiological Garden, a natural and cultural treasure that is home to a wide diversity of native flora and fauna. This unique space is a living testimony of the rich ethnobiological heritage of the region, where the traditional knowledge of the local communities and the conservation of biodiversity are intertwined.

With the aim of preserving and promoting this invaluable heritage, the web platform for the management and promotion of the Ethnobiological Garden has been created. This platform will be a comprehensive tool to efficiently manage all the information (obtained from different sectors, public and private institutions) related to this extraordinary garden, while promoting its knowledge and appreciation among visitors, researchers and nature lovers.

Through this web platform, users will be able to explore a wide range of resources and content, from detailed data on the plants present in the garden, to information on the ethnobiological practices of local communities and ongoing conservation projects. In addition, the platform will serve as a means to disseminate events, workshops and activities organised in the garden, thus fostering greater participation and awareness in the community.

In order to design the present project, a review of some already available platforms and realised projects was carried out, such as the following: UNAM (2023), The Institute of Biology of the UNAM has a Botanical Garden that promotes conservation, research and dissemination of knowledge of Mexican biodiversity. Oaxaca, J. E. (n.d.).

The Ethnobotanical Garden of Oaxaca is a unique space dedicated to preserving and showcasing the plant and cultural diversity of the state of Oaxaca. CONAHYT (2020),

The Regional Botanical Garden 'Roger Orellana' is a CICY project that focuses on the conservation of local and regional flora, promoting environmental education. UABC (2021),

The Ethnobiological Garden of the Autonomous University of Baja California highlights the importance of local flora and its relationship with the indigenous communities of the region. UDG (2021),

The Ethnobiological Garden of Jalisco of the University of Guadalajara is dedicated to the conservation of endemic species and education in ethnobotany. Toledo, V.M., Barrera-Bassols, N., & García-Frapolli, E. (2011) This book addresses ethnobiology as a discipline that combines natural and social sciences to understand the relationship between humans and their natural environment.

Monroe, M.C., Plate, R.R., Oxarart, A., Bowers, A.W., & Gentner, C. (2012), This article reviews effective strategies for climate change education, highlighting evidence-based methodologies.

Berkes, F. (2012). This book examines how traditional ecological knowledge can be integrated into sustainable natural resource management.

Krug, S. (2014). A book that offers a practical, common-sense approach to web usability, highlighting the importance of designing intuitive interfaces.

Methodology

The methodology includes the following phases:

1. Requirements analysis.

In this phase, the functional requirements were obtained to expose the functionality of the system, as well as the non-functional requirements such as colours, logos and typography to be used within the platform.

2. Analysis and collection of information

Once the information was collected. It was classified and organised in order to verify that the necessary information was available to establish the design of the system.

3. Design of the information architecture

Here the schemes were created to represent the flow of information, by means of sequence diagrams, in this phase the user stories were established, since SCRUM was used as the development methodology.

4. Design of the user interface

Balsamiq Mocups was used for the design, and Día software was used for the design of the database.

5. Development of the platform Testing and adjustments

In this phase the system was developed in the front-end part with HTML, css3 and JavaScript, in the back-end part, php and JavaScript were used, in addition to implementing some libraries such as json, and fpdf for the development of the reports.

6. Implementation

The platform is currently in this phase, with the aim of providing feedback and making improvements, as well as the evaluation and validation of the users.

Results

Figure 1 shows the user login, where the necessary credentials will be needed to access the platform.



Figure 1

Login

Source: Own elaboration

If the user does not have an account, he/she can register by clicking on the Register Now option.



Figure 2

User registration

Source: Own elaboration

Once the administrator user logs in, he/she will be able to see the following menu, and each user will have access according to the established privileges.

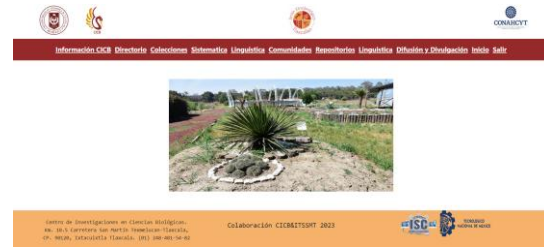


Figure 3

Administrator user menu

Source: Own elaboration

In the information registration part, a logo, mission and vision can be added. Organisational chart, etc.



Figure 4

Register of information

Source: Own elaboration

In the directory section you can register teachers, researchers and directors of the garden.



Figure 5

Directory registration Source: Own elaboration

The following figure shows the option to register collections and elements of each systematic collection.



Figure 6

Systematic collections

Source: Own elaboration

The following figure shows the register of different resources that promote different dialects such as guides, recipe books, manuals, etc.



Figure 7
Linguistics Register

Source: Own elaboration

The administrator will have access to all the information and in the case of the head of area only to some options, as well as validating that the access data are correct, or that information has been entered (see figure 8).

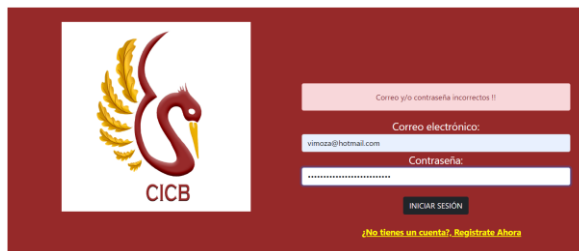


Figure 8
Login

Source: Own elaboration

When logging in as any type of user, its corresponding menu will be displayed, as well as the name of the person who is logging in. See figure 9.

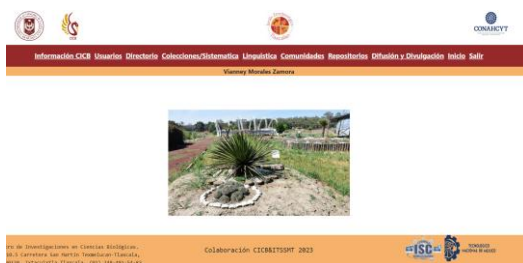


Figure 9
Administrator User Login

Source: Own elaboration

In the case of the area manager user, he/she will not have access to user information, nor to the directory, as shown in figure 10.



Figure 10
Chief User Login

Source: Own elaboration

In the case of general information, you can edit the information on the mission, vision, description, organisation chart, and the logo to be used, see figure 11. Figure 12 shows the data registered in the interface and which are the same in the database.



Figure 11
General information

Source: Own elaboration

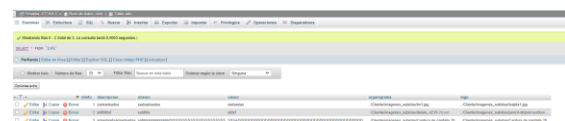


Figure 12
Database

Source: Own elaboration

Figure 13 shows the users registered in the system, where the administrator user can activate or inactivate them, as well as modify their registration information.



Figure 13
Registered users

Source: Own elaboration

Figure 14 shows the information previously captured in the database. It is worth mentioning that users will not be able to access the platform until their status is active.

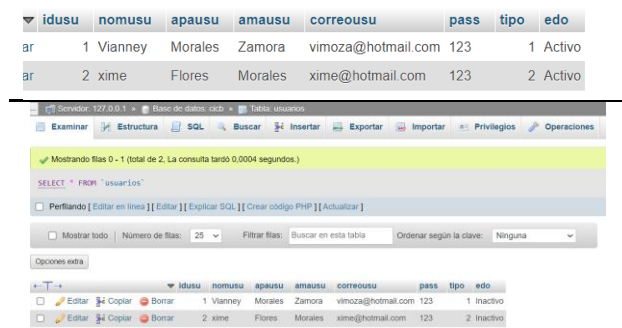


Figure 14

Registered users (Data in the database)

Source: Own elaboration

Figure 15 shows the interface for adding the managers' information, including their name, position, grade, email and a photograph. Figure 16 shows the registered data.



Figure 15

Directory data

Source: Own elaboration



Figure 16

Directory data (Data in the database)

Source: Own elaboration

Figure 17 shows the collections recorded, as well as the systematics of each of these collections, adding its common name, scientific name, latitude and altitude, and a photo of the specimen. In figure 18, the information in the database is presented.



Figure 17

Registered collections and systematics data

Source: Own elaboration



Figure 18

Registered collections and systematics data (in bd)

Source: Own elaboration

Figure 19 shows the linguistic files that can be registered, in this case preferably pdf files, where recipes, manuals, etc. in different dialects such as Nahuatl and Otomi can be registered. In Figure 20, the data recorded.

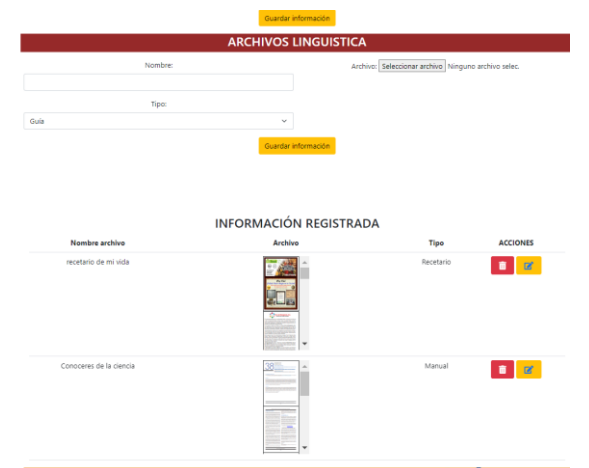


Figure 19

Registered linguistic files

Source: Own elaboration

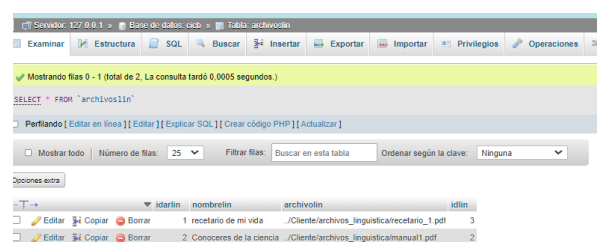


Figure 20

Registered linguistic files (Data in the database)

Source: Own elaboration

Figure 21 shows the information of the communities registered both in the database and in the platform.



Figure 21

Information on registered communities

Source: Own elaboration

Figure 22 shows the files uploaded to the repositories, which can be books, theses, dissertations, articles, etc., i.e. information available to the public, with the option to download, made by researchers.



Figure 22

Repository information

Source: Own elaboration

Figure 23 shows the files uploaded in dissemination and outreach, in this case they can be pdf files, images or videos, where the activities promoted in the garden are presented, such as talks, tours, workshops, courses, etc.



Figure 23

Registered dissemination and outreach archives

Source: Own elaboration

Figure 24 shows a menu with the options to generate reports in pdf, where you can see what is registered in the users, collections, linguistics, directory, communities and species repository.



Figure 24

Reports menu

Source: Own elaboration

Figure 25 shows the report of the users registered in the database and figure 26 shows the reports of the registered collections.

Nombre	Apellido Paterno	Apellido Materno	Correo	Tipo de usuario
Vianney	Morales	Zamora	vianney@conahcyt.com	1
María	Paredes	Xochihua	maria@conahcyt.com	2

Figure 25

User reports

Source: Own elaboration

Nombre Común	Nombre Científico	Latitud	Altitud	Tipo de colección
Mongo venenoso	Crotophaga sulcirostris (P.) Ph.	23.08	2250	2
Espeque de corchó	Chrysomitris guianensis (Wils)	23.08	9870	3

Figure 26

Report on registered collections

Source: Own elaboration

Conclusions

In conclusion, the design and development of a web platform for the management of information on the natural resources of the state of Tlaxcala represents a significant contribution. This tool not only organises data on the plants of the region, but also facilitates the dissemination of events related to the garden, promoting conservation, knowledge and appreciation of the natural wealth of the region.

Declarations

Conflict of interest

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

Authors' contribution

Morales-Zamora, Vianney, contributed to the development and programming of the platform.

Paredes-Xochihua, Maria Petra, contributed to the design and development of the database.

Sánchez-Juárez, Iván Rafael, contributed to the design of the platform's interfaces.

Availability of data and materials

The data obtained for the development of this platform are reserved by the Centro de Investigación en Ciencias Biológicas of the Universidad Autónoma de Tlaxcala.

Funding

No funding was provided for the development of the platform, it was developed with own resources.

Acknowledgements

We would like to thank the researchers Dr. Mercedes, Dr. Alejandro Kong and Dr. Gema Galindo, from the Centro de Investigaciones en Ciencias Biológicas of the Universidad Autónoma de Tlaxcala, for all the support and guidance for the development of this platform, for their time and information provided. Also to the Tecnológico Nacional de México Campus San Martín Texmelucan, for all the support received for the realisation of this project.

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