













Website of medical specialties of the region Huasteca Hidalguense




Sitio web de especialidades médicas de la región Huasteca Hidalguense.

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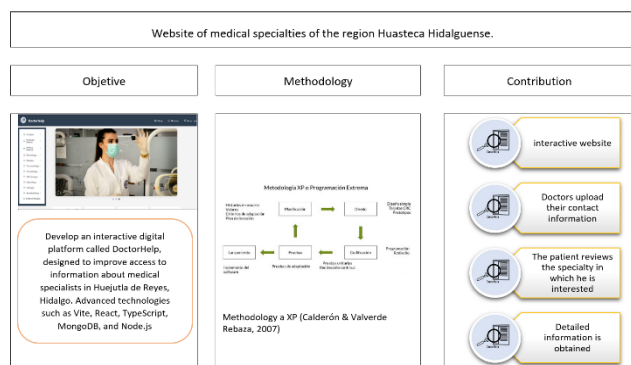


Abstract

This project aimed to develop an interactive digital platform called DoctorHelp, designed to improve access to information about medical specialists in Huejutla de Reyes, Hidalgo. Advanced technologies such as Vite, React, TypeScript, MongoDB, and Node.js were implemented, along with the Extreme Programming [XP] methodology due to its focus on simplicity, effective communication, and adaptability to change, which enabled optimal project monitoring and development. As a result, an initial version of the platform was produced, intended to significantly impact access to medical information by ensuring that residents of Huejutla de Reyes can obtain fast, functional, and efficient information, adapting to user requirements.

Resumen

El objetivo de este proyecto fue desarrollar una plataforma digital interactiva llamada DoctorHelp, destinada a mejorar el acceso a información sobre especialistas médicos en Huejutla de Reyes, Hidalgo. Utilizando tecnologías avanzadas como Vite, React, TypeScript, MongoDB, y Node.js. Se usó la metodología Programación Extrema [XP]. por su enfoque en la simplicidad, la comunicación efectiva y la capacidad de adaptación a los cambios, lo que permitieron darle un seguimiento óptimo al proyecto. Como resultado se obtuvo una primera versión del proyecto que pretende impactar notablemente en el acceso a la información médica, asegurando que los habitantes de Huejutla de Reyes puedan obtener la información rápida, funcional y eficiente, adaptándose a las demandas y necesidades de los usuarios.



Website, user interface, backend, Extreme Programming [XP].



Página, web, Interfaz de usuario, Backend, Extreme Programming [XP]

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

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1. Introduction

In Mexico, the National Health System [SNS] is divided into two main sectors: public and private. The public sector is subdivided into two: systems for people with formal employment and their immediate family members [social security scheme] and systems for people without formal employment or insurance. On the other hand, the private sector is made up of various service units for people with the ability to pay. The Department of Health acts as the governing body of the system. [Díaz de León, 2020] Modernisation and conventional medical care threaten to displace ancestral practices and knowledge; however, in some regions of the country, caring for life from gestation, birth and upbringing is the work of the profound knowledge of midwives and indigenous women. [PEREZ, 2025]

The health system in Mexico plays a crucial role in the general well-being of the population, making it a highly topical and relevant issue. In a diverse and dynamic country such as Mexico, the importance of a robust and accessible health system lies not only in medical care itself, but also in its ability to address diverse challenges that affect the quality of life of millions of people. From disease prevention to efficient resource management and equitable access to medical services, Mexico's healthcare system plays an integral role in building a healthy and resilient society. [UNIR Universidad en Internet, 2023]

Knowledge about the medical specialists and healthcare services available in a region is crucial because it facilitates access to timely and effective medical care, enables disease prevention, and assists in the proper management of health problems. In the city of Huejutla de Reyes, Hidalgo, with a population of 126,781 inhabitants, 48.4% of whom are men and 51.6% women, the rate of disease in the state of Hidalgo is high and medical service coverage is scarce. In Hidalgo, the leading causes of death, reflecting the most prevalent diseases, are heart disease, diabetes mellitus, malignant tumours, influenza and pneumonia, and liver disease, according to recent data from the National Institute of Statistics and Geography [INEGI] on deaths, although there are also vector-borne diseases such as dengue fever. The rates are calculated per 100,000 inhabitants, and the specific data vary annually, but these are the chronic and acute pathologies with the greatest impact on state mortality. [INEGI, 2024]

Access to health services, which is considered in the measurement of multidimensional poverty, reflects the essential element of the right to health. Based on this criterion, the threshold for calculating this deprivation is the entitlement or right to receive medical services from a public institution or private services. Its components refer to the employed population without direct access to health services and the unemployed population without access to health services. In the state of Hidalgo, 43.5% of people without access to medical services were recorded in 2024, which means they use other alternatives such as private services or self-medication. [INEGI, Análisis de los resultados de la medición de la pobreza multidimensional, 2025].

Box 1

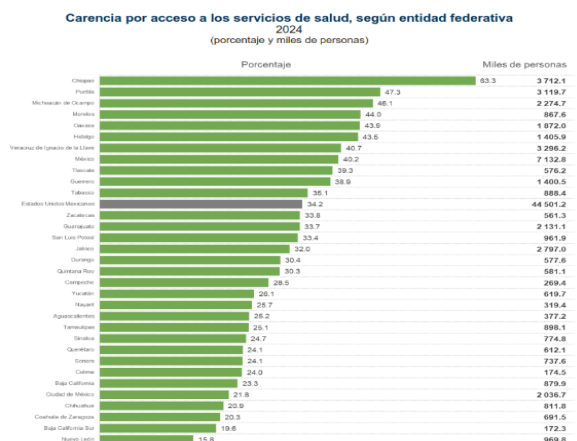


Figure 1

Lack of access to health services, by federal entity, 2024

Source: [INEGI, Carencia por acceso a los servicios de Salud, 2024]

The search for specialists is based on verbal recommendations, which often do not provide complete or up-to-date information on the availability and location of specialists. Likewise, the gap between rural and urban areas makes it even more difficult to access up-to-date information on specialists. There are no specialist clinics in the Huasteca region, so doctors from other urban areas such as Mexico City, Pachuca, Tampico, and other places are willing to see patients on certain days in Huejutla Hidalgo. However, these visits are sporadic.

Given the problem encountered, it is considered an area of opportunity to create a website with information on specialist doctors who attend in the region, with availability of dates and hours of attendance, to offer users a tool capable of concentrating this detailed and up-to-date information.

First, the needs and problems of users were identified, which will define the requirements of the platform, by collecting information and conducting user studies, ensuring that the platform meets user expectations.

Subsequently, the characteristics and functionalities of the platform were defined, including its components and how they were developed. The elements necessary for the web platform to be simple and functional, requiring little maintenance and easy to navigate, were also analysed, implementing an intuitive and clean design with the aim of improving the user experience and reducing the maintenance workload.

Information and Communication Technologies are a crucial resource for strengthening health systems, integrating them into epidemiological surveillance, health promotion and care activities, under the concept of e-Health. This includes applications such as electronic health records, clinical decision support systems and telemedicine, among others.

1. Theoretical Foundations

2.1 Health: a constant concern

To achieve effective access to the right to health, there must be no barriers or obstacles to accessing services, whether physical, economic, or related to information about the location of health facilities and the problems they can address. Likewise, the availability of sufficient physical and human resources must be guaranteed, and efforts must be made to ensure that these resources have the best possible tools in terms of updating and training so that patients receive quality care as soon as they need it, that it is continuous and that it is also culturally appropriate and sensitive to gender and life course requirements. [CONEVAL, 2018]

Practising a healthy lifestyle has a positive effect on the functioning of the body and mind, as well as preventing chronic non-communicable diseases. Healthy habits can improve quality of life and prevent obesity, diabetes, cardiovascular and respiratory conditions. A combination of practices, such as exercising, getting enough rest and maintaining a varied and balanced diet, contributes to personal well-being.

The adequate location and distribution of medical specialists in a region is essential to ensuring an equitable and efficient health system that is capable of responding to the real needs of the population.

In rural or isolated regions, the lack of specialists often creates significant gaps in access, preventing rapid medical care.

Box 2

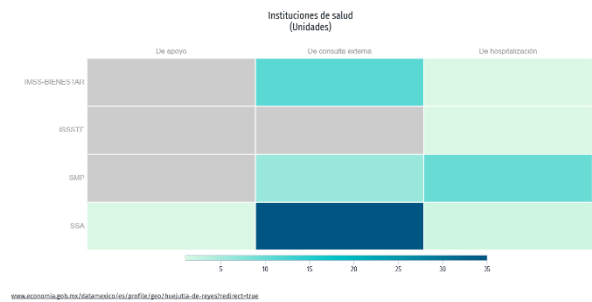


Figure 2 Health institutions [Units]

Source: [DataMéxico, Instituciones de Salud, 2022]

The constant concern for health in Huejutla de Reyes Hidalgo and in all states is related to the death rate and causes, which is worrying and alarming for the population. The presence of specialists is directly related to better health outcomes.

Regions with lower densities of specialists have higher rates of preventable mortality, untreated disabilities, and delayed diagnoses.

Box 3



Figure 3 Top 5 causes of death, by federal entity of usual residence and sex of the deceased person

Source: [INEGI, 5 principales causas de muerte, según entidad, 2022]

2.2 Active participation of patients in their own care

Patient involvement in their own care is a fundamental pillar of Patient-Centred Care. This approach encourages patients to be active collaborators in decisions related to their health.

It involves openly sharing information with healthcare professionals, making informed and joint decisions about treatment, and proactively managing their self-care. This participation empowers patients, making them feel responsible for their well-being and promoting a more equitable and satisfying relationship with their healthcare providers. [UNIR Universidad en Internet, 2023]

Patient involvement in the care process and decision-making not only improves clinical outcomes, but also patient satisfaction and perceived well-being during treatment. Participation involving dialogue and collaboration with professionals is associated with a better experience and positive perceptions of the care received. [Kim, 2018]

2.3 Impact of Technology on Rural Health

Public health plays a crucial role in improving the quality of life of the population through various strategies and actions focused on disease prevention, health promotion, and improvement of health systems.

The healthcare system in Mexico faces multiple challenges that affect both the accessibility and quality of medical services available to the population. One of the most pressing problems is the lack of physical and economic access for many citizens, especially those living in rural or marginalised areas. This translates into long distances to reach health centres and prohibitive costs for many.

In addition, hospital infrastructure has significant deficiencies, with most units concentrated in urban areas, leaving rural communities with limited coverage.

The availability of hospital beds is low compared to international standards, making it even more difficult to access timely medical care, especially in emergencies.

Medical personnel are also scarce, with an insufficient ratio of general practitioners and specialists per thousand inhabitants. This means that many people do not receive the necessary medical care at the right time, exacerbating health problems and increasing mortality rates from preventable diseases. In terms of quality, there are concerns about long waiting times in emergency rooms and the incidence of medical malpractice in the public sector.

This affects the population's confidence in the health system and compromises the effectiveness of treatments and care received. In addition, educational campaigns for disease prevention have not succeeded in significantly reducing the high rates of chronic diseases such as diabetes and obesity, which continue to be a major burden on the public health system. In response to these challenges, the Mexican government has outlined a strategic plan to improve the coverage, quality, and efficiency of the health system, focusing on increasing transparency in the use of resources, expanding infrastructure in underserved areas, and strengthening prevention and health education strategies.

This approach is crucial to ensuring that all Mexicans have equitable access to adequate health services and can receive quality medical care, regardless of their geographical location or economic situation. [García, 2019]

The digitisation of the health sector is essential in Mexico, with a growing emphasis on technologies such as telemedicine, remote monitoring, and artificial intelligence. These technologies are transforming healthcare by enabling remote communication between doctors and patients, as well as remote monitoring of critical conditions. This is especially beneficial for rural areas where physical access to hospitals is limited. However, it is crucial to establish clear regulations to ensure the safety and efficacy of these technologies, as well as to encourage innovation and collaboration between the private and public sectors to improve the quality and accessibility of healthcare in remote areas. [Asociación HealthTech México, 2023]

2.2 Accessibility to Specialised Healthcare

Access to health services, which is considered in the measurement of multidimensional poverty, reflects the essential element of the right to health. Based on this criterion, the threshold for calculating this deprivation is the entitlement or right to receive medical services from a public institution or private services. Its components refer to the employed population without direct access to health services and the unemployed population without access to health services.

In 2024, the percentage of the population lacking access to health services was 34.2%, representing 44.5 million people. From 2016 to 2022, this deprivation increased from 15.6% to 39.1% of the population [a difference of 31.6 million more people]. However, between 2022 and 2024, there was a reduction of 4.9 percentage points, meaning that 5.9 million more people reported being affiliated, registered, or entitled to receive health services in a public or private institution.

Box 4

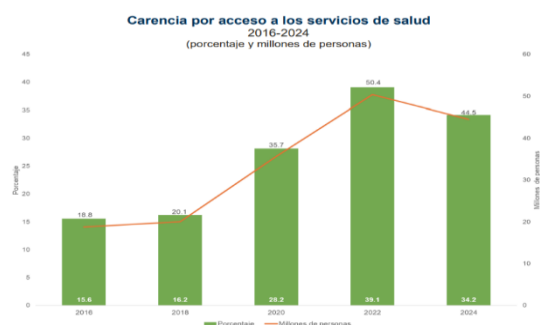


Figure 4

INEGI. National Household Income and Expenditure Survey [ENIGH] 2024, using the Coneval methodology.

Source: [INEGI, Carenzia por acceso a servicios de Salud, 2024]

This is why the population has opted for another alternative for medical care that is available:

In 2024, the Health Statistics in Private Establishments [ESEP] integrated information from 2,747 establishments distributed across 558 municipalities and territorial districts. Of these, 63 had at least 10 private establishments and accounted for 56.1% of the total number of such establishments.

The states that accounted for 52.5% of private health establishments were as follows: State of Mexico, with 15.6%; Mexico City, with 8.3%; Jalisco, with 7.5%; Guanajuato, with 6.3%; Michoacán, with 5.1%; Veracruz, with 5.0%; and Puebla, with 4.7%. The following municipalities and territorial divisions had at least 20 establishments and, together, accounted for 33.3% of them: Tijuana, Guadalajara, Puebla, Nezahualcóyotl, Iztapalapa, Toluca, Ecatepec, Gustavo A. Madero, Morelia, Juárez, León, Cuauhtémoc, Monterrey, Naucalpan de Juárez, Cuernavaca, Acapulco de Juárez, Oaxaca de Juárez, Zapopan, Querétaro, San Luis Potosí, Tuxtla Gutiérrez, Durango, Benito Juárez, and Reynosa.

Box 5

Establecimientos particulares de salud, según tipo de especialidad 2024 (porcentaje)

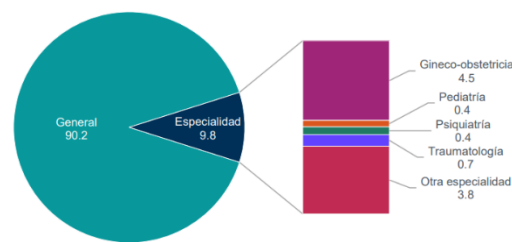


Figure 5

Health statistics in Private establishments [ESEP]

Source: [INEGI, ESEP, 2024]

These statistics show that there is no concentration of specialists in the Huasteca region and few in general hospitals.

The following information is available for Huejutla de Reyes Hidalgo.

Box 5

Table 1

Statistics on clinics and doctors

Centre / Unit	Consulting rooms	Total doctors	General practitioners	Medical specialists	
Huasteca General Hospital [SSA]	11	45	11	13	[hospitalesmexico.com]
Urban Consultation Unit [SSA]	6	22	15	1	[hospitalesmexico.com]
Tehuacán Rural Unit [SSA]	3	6	4	0	[hospitalesmexico.com]
IMSS-Prospera Rural Hospital	15	39	8	5	[hospitalesmexico.com]
Private clinics [Doctoralia / directoriales]	—	Various	Various	- Several private specialists	[Doctoralia]

2.1 Challenges in accessing medical specialists

The main challenges in accessing medical specialists include a shortage of professionals, geographical and financial barriers, and long waiting lists. These problems are particularly acute in countries such as Mexico, where the distribution of doctors is uneven and resources are limited. These challenges can be grouped into:

- Uneven geographical distribution of specialist staff

Specialists are concentrated in urban areas, working in large cities or hospital centres, while rural municipalities or those with a highly dispersed population have few or no specialists.

- Shortage of specialists in certain areas

In many health systems, there are specialties with chronic shortages [e.g. geriatrics, psychiatry, oncology, nephrology].

- Economic barriers

Even when specialists are available, access may be limited by: private consultation costs, travel expenses, costs of diagnostic tests and specialised medicines, and low availability of insurance or public coverage.

- Administrative barriers

In public or social security systems, access to a specialist may require: extensive paperwork, long waiting lists, limited hours and availability of appointments.

- Cultural and linguistic barriers

In indigenous regions or traditional rural communities: Lack of specialists who speak the local language.

2.1 Technologies to Improve Public Health

The impact of technology on rural health can be seen on several fronts: community radio stations are key to transmitting health and environmental messages in an accessible way; colourful billboards are used effectively to communicate public issues visually; community assemblies remain important even without direct technological mediation, depending on the tone of voice and status of the participants; and municipal presidencies still use traditional methods such as car-mounted loudspeakers. Broader integration of digital technologies could improve communication and emergency response in these rural communities. [Matus & Ramírez, 2020]

The digitisation of the health sector is essential in Mexico, with a growing emphasis on technologies such as telemedicine, remote monitoring, and artificial intelligence.

These technologies are transforming healthcare by enabling remote communication between doctors and patients, as well as remote monitoring of critical conditions. This is especially beneficial for rural areas where physical access to hospitals is limited. However, it is crucial to establish clear regulations to ensure the safety and efficacy of these technologies, as well as to encourage innovation and collaboration between the private and public sectors to improve the quality and accessibility of healthcare in remote areas.

3. Methodology

The XP methodology was chosen for this project because of its focus on simplicity, effective communication, and adaptability to change. XP promotes the frequent delivery of functional versions of the product, allowing for early feedback and adjustments to development accordingly. In addition, the XP methodology encourages collaboration among team members and continuous improvement of the product, leading to a more successful launch and customer satisfaction.

Extreme Programming [XP] is an agile methodology proposed in 1999 by Kent Beck in his book entitled ‘eXtreme Programming eXplained’ for the development of IT projects, which seeks to solve the problems encountered in the creation of software engineering projects. It is used for short-term projects, small development teams, and projects with relatively short delivery times, presented to the user in the form of small deliverables, whose goals and schedules are adjusted in real time according to the level of progress and the actual difficulties presented by the project.

Box 6



Figure 6

Extreme Programming [XP] Methodology

Source: [Calderón & Valverde Rebaza, 2007]

3.1 Planning.

- 1 During this phase, a meeting was held between the stakeholders, i.e. the developer and the client, to identify the project requirements. Priorities were established, identifying the problem, the objective and the justification for why the website, named 'DoctorHelp', should be developed. The client stated the desired modules and their purpose, providing a clear vision of the needs and functionalities.
- 2 Records were drawn up describing the desired characteristics of the website from the end user's perspective. These records were used in the following phases. Planning includes estimating the effort required to complete each requirement, which helps to define the scope and time required. For this reason, a schedule of activities was drawn up, and the optimal methodology for the type of project was chosen, in this case the XP methodology.
- 3 In each phase of this methodology, we planned how and when the client's requirements would be completed, organising the schedule by weeks. Each week was dedicated to a specific task, ensuring that the time spent on creating the website was distributed efficiently. This weekly approach allowed the developer to focus on clear and achievable goals, maintaining a steady pace of progress. It also facilitated the early identification of problems and the implementation of necessary adjustments, ensuring that the project remained aligned with the client's expectations and the established deadlines.

Thus, the development of the website was carried out in a structured and organised manner, optimising the use of time and available resources.

Box 7

No.	Actividades	Prog./Real	Semanas													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Planificación	P	■													
		R														
2	Diseño	P		■	■	■										
		R														
3	Codificación	P			■	■	■	■	■	■	■	■	■	■	■	
		R														
4	Pruebas	P					■	■	■	■	■	■	■	■	■	
		R														
5	Lanzamiento	P											■	■	■	
		R														
6	Redacción de memoria	P														
		R														
7		P														
		R														

Figure 7
Planning

Source: Own work

3.2 Design

At this stage, the website architecture was created, including the navigation map, data model, and interface. The focus was on simplicity and clarity to ensure an optimal user experience. Within this architecture, the navigation map was added, which was designed in several ways to select the most efficient and user-friendly option for the user.

The number of clicks required for users to quickly access a catalogue was considered, thus optimising navigation and improving the usability of the website.

Box 8

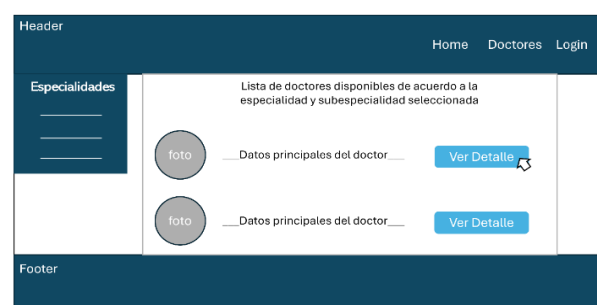


Figure 8

Interface Design

Source: Own work

The data model was designed, structuring how the data necessary for the website to function would be stored and managed. A robust and well-organised database was created, allowing for efficient data access and manipulation. In addition, the website interface was designed with a focus on providing an attractive visual experience and intuitive navigation. Colours, fonts and visual elements were carefully selected to create a professional appearance consistent with the DoctorHelp identity. Several prototypes of the interface were developed, testing different layouts and styles until the combination that best suited the needs of the client and end users was found.

Box 9

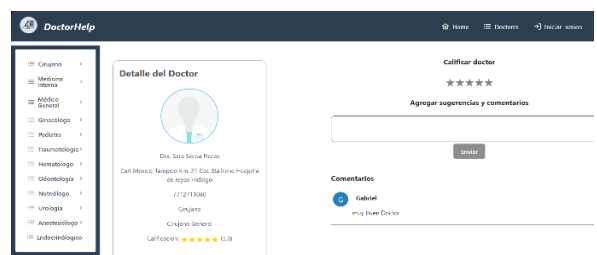


Figure 9

Final site design

Attention to detail in the design phase ensured that the website not only met functional requirements but also provided a smooth and enjoyable user experience. The well-planned architecture and carefully designed interface laid the foundation for successful development, allowing the developer to move confidently on to the next phase of the project.

3.3 Coding

In this phase, the coding of the website began. The project was created in Visual Studio Code, using TypeScript and Vite, technologies that provide a solid and efficient foundation for frontend development. For data management, a database was designed and created in MongoDB, with local testing to ensure proper functioning and optimise performance. Subsequently, a proprietary API was developed for the backend, which was responsible for managing interactions with the database and providing the services necessary for the website's functionalities.

Special attention was paid to the user interface, refining the details to provide an attractive visual experience consistent with the DoctorHelp identity. This included the careful selection of colours, fonts and graphic elements, as well as optimising the layout of the components on the page to facilitate navigation.

3.4 Testing

In this phase, exhaustive testing was carried out on the system to ensure that the DoctorHelp website offered the best possible experience to users. Various unit tests were carried out to verify that each individual component was functioning correctly. Some of the tests carried out are detailed below.

Test carried out: Verify that the 'BannerPrincipal' component is rendered correctly.

Result: Test passed.

In addition, integration tests were run to ensure that all components worked together without conflicts. Real-world usage scenarios were simulated to verify that key functionalities, such as searching for doctors, viewing profiles, and booking appointments, worked smoothly.

- Test performed: Verify that 'CarruselDoctores' loads the list of doctors and displays correctly on 'Home'.

Result: Test passed.

Performance testing was also an essential part of this phase.

The speed and responsiveness of the website was evaluated under different user loads, ensuring that it could handle traffic spikes without degrading the user experience. Additional security measures, such as data encryption and robust authentication, were implemented to protect the privacy and integrity of user data.

- Test performed: Evaluate the responsiveness of the doctor carousel under different user loads.

Result: The page maintains a fast response even with 100 simultaneous users.

In addition to technical testing, usability tests were conducted with real users to obtain direct feedback on the browsing experience and interaction with the website. These users provided valuable insights on aspects such as ease of use, interface clarity, and overall satisfaction with the system's functionality. Based on their feedback, adjustments and improvements were made to ensure that DoctorHelp was intuitive and easy to use for everyone.

3.5 Launch

This phase saw the launch of the 'DoctorHelp' website, marking the culmination of months of planning, design, development, and rigorous testing. In addition, all monitoring systems were ensured to be operational, providing real-time data on the performance and stability of the website.

4. Results

An interactive website was developed to meet the needs of users searching for information on medical specialists in Huejutla de Reyes, Hidalgo. Advanced technologies were employed to ensure that the platform was efficient, easy to use, and capable of solving the identified problems.

A detailed exploration was carried out in which theoretical research supported the need found in Huejutla de Reyes, Hidalgo. First, user needs were identified, which defined the platform's requirements. Through information gathering and user studies, a detailed report analysing user needs was obtained.

This process was crucial to ensure that the platform met user expectations, ensuring that all essential functionalities were aligned with their needs.

Subsequently, the XP methodology that would monitor the project was defined, and a clear structure was developed detailing the aspects that make up the platform and how each functionality should operate to meet the requirements of end users. This phase allowed us to structure a system that responds directly to user demands, ensuring their satisfaction and usefulness.

An intuitive and clean design was also implemented to improve the user experience and minimise the maintenance workload, resulting in an interface that facilitates navigation and allows for efficient interaction with the system.

After writing the project code in accordance with the established requirements and following best programming practices, we ensured that the system worked correctly and offered an optimal user experience. In addition, we conducted exhaustive testing of the system's functionality, performance, and usability, ensuring that the system operated smoothly and provided a positive user experience. These tests helped identify and resolve potential issues prior to launch.

Finally, the final version of the product was prepared, functional, ready and accessible to users. The results obtained confirmed that the approach used to develop the platform was effective, significantly improving access to specialised medical information.

The well-defined structure of the platform and the intuitive design provided an enhanced user experience, demonstrating that the technologies employed are suitable for this type of project.

Box 10

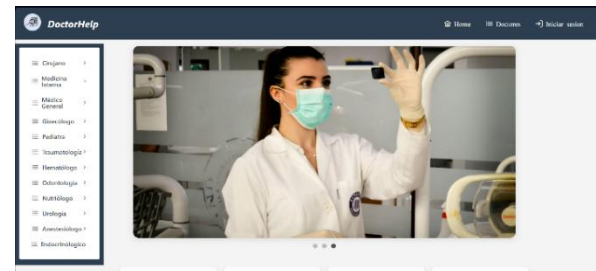


Figure 10

Final site design.

Source: Own work

5. Conclusions

The main objective of this project was to develop an interactive digital platform called DoctorHelp, designed to improve access to information about medical specialists in Huejutla de Reyes, Hidalgo. Using advanced technologies such as Vite, React, TypeScript, MongoDB, and Node.js, we were able to create a robust, scalable, and easy-to-maintain solution. These tools not only ensured that the platform was fast and secure, but also provided an optimised user experience, significantly reducing the time and effort required to find specialised medical information.

All specific objectives were met. A comprehensive analysis of user needs was carried out through information gathering and user studies, which allowed us to define clear and precise requirements for the platform. Features and functionalities were established in line with end-user expectations.

In addition, an intuitive and clean interface was designed, which significantly improved the user experience and made it easier to navigate the system. The code was implemented following best practices and extensive testing was carried out to ensure that all the system's functionalities were working correctly.

The expected impact of DoctorHelp is significant because, by centralising and constantly updating information on medical specialists, the platform will facilitate access to health services for the population of Huejutla de Reyes.

The platform is expected to reduce barriers to accessing specialised medical care, particularly in rural areas, and contribute to better local public health management.

In a second stage, the aim is to keep the platform regularly updated to ensure its continued relevance, involve users in the evaluation of new functionalities, and seek opportunities to integrate new technologies that can further improve the user experience. In addition, it is suggested that partnerships be established with local medical institutions to ensure that the information provided is always accurate and up to date, thus maximising the positive impact of the platform on the community.

During the launch, a communication campaign was carried out to inform the community of Huejutla de Reyes, Hidalgo about the availability of 'DoctorHelp'. Various channels were used, including social media, emails, and local advertisements, to ensure that the news reached as many people as possible.

The campaign emphasised the features and benefits of the website, highlighting how DoctorHelp would facilitate access to medical specialists in the region. Data was collected from doctors to make it available on the website.

The launch of DoctorHelp was a meticulous and well-planned process, designed to ensure a positive experience for users from the outset. The combination of a gradual rollout, an effective communication campaign, adequate technical support, and constant monitoring ensured that the website established itself as a reliable and valuable tool for the community of Huejutla de Reyes, Hidalgo.

Declarations

Conflict of interest

The authors who belong to the Academic Body in Information Technology [CATI] 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.

Contribution of the authors

Del Carmen Morales, Heidi: Contributed the research idea and project management, performing the role of coach and developer.

Del Carmen-Morales, Yucels Anaí: Participated in the design phase, performing the role of tracker.

Felipe-Redondo, Ana María: Participated in defining the technologies to be used and took on the role of developer.

Hernandez-Rodriguez, Yvan de Jesus: An expert server engineer working in the industry, he guided the team and took on the role of tester.

Availability of data and materials

The data, results and information collected are available for consultation upon request to the corresponding author.

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Abbreviations

XP	Extreme Programming XP
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SNS	National Health System
UNIR	Internet University
INEGI	National Institute of Statistics and Geography
CATI	Academic Body in Information Technology
CONEVAL	National Council for the Evaluation of Social Development Policy
CI	Continuous Integration
TIC	Information and Communication Technologies
UTHH	Technological University of the Huasteca Hidalguense

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