

MOBILE WEB OPTIMIZATION: THE POWER OF BOOTSTRAP IN ADAPTIVE DEVELOPMENT

MOBILE WEB OPTIMIZATION: THE POWER OF BOOTSTRAP IN ADAPTIVE DEVELOPMENT

Martínez Ramírez Violeta¹, Teresa Luciano Machorro², Susana Martínez Rabanales³,
Efrén Armando Osorio Ramírez⁴, José Javier Reyes Ramos⁵

<https://doi.org/10.61117/ipsumtec.v7i2.337>

¹Doctorate in Education. Tecnológico Nacional de México, Campus Instituto Tecnológico de Puebla. Department of Systems and Computing. Address violeta.martinez@puebla.tecnm.mx, Av. Tecnológico 420 Col. Maravillas, C.P. 72220. Puebla, Puebla, México. <https://orcid.org/0000-0003-1518-786X>

²Master's Degree in Engineering. Tecnológico Nacional de México, Campus Instituto Tecnológico de Puebla. Address. teresa.luciano@puebla.tecnm.mx Av. Tecnológico 420 Col. Maravillas, C.P. 72220 Puebla, Puebla, México. <https://orcid.org/0000-0003-3979-9369>

³Master's Degree in University Teaching. Tecnológico Nacional de México, Campus Instituto Tecnológico de Puebla. Department of Systems and Computing. Address susana.martinez@puebla.tecnm.mx, Av. Tecnológico 420 Col. Maravillas, C.P. 72220. Puebla, Puebla, México. <https://orcid.org/0009-0002-8510-5380>

⁴Doctorate in Science in Business Planning and Regional Development. Tecnológico Nacional de México, Campus Instituto Tecnológico de Puebla. efren.osorio@puebla.tecnm.mx Av. Tecnológico 420 Col. Maravillas, C.P. 72220, Puebla, Puebla, México. <https://orcid.org/0000-0002-6902-1841>

⁵ 9th semester student of the Information and Communications Technology Engineering program. Tecnológico Nacional México, Campus Instituto Tecnológico de Puebla. Address. i19221867.19@puebla.tecnm.mx Av. Tecnológico 420 Col. Maravillas, C.P. 72220 Puebla, Puebla, Mexico. <https://orcid.org/0009-0004-5250-6553>

Abstract - Web development is not understood today without a harmonized visual appearance considering that it significantly increases user experiences in Internet browsing and their permanence in sites designed expofeso. According to Eleven Comunicaciones.com the user experiences on the internet or better known as UX, among other benefits, is to generate long and recurring conversations, returns benefit to the brand of the business of interest, provides ease of navigation and painless search for services or products offered by the site. Consequently, this project shows the importance of the Bootstrap library within the web design for the FrontEnd of the site of the business aimed at accounting and financial services in the region. This involves highlighting its importance when viewed from the mobile with the same quality automatically creating a visual response as on PC or responsive site.

Keywords: mobile, responsive site, UX, web.

Abstract -- Web development will not be understood today without a harmonized visual appearance considering that it significantly increases user experiences when browsing the Internet and their permanence on purpose-designed sites. According to Eleven Comunicaciones.com, user experiences on the Internet or better known as UX, among other benefits, is to generate long and recurring conversations, returns benefit to the brand of the business of interest, provides ease of navigation and painless searching of the services or products offered by the site. Consequently, this project

shows the importance of the Bootstrap library within the web design for the FrontEnd of the business site aimed at accounting and financial services in the region. This implies highlighting its importance when viewed from a mobile phone with the same quality, automatically creating a visual response just like on a PC or responsive site.

Key words - mobile, responsive site, UX, web.

INTRODUCTION

According to Hostgator, the importance of a website and its adaptability to cell phones offers many people to solve practically everything on the Smartphone from shopping, ordering cabs on platforms, children's school routines, scheduling services of various types, "Almost 9 out of 10 Smartphone owners are willing to buy again from a company that provided them with a relevant mobile experience", a responsive website for mobile and tablets is a must [1].

For Telcel, its portal highlights the user experience on the web "must meet the customer's needs exactly, without problems or inconveniences", with the aim of placing the brand in the consciousness of Internet users. In addition, it is important to know the user's level of satisfaction at the end of their visit the site [2].

OBS Business School, defines "user experience (UX) refers to the way a person feels when interacting with a product, service or digital platform" and its importance in retaining and catering to the

customers, improve conversation, increase user satisfaction, reduce support costs [3].

State of the Art

The academic work published in Havana Cuba highlights that UX is taking greater importance worldwide and organizations are concerned about the emotions, perceptions and responses that users will have when interacting with their products and services on the web and the importance of software design is to keep in mind the evaluation of it [4], the measurements in this work project its permanent incremental importance.

In Colombia is published the computational work focused on understanding and satisfying the needs of users and knowing with certainty what they want and the context in which the product will be used, thereby ensuring that the objectives are clear and in this order of ideas that the product works to be placed effectively, designed in HTML and CSS [5] There are studies related to the importance of web design, such as the one published in Costa Rica assert that 88% of consumers are not willing to return to a website where they had a bad experience and consequently create a bad perception of the company in general, after . They state that users judge the credibility of a website by 75% based on its aesthetics [6]. Talking about responsive sites and their importance nowadays, the project developed at the University of Havana was updated from a design based on the Model-View-Controller pattern; to a new design to solve the problem of visibility in different types of mobile devices, allowing to increase the positioning of the site in search engines and creates the basis to incorporate new services such as e-commerce [7] to meet current trends on the web.

In this sense, Adaptive Web Design as it is also known is a solution to the presentation of the site in any portable medium. Also widely used for e-commerce, the most used open source tools (OSS) are PHP, JQuery, Bootstrap, JavaScript, HTML5 for web creations by the Technical University of Machala in Ecuador [8].

Problem

One of the main problems is the company's lack of visibility, which suggests an urgent need to increase the work unit's presence in the market. Insufficient advertising and lack of information on the services offered, as well as the technical support provided to clients, contribute to this lack of visibility.

Efficient technical support management has become essential for customer satisfaction and operational success today. However, the lack of an adequate technology infrastructure can generate

significant challenges in this process, directly affecting the quality of the service provided.

In this context, the main challenge we face is the absence of a web-based information system that effectively directs technical support requests to the business unit. The design and implementation of a web-based technical support system is a crucial solution to overcome these limitations. This system will not only improve the visibility of the business unit by providing detailed information about its services, but will also optimize the management of technical support,

contributing to operational efficiency and, ultimately, strengthening the company's competitive position in the market.

Justification

, websites have undergone a significant evolution.

evolution, driven by technological advances and changes in user preferences. The predominant trend is the search for more interactive, faster and personalized experiences. Direct integration with the accounting and financial services business unit seeks to response times and support quality by establishing a direct connection between users and specialized technical services.

By implementing the website, customers will not only have access to detailed information about the products and services offered, but will also benefit from a more efficient and direct technical support experience. Digitization and digital transformation have underlined the importance of having an up-to-date online presence, enhancing the two-way communication of web-based customers and the business unit.

Most websites have forms that will make it easy for consumers to ask questions at any time, which will improve accessibility and interaction. This proactive approach to customer communication will strengthen trust and user satisfaction.

Some important benefits that the business unit will get when it has the website set up are the following:

- 24-hour access.
- More updated and detailed information on certain software they offer for companies or businesses.
- Direct communication with the web client allowing them to make inquiries or request assistance in an efficient manner.

General Objective:

To develop a customer-centric web-based support platform that connects in an efficient and personalized way with the technical services of the business unit of interest in the accounting services sector.

Specific Objectives:

The specific objectives are as follows:

- Specify web software requirements
- Sketch a website user interface that effectively adapts to various screen dimensions and is readable to users.
- Design Front-End of the web application with CSS based on Bootstrap.
- Perform Back-End and flexibility of the web platform with PHP.
- Check the performance and functionality of the web system towards the web user.

Scope

Web Site Development:

In a period of no more than 6 months include advertising that includes the use of pop-up windows, artificial intelligence to know specific user trends.

Increase in the financial profit of the company up to 10% from better positioning of the users' taste in the services offered by the business through the website verifiable from the next year onwards.

Integration with the business in all its administrative and financial processes under high quality cybersecurity standards in a period of no more than 2 years.

Limitations

Addressed to:

Company leaders who will benefit improved business efficiency and customer satisfaction.

Business unit customers who use the software and who may require technical assistance.

Direct technical support personnel will experience greater efficiency thanks to the website

DEVELOPMENT

For the development of the web system, Bootstrap was adopted as the main Framework, due to its ability to create responsive interfaces that adapt to different devices, especially mobile devices. The importance of a responsive website lies in the improvement of the experience, since it allows the content to be displayed correctly on screens of different sizes, such as smartphones, tablets and desktop computers, without the need to create separate versions of the site.

This Framework offers key advantages in web development, one of the most important is that it has a complete documentation, which facilitates to solve doubts quickly and optimize the development process. It also greatly facilitates the design of interfaces and also includes by default a highly optimized template.

Expandability is crucial in today's web development because it ensures that users can interact with site content optimally no matter what device they are using. This not only improves navigability, but also increases accessibility, resulting in greater user satisfaction and, potentially, higher traffic and conversions.

The design process was based on the following phases:

1. Definition of Requirements

In this phase, continuous communication was maintained with the client to identify in detail their needs. The main objective was to create a professional, visually appealing and fully **responsive** website that would adjust to different devices. The requirements included contact forms to facilitate communication with users, integration with social networks to increase the company's digital presence, and the implementation of a customer database, which would allow the registration and tracking of users visiting the site. In addition, the need for a modern design that would reflect the company's visual identity and an intuitive navigation system to improve the user experience was established.

2. Preliminary Design

Initial sketches were developed to get a clear vision of how the main pages of the site would be structured. Preliminary design included the creation of key pages, such as the **home**, **product** and **contact** pages, all of which were designed with engaging visual **animations** to capture users' attention. Special attention was paid to **optimizing for mobile devices**, ensuring that elements such as the navigation menu were easy to use and adaptable to different screen sizes. Modern design techniques were used with an emphasis on usability and user experience (UX), focusing simplicity and efficiency when navigating the site.

3. Coding

The functionalities were implemented using HTML, CSS and Bootstrap, the latter being fundamental to guarantee the adaptability of the design to mobile devices and desktop screens. Special attention was dedicated to the creation of the navigation menu using the <nav> tag, ensuring that it was easy to use and responsive, adjusting perfectly to different resolutions. In addition, other Bootstrap components, such as grids and cards, were integrated to improve the structure and presentation of the content.

Animations and visual effects were also incorporated using CSS to enrich the user experience.

4. Testing and Adjustments

Extensive testing was carried out on different devices and browsers to ensure that the website would function correctly and display properly on any platform. During this phase, we verified the correct adaptation of all **responsive** elements and made adjustments to the code to solve possible inconsistencies or errors. Usability tests were also implemented to ensure that the site was intuitive and offered a smooth user experience.

In short, the implementation of these steps has not only ensured an efficient development aligned with the client's requirements, but has also allowed us to create a website that provides a satisfactory experience for users. The use of Bootstrap has been a wise choice, facilitating responsive and adaptive design, which is essential in a digital environment where accessibility and usability are paramount.

HTML code structure

The essential in this section of the structure is to start with the development of the menu for the web user and know the content of the site.

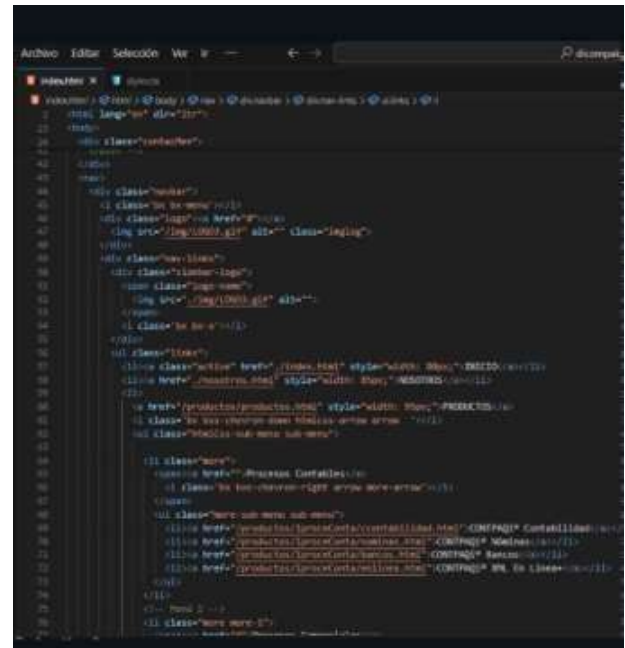
In this process, Bootstrap with HTML is used to create the menu, here is how it is coded See image 1:



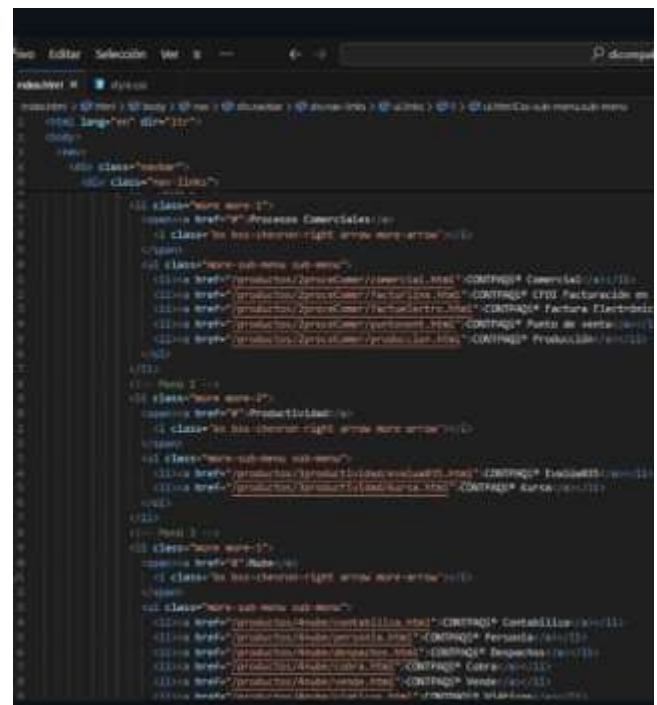
Image 1. Bootstrap library link.
Source. Own elaboration.

Menu development with nav tag.

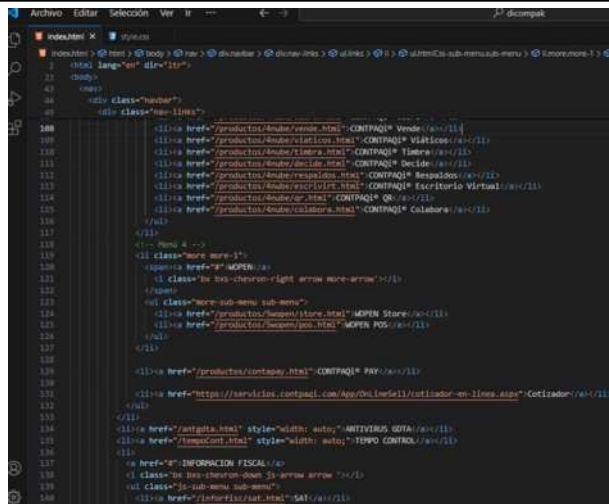
Next, we develop the navigation menu using the `<nav>` tag, we must take into account that we have already put the Bootstrap link. This menu will contain several options that will facilitate the user's navigation through the site. See image 2, 3 and 4.



Code for menu part 1.
Source. Own elaboration.



Code for 287enu part 2.
Source. Own elaboration.



Code for menu part 3.
Source. Own elaboration.

What is most interesting is how Bootstrap makes it easy to modify styles directly within tags. Bootstrap provides predefined classes that we can apply to quickly change the appearance of our elements. An example of the code I provide is the class "navbar-dark" and as CSS is that we can change the text color as is "bg-dark", so is developing the scheme until the CSS is used to customize the menu already more striking naming classes, these tags are coded as follows, see image 5:

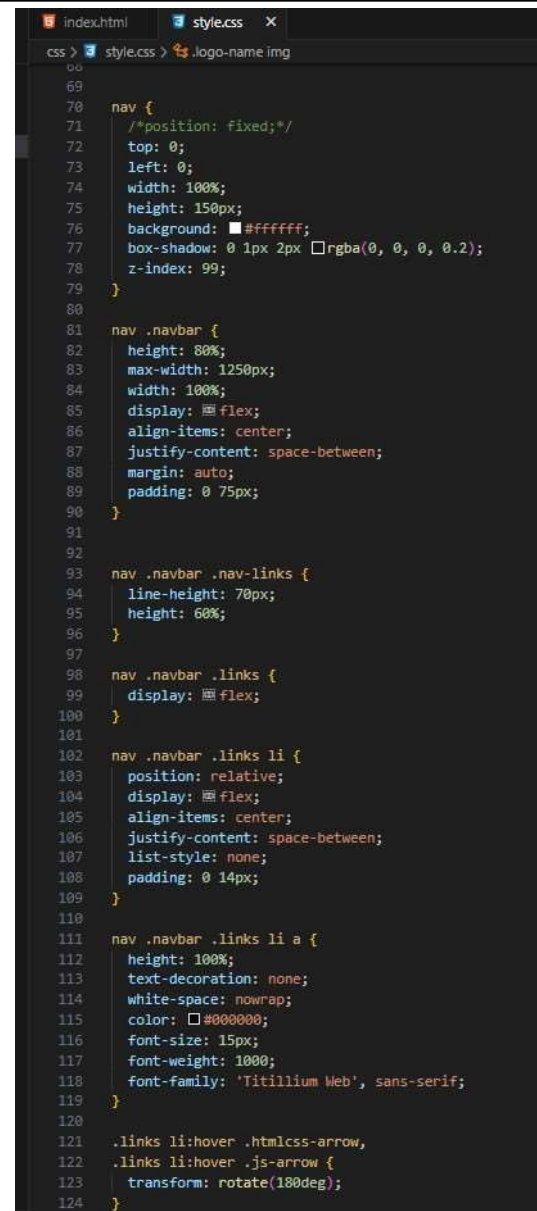


Image 5. CSS styles for menu.
Source. Own elaboration.

Here we can see the name assigned to each label when we put `class = "class-name"`, I find it fascinating the style given to the menu, let me show you how the results are displayed on the computer and on mobile. See image 6.



Image 6. Default design on PC and cell phones.
Source. Own elaboration.

It should be noted that Bootstrap makes the design adaptable as shown in the image, of course it is also customized with CSS, an example of how this part is shown:

The following image customizes the size of the mobile devices and then we start to accommodate the elements that go according to these devices, see image 7:



Image 7. CSS styles of media query.
Source. Own elaboration.

This is how to work with the Bootstrap Framework. We continue with the other contents using it. It is useful to clarify some parts of this section of the menu, because from there, many other components are already responsive thanks to this Framework.

User testing and settings.

At this stage, the interaction with the customer takes place, once the verifications and adjustments are completed, testing with the end user begins.

The interaction with one of the company's web users was created and access to the site was requested. Subsequently the contact form was required, to know if the data was stored correctly. And finally it successful. Let's see the following image 8.



Image 8. Form.
Source. Own elaboration.

In PLESK we select the *Databases* option and we see the data that was stored correctly.

Once the development and testing of the web system is complete, the next step is to upload the site to a Plesk server for production mounting. This procedure involves transferring the website files to the server and configuring the environment to make the site accessible online.

Inside this folder drag and drop the files, analyze the files and you are ready to see the website live. See image 9.



Image 9. Website published.
Source. Own elaboration.

It is also necessary to configure the database and adjust the server configuration according to the site's needs.

Once the web site is online, it is important to perform additional tests to ensure that everything works correctly in the production environment. This includes verifying that the pages load properly, that the forms work

correctly and that the database is updated correctly. Another of the client's requirements was about the company's information, including colors, animations, images etc. See image 10, 11 and 12.



Image 10. Animation of logo and custom name.
Source. Own elaboration.



Image 11. Relevant business organization information.
Source. Own elaboration.



Image 12. Footer on more information.
Source. Own elaboration.

In addition, the web user has the possibility to interact with the technical support via WhatsApp chat. See image 13.

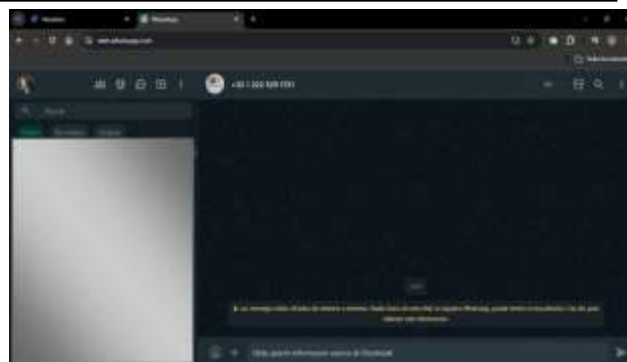


Image 13. Client clicks on the WhatsApp button. There is interaction with technical support.
Source. Own elaboration.

This is how the product section is structured, often using this template provided by Bootstrap. See image 14



Image 14. Cost section and more information about the product.
Source. Own elaboration.

DISCUSSION AND ANALYSIS OF RESULTS

Analysis of results

They highlight the importance of an effective website for the business organization, showing that high ratings in ease of use, compliance with requirements and improved communication provide a positive user experience and generate a favorable impression on potential prospects. In addition, the positive perception on navigation and impact on sales support the importance of good in attracting more traffic and sales. These findings underscore the critical relevance of maintaining a well-designed and functional website for business success in today's digital environment.

In summary, this work has identified several advantages and benefits for the company. Among them, we highlight the improvement in online presence, which has allowed the company to more potential customers, including more distinguished customers and expand its sales reach.

In addition, the optimization of internal processes through the use of technologies such as Plesk has generated greater efficiency and speed in the company's daily operations, thus improving its competitiveness in the market. As for the impact of the project, there has been a notable efficiency in response times and customer service, thanks to the contact forms and WhatsApp chat, which has generated greater customer satisfaction and an improvement in the service offered by the company.

Satisfaction survey to obtain feedback on the project and ensure that all customer expectations have been met.

1. How do you rate the user-friendliness of your website?



Ease of use. Source. Own elaboration.

Analysis: 100% of respondents rated the usability of the website as excellent. This indicates that the site's design and navigation are intuitive and easy for users to understand.

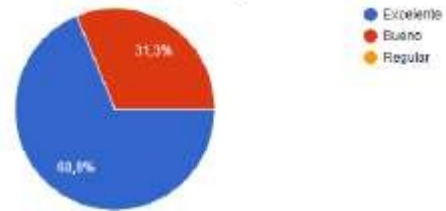
2. Does the web application satisfactorily cover the requirements?



Graph 2. Web requirements.
Source. Own elaboration.

Analysis: In terms of compliance with the client's requests, 100% of the respondents considered that the web application meets their requirements satisfactorily. This response confirms that the website has been designed taking into account the needs and expectations of the users, which contributes to its usefulness and effectiveness.

3. Did the website help you increase your sales?

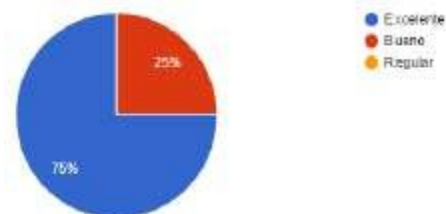


Graph 3. Sales increase. Source:
Own elaboration. Own elaboration.

Analysis: 68.8% of respondents indicated that the website helped them increase their sales, while 31.3% rated it as good. This is evidence that the website has had

a positive impact on the business unit's sales, although it also indicates that there is room for improvement to further increase sales through the website.

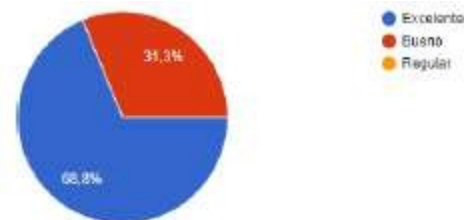
4. What kind of feedback have you gotten from your customers about the site?



Graph 4. Customer comments.
Source. Own elaboration.

Analysis: 75% of the respondents have obtained excellent comments about the site, while 25% rated it as good. These positive comments are an indicator that customers value the quality and usefulness of the website's content, as well as its design and functionalities.

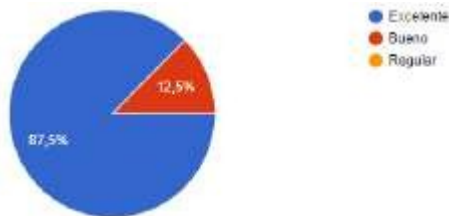
5. Has the navigation of the website increased customer satisfaction?



Graph 5. Satisfied customers.
Source. Own elaboration.

Analysis: 68.8% of the survey participants considered that the website navigation has increased customer satisfaction, 31.3% rated it as good. This highlights that the navigation structure of the website is effective in guiding users to the information they are looking for, which contributes to a better user experience.

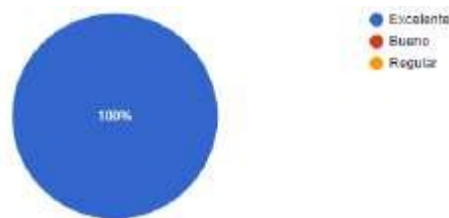
6. Did the web system improve communication between the customer and you as a company?



Communication between customers and the company.
Source. Own elaboration.

Analysis: 87.5% of respondents indicated that the web system has improved communication between the client and the company, while 12.5% rated it as good. This high rating on improved communication suggests that the website has facilitated contact and interaction between customers and the company, which contributes to better customer service.

7. Do the security features of your site meet your needs?



Graph 7. Website security.
Source. Own elaboration.

Analysis: 100% of the respondents considered that the security features of the site meet their needs. This response confirms that users perceive that the website offers a secure environment for conducting transactions and sharing personal information, which generates trust in the website.

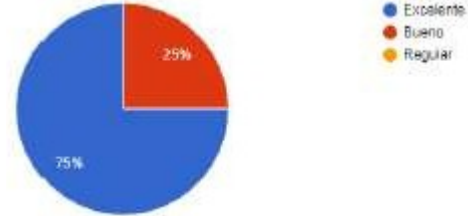
8. How do you evaluate the contribution and development of my work?



Evaluation of my work development.
Source. Own elaboration.

Analysis: 100% of the respondents evaluated the contribution and development of my work as excellent. This high rating is a recognition of the effort and dedication I have invested in the project, as well as the quality of the work performed.

9. Did you find the interaction between the two to be complete and satisfactory?



Graph 9. Customer interaction.
Source. Own elaboration.

Analysis: 75% of the respondents considered that the interaction between the two was complete and satisfactory, while 25% rated it as good. This response shows that users value positively the communication and service provided through the website, which contributes to a better relationship with the company.

10. you collaborate with a general commentary, regarding the site, clients and personal development.



Graph 10. General comments. Source.
Own elaboration.

Discussion

For the technology company, Itequia The future of responsive design defines "New Responsive" as the fundamental evolution in the way in which responsive design is conceived and applied, the components have built-in intelligence that allows them to adjust according to the context of the user as well as the device where it is displayed.

It is to adapt not only to the device, but also to the user, to the interface in real time under the parameters of color, available space, light and dark modes, transitions and animations, etc, [9].

Wellaggio web Agency, specifies how the rise of responsive web design has gone hand in hand with the expansion of the mobile web since 2015 which grew its use and continuously improved thanks to tools that are easily accessible to designers, among them The Bootstrap[10].

The priority in 2024 for the SINAPSIS agency, is to create websites that are not only viewable on different devices, but that offer a seamless and consistent user experience [11].

CONCLUSIONS

As is known, Information and Communication Technologies (ICT) play a significant role in web development. In this project, we have been able to design the website for Dicompak, using various technologies and tools such as HTML, CSS, JavaScript, PHP, Bootstrap and Plesk.

Throughout the process, I have appreciated the importance of planning and organization in web development, as well as the need to adapt to the changes and requirements of the project. I have explored and applied concepts such as responsive design and the integration of security features such as SSL/TLS certificates, essential to ensure the usability, accessibility and security of the website.

As for Plesk, its use as a control panel for server and web site management has been easy and efficient, and its advantages in terms of ease of use, centralized management and advanced security have been appreciated.

Recommendations. It is possible to get regular updates of the website in terms of content, design and functionalities, adapting it to the changing needs of the company and customers. Although the business unit already has a presence in social networks, it is essential to implement digital marketing strategies such as SEO to increase the impact and visibility of the website and attract more traffic and potential customers.

As a next stage, the medium-term work is to cover the design needs that Bootstrap itself is adding every year, the agility that web browsers present in downloads goes hand in hand with improved HTML and CSS, "Less load, faster" as one of the most demanded Bootstrap's Framework is renewed driving web development, i.e. permanent update of the FrontEnd. "The future of web development is exciting, with innovations such as CSS Houdini, Progressive Web Apps (PWA)," [12]. , integrating benefits of the Tether library, to eliminate general scrolling problems, defining standard features to emerging elements that at the moment are not included [13].

Including Reverse Design to attract more web surfers to your website, integrating augmented reality (AR), virtual reality (VR) and Artificial Intelligence (AI) technologies into your marketing campaigns and digital platforms will transform the way you market your products and services.

in which the company interacts with its audiences, a positioning that is greater than that of its closest competitors [14].

Implementing data analysis on frequency, site permanence, to predict and stabilize a positive increase in sales will allow the business unit to constantly reinvent itself [15].

Finally, for a better UX experience, in addition to including voice user interfaces (VUI), the experience will be total if you add an inclusive design where all user senses are interactively considered, hearing and voice. In addition, internet of things (IoT), where all devices are integrated with which they communicate seamlessly [16].

BIBLIOGRAPHY .

- [1] HostGator (2023) What is a responsive website and how does mobile adaptability work? Available at <https://www.hostgator.mx/blog/sitio-web-responsive/>
- [2] Telcel (2024) What is the importance of a good UX for your your company? Available at <https://www.telcel.com/empresas/tendencias/notas/importancia-de-ux-en-empresa#:~:text=The%20experience%20of%20the%20user%20o,sus%20servicios%20y%20sus%20productos.>
- [3] OBS Busines School (2023) User Experience: What it is and why it is so important. Available in <https://www.obsbusiness.school/blog/experiencia-de-user-what-is-and-why-it-is-so-important>
- [4] Barroso Benítez, Y., Trujillo Casañola, Y., & Millet Lombida, Y. (2021). User experience evaluation framework in software development. Cuban Journal of Computer Science, 15(3), 92-117.... Available at <http://scielo.sld.cu/pdf/rcci/v15n3/2227-1899-rcci-15-03-92.pdf>
- [5] Pedraza-Gutiérrez, S. I., Romero-González, J. F., Güiza-Rodríguez, J. C., Giraldo-Henao, E. W. (2022). User-centered design and user experience in the access control system of the Universidad Libre. Available at <https://revistas.unsm.edu.pe/index.php/rcsi/article/view/426/832>
- [6] Alfaro Vargas, I. D. (2021). Integration of good practices of user experience and information in software development. Available at <https://repositorio.ulacit.ac.cr/bitstream/handle/20.500.14230/10585/REF-1640150048-1.pdf?sequence=1>
- [7] Riccardi Sabatier, Y., Vega Almeida, R. L., & Miyares Díaz, E. (2018). Application of Responsive Web Design in the creation and implementation of Placental Histotherapy Center website. Cuban Journal of Medical Informatics, 10(1), 16-27. Available at http://scielo.sld.cu/scielo.php?pid=S1684-18592018000100003&script=sci_arttext&tlng=pt
- [8] Martínez, E. L., & Ceballos, C. S. (2013). Adaptive or responsive web design. Available at <file:///C:/Users/Violeta%20Martinez/Documents/INVESTIGACION/ARTICULOS%20PUBLICADOS/Paper%20>

[02024/IPSUMTEC/Art%20Javi/bibliografia/Dialnet-EnsenanzaEnAplicarResponsiveWebEnLaImplementacionD-9152566.pdf](https://doi.org/10.24018/IPSUMTEC/Art%20Javi/bibliografia/Dialnet-EnsenanzaEnAplicarResponsiveWebEnLaImplementacionD-9152566.pdf)

[9] Itequia (2023) The future of responsive design. Available at <https://itequia.com/es/el-futuro-del-diseno-responsive/>

[10] Wellaggio (2024). The-future-of-web-design-responsive. Available at <https://wellaggio.com/el-futuro-del-diseno-web-responsive/>

[11] SINAPIS (2024). Responsive web design 2024: beyond from the adaptability. Available at <https://blog.sinapsis.agency/diseno-web-responsive-2024-beyond-adaptability/>

[12] Impulse_060 (2024). HTML5 and CSS3 in 2025: Everything You Need to Know Not to Fall Behind. Available at <https://impulso06.com/html5-y-css3-en-2025-everything-you-need-to-know-to-don't-get-behind/>

[13] carmatec (2018). Bootstrap 4: cool and smart new features you'll be excited about. Available at https://www.carmatec.com/es_mx/desarrollo-php/bootstrap-4-new-intelligent-features-e-interesting-enthusiast/

[14] tuatara (2024). Design trends for 2025: everything that is that you should know. Available at <https://tuatara.co/blog/diseno/tendencias-de-diseno-2025/>

[15] Editverse (2024). Bootstrapping in statistical analysis: resampling methods for 2024-2025 Available from <https://editverse.com/es/bootstrapping-in-statistical-analysis-resampling-methods-for-2024-2025/>

[16] IEM digital Business Schoole (2024). Anticipating the future of UI/UX design: Trends for 2025. Available at <https://iembs.com/read-think/anticipando-el-futuro-del-diseno-ui-ux/>

Editorial staff	Original draft - Violeta Martínez Ramírez
Editorial staff	Proofreading and editing - Violeta Martínez Ramírez



This work is
licensed under an
international license
Creative Commons Attribution 4.0.

CONTRIBUTION ROLES

Role	Author(s)
Conceptualization	José Javier Reyes Ramos
Data Curation	José Javier Reyes Ramos
Methodology	Susana Martínez Rabanales
Project management	Susana Martínez Rabanales
Resources	Proofreading and editing - Violeta Martínez Ramírez
Software	José Javier Reyes Ramos
Supervision	Efren Armando Osorio Ramirez
Validation	José Javier Reyes Ramos
Visualization	Teresa Luciano Machorro