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UX AND UI: METHODOLOGICAL ANALYSIS OF APPLICATION AND ITS PRINCIPLES.

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RESUMEN

The application of new technologies brings transcendental changes in e-commerce and communications, the lack of a methodological study and its application based on the principles of design according to the user experience and interface, obtaining few attractive and functional resources; therefore the objective of this study was to analyze the use of a UX/UI methodology in the e-commerce website of Almacenes Juan Eljuri. The research approach is documentary that helped the review of the state of the art, quali-quantitative in the stage of compliance analysis according to parameters of interaction, usability and functionality. The methodology created by Rodrigo Ronda León was used, which consists of four stages: research, organization, design and testing; which allowed the design of the analysis sheets applied to the home page, commercial line and shopping cart of the e-commerce site www.eljuri.store in the parameters of evaluation, usability and functionality, the heuristic evaluation sheets, of compliance with the UX / UI methodology, in turn the comparison was made with the design team of the Warehouse who designed the website. The aspects that were analyzed to demonstrate that there is a relationship between following a methodological process for the creation of a website containing UX/UI design elements and its impact reflected in the levels of functionality were: the comparison between the methodology used by the design team of Almacenes Juan Eljuri when creating the website and the methodology according to Rodrigo Ronda León, adding the heuristic principles of Jakob Nielsen to analyze both the website and the user, the same that allowed the evidence of 70% compliance with the parameters of analysis. Finally, it is concluded that the elements that constitute the UX/UI design work as a solid structure for the generation of engagement or user attraction, thus positioning the website in search engines as an SEO outreach strategy and the need for a methodology based on these principles.

Keywords: UX Design, UI Design, Methodology, Graphic Design, E-commerce, interaction, usability, heuristic principles.

I. INTRODUCTION

The term UX/UI was introduced in the 2000s and has recently evolved within the Internet era. The Web 1.0 era appeared in the 1960s where the World Wild Web (www) was introduced as a typical example of providing static one-sided information, i.e., browsers were text-only. The next era, Web 2.0, appeared in 2001, where information could be shared on platforms based on the participation created by individuals, bringing with it the appearance of user groups, social networks, blogs and wikis, among others, all of them encouraging collaboration between users, so that in this era the user can now not only access information, but also participate in its creation. Web 3.0 emerged in 2006 as an "intelligent" era because it can relate the semantics of the information to relate it and allow its search in an effective and efficient way. It opens communication between browsers and new intelligent devices, where content and knowledge are related to each other; this is how Web 4.0 begins, this era is defined by artificial intelligence that appears as the main technology for the connection of platforms and their interaction, in this era importance is given to the needs of users and an easy and effective way of communication between device and user.La experiencia de usuario no se trata de un buen diseño industrial, multitáctil, o de elegantes interfaces sino acerca de trascender el material, es crear una experiencia a través de un dispositivo. (Marc Hassenzahl, 2013)

The experience design can be basically defined as the interaction of the user with the website and each element that composes it such as; diagrams, visual design, text, branding, sounds and interface. The basis for achieving a satisfactory user experience is to meet all the user's needs without disturbing him, once the basis is established, an elegant and simple site must be created that generates satisfaction when the user uses the site. It is important to distinguish user experience from usability and user interface (Nngroup, n.d.).

The information architecture is the pillar of the interface, although it is known that within the UX/UI design the term interface is directly related to the application or website in which the user interacts, it is important to prioritize the information architecture as the basis for the construction of the structure which will provide organization to the interface, that is, the first step to follow is to develop a logical path that the user will follow to interact on the website.

IA (Information Architecture) is defined as the art and science of organizing information spaces in order to help users satisfy their information needs. The activity of organizing involves structuring, classifying and labeling the contents of the website (Toub; 2000).

In general terms, interaction design refers to the process of generating and evaluating products, systems or devices that fulfill the purpose for which they were designed, and that support the activities that people perform in their work and daily lives (Rogers, Sharp and Peerce 2002).

Usability can be understood as the consequence or result of using a tool, in this case a platform, that is, how easy the website was for the user to use, however, for the term usability to exist, other related terms such as accessibility must be taken into account, which together form the quality of usability. (Hassan 2006).

According to Ronda (2013) the methodology is based on the four stages of software design mentioned above and respond to four basic elements which are: Research, Organization, Design

and Testing, allowing the analysis in relation to the project, users, context, content and process to represent them in each according to scientific - technical criteria, reviewing the structure, product performance and screens and at the end evaluate the prototypes with their respective navigability diagrams.

The principles are precepts that will regulate the user interface (UI) design process, these have expression in each of the stages and tasks through which it passes as part of the software development. They are subject to the characteristics of the process itself and its direct interaction in the product life cycle. Therefore, they are closely related to the macro-process from which the project designed for its development derives, the characteristics of the software product as a result and the personnel involved, among which are reliability, usability, accessibility, consistency, interactivity and adaptability.

Functionality is one of the most important principles within web design since it raises the reason for action of the page, i.e. what will be the type of user, thus the website is oriented to meet a previously assessed need and as a result the user enjoys a functional website. In this part the information architecture intervenes, which is fundamental to increase the user experience.

Interactive components refer to non-static elements within a website, their design is based on sounds, animations and any other action that allows the user to interact directly with an image, text, etc. Within the web design interactive components are made with a sense of personalization for the user and a visual appeal to customers of the site, this motivates visitors to interact, as a result increases engagement and traffic to the page, this will help generate a significant increase in sales.

E-commerce "refers to financial and information transactions conducted electronically between an organization and any third party with whom it has dealings." (Chaffey and Ellis-Chadwick 2014, p. 20).

Within e-commerce there are different types; depending on the nature of the business, its transactions and revenues, the most commonly used are: Business to business (B2B): this commercial profile refers to the fact that the target audience is a company, i.e. business to business, for example, stores that sell raw materials. Business to customer (B2C): these e-commerce are aimed at the end consumer, this profile is the most common, for example, online fashion stores. Costumer to costumer (C2C): this profile deals with consumers who sell products directly to other consumers, this has expanded in recent years with the buying and selling.

The main similarity between UX and UI Design is that they interact directly or are the means of communication that exists between them, the individual or user seeks or operates some specific task and the interface matrix provides a response depending on the need of the individual.

According to (Cuesta 2020). For a website to be considered optimal, both in design and functionality, it is essential that the user knows how to move through it and do it intuitively and quickly. In this case, the idea was to combine this with some elements that would surprise the user and make navigation a memorable experience. With this in mind, on the main page, we created a horizontal scroll that presents the fanzines as a gallery. That resembles galleries and museums in the real world.

To make the website more dynamic, we used a hamburger menu that appears from left to right showing the different pages. Once on these, a classic vertical scroll is already visible, which, however, in some parts is combined with screen splits.

II. METHODOLOGY

In the development of the research a mixed approach was used; qualitative in the collection of data, applying two instruments: the observation sheet with which the parameters that the e-commerce website of Almacenes Eljuri complies with were verified based on the 10 heuristic principles of Jacob Nielsen and the methodologies of Rodrigo Ronda León and Luján, applied to the home pages, commercial line category and shopping cart.

The interview instrument was applied to Boris Cabrera, systems analyst of the Software Development and Innovation area of the Systems Management of Almacenes Juan Eljuri, and later to William Ortiz, graphic designer of the Marketing Management of Almacenes Juan Eljuri, in order to learn about the process of creating the website and the usability principles applied according to the methodology of Lujan and Rodrigo Ronda León.

The inductive method was used in the systematic analysis of each of the usability, functionality and interaction parameters of the study pages according to the methodologies based on the UX/UI principles that allowed synthesizing the information in cards that were later used for the validation of the hypothesis raised in the study.

The study population was the Eljuri group that has presence in 18 cities nationwide in Ecuador with its different lines of business, among these: appliances, hardware, liquor, perfumes, cosmetics, bazaar, home, toys and even restaurants. The sample and to whom the research instruments were directed; is made up of two employees corresponding to the systems department of Almacenes Juan Eljuri: Boris Cabrera, systems analyst of the area of Development and Innovation of software of the Systems Management of Almacenes Juan Eljuri and William Ortiz, graphic designer of the Marketing Management of Almacenes Juan Eljuri.

As a background, it is stated that in 2020 the e-commerce website is created with domain www.eljuri.store that directs the sale of its products to the entire Ecuadorian population providing payment facilities and direct credit, with delivery throughout Ecuador. The e-commerce website is directed from young-adults and older adults who are economically active or have economic solvency, managing generations X, Y, Z and Boomers (older adults) who are in age ranges from 18 to 67 years.

III. RESULTS

The data collection was carried out with the objective of knowing if the website www.eljuri.store of the company Almacenes Juan Eljuri was created with a methodology based on UX/UI design to check successes or failures within the website. The UX methodology according to Rodrigo Ronda León was used to analyze the process of creating a website because it alludes to the 10 heuristic principles of Jakob Nielsen as a guide for the evaluation of usability and functionality.

The interviews to the systems analyst and the graphic designer of the company showed results based on the usability principles used for the design of the web site, as a result, the use of a methodology for the creation of a web site using UX/UI design by the design team of Almacenes

Juan Eljuri was verified in comparison with the methodology proposed by Ronda, which is used in this research as a basis for the elaboration of analysis sheets.

Subsequently, we show the results of the application of an observation sheet evaluating the 10 heuristic principles of Nielsen using the criteria of Yusef Hassan Montero and Francisco Martín Fernández for the 22 items of the heuristic evaluation table, the 2 interviews conducted with the main people in charge of creating the website and a comparative table of the UX methodology according to Ronda and the methodology according to Luján, which was used by the graphic design team of Almacenes Juan Eljuri.

INTERVIEW RESULTS			
Compare the methodology used in the creation of the website www.eljuri.store with the UX/UI methodology according to Rodrigo Ronda León.	**Not applicable**	**YES**	**NO**
METHODOLOGY			
A UX methodology was used for the creation of the website.		X	
UX METHODOLOGY			
The 4 stages of the UX methodology according to Rodrigo Ronda León			
RESEARCH			
2. There is an investigation stage		X	
3. A SWOT analysis was performed			X
4. A content study was conducted			X
ORGANIZATION			
5. There is an organizational stage		X	
6. Themes and content were prioritized		X	
7. The needs of the sender and receivers were taken into account		X	
DESIGN			
8. There is a design stage		X	
9. Presentation diagrams were made (wireframes)		X	
10. The services and functionalities of the products were defined.		X	
TEST			
11. There is a test stage		X	
12. A prototype was made		X	
13. Tests were carried out with customers/users			X
UI METHODOLOGY			
UI DESIGN PRINCIPLES			
1. Reliability		X	
2. Usability		X	
3. Accessibility		X	
4. Functionality		X	

5. Interactivity		X	
6. Adaptability	X		
USER INTERFACE ELEMENTS			
7. Input controls		X	
8. Navigation components		X	
9. Information components		X	
10. Containers		X	

Table 1: Summary of interviews with Boris Cabrera and William Ortíz.
Prepared by: the authors

3.1 UX Methodology Evaluation

UX METHODOLOGY EVALUATION		
Analysis of the UX methodology of the website www.eljuri.store with the UX/UI methodology according to Rodrigo Ronda León	**YES**	**NO**
UX METHODOLOGY		
The 4 stages of the UX methodology according to Rodrigo Ronda León		
RESEARCH		
1. Define the general needs of the project	**X**	
2. Define the general theme of the product to be produced or redesigned.	**X**	
3. Define the objectives of the customers or issuers with the product.	**X**	
4. Define the communicative intention of the product (inform, entertain, alert).	**X**	
5. Define the typology of the desired product.	**X**	
6. Define in a general way the users of the product, its context of use and the contents that it will have.		**X**
7. Characterize the users (typology, roles, etc.).		**X**
8. Investigate their needs (information, training, etc.).		**X**
9. Define scenarios		**X**
10. Define the processes carried out by users in their real contexts.		**X**
11. Define the characteristics of the context of use (cultural, political, economic, social, and technological).	**X**	
12. Define the business model	**X**	
13. Make a FODA matrix	**X**	
14. Define a bank of problems of the context of use.		**X**
15. Create flowcharts of processes and activities.	**X**	
16. Conduct a study of the market and/or of products similar to the one to be developed or redesigned.	**X**	
17. Conduct a usage analysis (e.g. loods, google analitycs).		**X**
18. Conduct an evaluation of the existing product to determine its	**X**	

quality.		
19. Inventory the product information resources.	**X**	
20. Create concept maps (Concept map)	**X**	
21. To make content maps (Content map)	**X**	
22. Define a work strategy	**X**	
23. Analyze the work resources available.	**X**	
24. Plan work time	**X**	
ORGANIZATION		
25. Represent all possible structures of the contents, in correspondence to the user's needs and context.		**X**
26. Define all the ways of hierarchizing the thematic and contents.	**X**	
27. Match the proposed structures to the needs of both issuers (customers) and receivers (users).	**X**	
28. To define all the functional flows that the software product will have, corresponding to the real flows of the users in their context.		**X**
DESIGN		
29. Define the product structure (taxonomy and organization diagrams or blueprints).	**X**	
30. Define the product's operation (operation diagrams).	**X**	
31. Define the product screens (presentation diagrams or wireframes).	**X**	
32. Define the services and functionalities that the product will have.	**X**	
33. Define the product labels (labeling).	**X**	
34. Create low and high level prototypes		**X**
TEST		
35. Prototype testing	**X**	
36. Diagram review	**X**	
37. Understanding of the designed services by the users.	**X**	

Table 2: UX methodology evaluation
Prepared by: the authors

3.1.1 UX Methodology Evaluation. Stage 1: Research

The Research stage is made up of 24 indicators. The Almacenes Juan Eljuri website has 17 hits and 7 errors, which will serve as data for the calculation of the percentage. The formula is as follows:

$$X = \frac{17}{24} \quad : \quad X = \frac{17}{24} \quad \text{(Decimal: } x = 0{,}70833\ldots\text{)}$$

Graph 1. Percentage formula: Stage 1: Investigation
Prepared by: the authors

The home page of the www.eljuri.store website complies with 70.83% of the research parameters within the UX Methodology according to Rodrigo Ronda León, while 29.17% belong to the indicators that were not met.

3.1.2 UX Methodology Evaluation. Stage 2: Organization

The Organization stage is made up of 4 indicators. The Almacenes Juan Eljuri website has 2 hits and 2 errors, which will serve as data for the calculation of the percentage. The formula is as follows:

Graph 2. Percentage formula: Stage 2: Organization

$$X=\frac{2}{4} \quad : \quad X=\frac{1}{2} \quad \text{(Decimal: } x=0{,}5\text{)}$$

Prepared by: the authors

The home page of the www.eljuri.store website complies with 50% of the organizational parameters within the UX Methodology according to Rodrigo Ronda León, while 50% belong to the indicators that were not met.

3.1.3 UX Methodology Evaluation. Stage 3: Design

The Design stage is made up of 6 indicators. The Almacenes Juan Eljuri website has 5 hits and 1 error, which will serve as data for the calculation of the percentage. The formula is as follows:

Graph 3. Percentage Formula: Stage 3: Design

Prepared by: the authors.

$$X=\frac{5}{6} \quad : \quad X=\frac{5}{6} \quad \text{(Decimal: } x=0{,}83333\ldots\text{)}$$

The home page of the www.eljuri.store website complies with 83.33% of the design parameters within the UX Methodology according to Rodrigo Ronda León, while 16.67% belong to the indicators that were not met.

3.1.4 UX Methodology Evaluation. Stage 4: Testing

The Design stage is made up of 3 indicators. The Almacenes Juan Eljuri website has 3 hits, which is equivalent to 100%. The home page of the website www.eljuri.store complies with 100% of the test parameters within the UX Methodology according to Rodrigo Ronda León.

3.1.5 General results of the UX Methodology Evaluation form

As a result of the analysis of the 4 stages of the UX Methodology Evaluation tab, a formula will be used to average the overall percentage of successes and failures of the Almacenes Juan Eljuri website. The formula is as follows:

$$X= \frac{(70{,}83 + 50 + 83{,}33 + 100)}{4} \quad : \quad X= \frac{304{,}16}{4} \quad \text{(Decimal: } x= 76{,}04\text{)}$$

Percentage formula: Results of the UX methodology evaluation sheet.
Prepared by: the authors.

The result is obtained by adding the four percentage values resulting from each stage and dividing by the total number of stages, resulting in 304.16/4, equivalent to 76.04%.
The website www.eljuri.store has an overall average of 76.04% hits and 23.96% misses in the UX Methodology evaluation. Therefore, it can be stated that the observed website was developed using several points that correspond to the methodology according to Rodrigo Ronda León, within the analyzed stages of Organization, Design and Testing a favorable number of successes can be highlighted, however, in the Research stage within the points referring to the definition of users there were several indicators that were unfavorable.

3.2 UI Methodology Evaluation

EVALUATION METHODOLOGY UI		
Analysis of the UI methodology of the www.eljuri.store website based on principles, elements and user interaction.	**YES**	**NO**
UI METHODOLOGY		
UI DESIGN PRINCIPLES		
1. Reliability	**X**	
2. Usability	**X**	
3. Accessibility	**X**	
4. Consistency		**X**
5. Functionality	**X**	
6. Interactivity	**X**	
7. Adaptability		**X**
USER INTERFACE ELEMENTS		
8. Input controls	**X**	
9. Navigation components	**X**	
10. Information components	**X**	
11. Containers	**X**	
USER INTERACTION		
12. Direct manipulation	**X**	
13. Menu selection	**X**	
14. Form filling	**X**	

Table 3: UI methodology evaluation

Prepared by: the authors

3.2.1 Results of the sheet: Evaluation of UI Methodology

The UI Methodology Evaluation tab is made up of 14 indicators. The Almacenes Juan Eljuri website has 12 hits and 2 errors, which will serve as data for the calculation of the percentage of hits. The formula is as follows:

Graph 5. Percentage formula: UI methodology evaluation sheet

$$X=\frac{12}{14} \quad : \quad X=\frac{6}{7} \quad \text{(Decimal: } x=0{,}85714\ldots\text{)}$$

Prepared by: the authors

The website www.eljuri.store has an overall average of 85.71% hits and 14.29% misses within the UI Methodology evaluation. Therefore, within the parameters that influence the user interface, it can be stated that the observed website used as part of its structure a favorable number of UI design indicators, standing out in the user interface and interaction elements. The indicators met within the UI design evaluation were 12 out of 14, which are: reliability, usability, accessibility, functionality, interactivity, input controls, navigation components, information components, containers, direct manipulation, menu selection and form filling.

3.3 Usability and Functionality Evaluation

3.3.1 Home page

USABILITY AND FUNCTIONALITY EVALUATION			
Evaluation indicators of the usability and functionality of the HOME page of the www.eljuri.store website.	**Not applicable**	**YES**	**NO**
USABILITY AND FUNCTIONALITY INDICATORS			
1. It has interactive navigation maps for its correct use and navigation.		**X**	
2. Intuitive navigation system		**X**	
3. Includes navigation links in the footer		**X**	
4. Redirection at the entrance to the portal		**X**	
5. Clear identification of the linked elements		**X**	
6. Possibility of direct return to the home page at any time.		**X**	
7. Menu permanently with no more than 7 options		**X**	
8. Availability of a trace bar at all times.		**X**	
9. External links open in new windows			**X**
10. Present icons and menus with concise and explanatory titles and text.		**X**	

11. The icons used are understandable		**X**	
12. Optimal page dimensions		**X**	
13. Viewed correctly with different screen resolutions.			**X**
14. Balanced use of the visual space of the page to avoid oversaturation of elements.		**X**	
15. Information on limitations or conditions for navigation is offered.	**X**		
16. Technical aspects are specified for a correct presentation.	**X**		
17. Structure organized according to user profile criteria	**X**		
18. Adequate discharge time	**X**		
19. Absence of frames			**X**
20. Clear and concise labeling		**X**	
21. Existence of a search option at the top of the home page.		**X**	
22. Advanced search option		**X**	
23. No plugin needed to display the pages		**X**	
24. Features multimedia elements such as animations or music		**X**	
25. The use of images/illustrations maintains a higher aspect ratio than text.		**X**	
26. Typography has adequate font size and is legible.		**X**	
27. Descriptive page titles		**X**	
28. Absence of pop-ups		**X**	
29. Presence of drop-down menus, scrolling text, marquees, floating text, etc.		**X**	
30. Works in different browsers (Firefox, Chrome, Safari).			**X**

Table 4: Usability and functionality evaluation: Home Page
Prepared by: the authors

3.3.2 Commercial line category

USABILITY AND FUNCTIONALITY EVALUATION			
Evaluation indicators of the usability and functionality of the CATEGORY OF COMMERCIAL LINE page of the www.eljuri.store website.	**Not applicable**	**YES**	**NO**
USABILITY AND FUNCTIONALITY INDICATORS			
1. It has interactive navigation maps for its correct use and navigation.		**X**	
2. Intuitive navigation system		**X**	
3. Includes navigation links in the footer		**X**	
4. Redirection at the entrance to the portal		**X**	
5. Clear identification of the linked elements		**X**	

6.	Possibility of direct return to the home page at any time.		**X**	
7.	Menu permanently with no more than 7 options		**X**	
8.	Availability of a trace bar at all times.		**X**	
9.	External links open in new windows			**X**
10.	Present icons and menus with concise and explanatory titles and text.		**X**	
11.	The icons used are understandable		**X**	
12.	Optimal page dimensions		**X**	
13.	Viewed correctly with different screen resolutions.			**X**
14.	Balanced use of the visual space of the page to avoid oversaturation of elements.		**X**	
15.	Information on limitations or conditions for navigation is offered.	**X**		
16.	Technical aspects are specified for a correct presentation.	**X**		
17.	Structure organized according to user profile criteria	**X**		
18.	Adequate discharge time	**X**		
19.	Absence of frames		**X**	
20.	Clear and concise labeling		**X**	
21.	Existence of a search option at the top of the home page.	**X**		
22.	Advanced search option		**X**	
23.	No plugin needed to display the pages		**X**	
24.	Features multimedia elements such as animations or music			**X**
25.	The use of images/illustrations maintains a higher aspect ratio than text.		**X**	
26.	Typography has adequate font size and is legible.		**X**	
27.	Descriptive page titles	**X**		
28.	Absence of pop-ups		**X**	
29.	Presence of drop-down menus, scrolling text, marquees, floating text, etc.			**X**
30.	Works in different browsers (Firefox, Chrome, Safari).			**X**

Table 5: Usability and functionality evaluation: Business Line Category
Prepared by: the authors

3.3.3 Shopping cart

USABILITY AND FUNCTIONALITY EVALUATION			
Evaluation indicators of the usability and functionality of the SHOPPING CART page of the www.eljuri.store website.	**Not applicable**	**YES**	**NO**
USABILITY AND FUNCTIONALITY INDICATORS			
1. It has interactive navigation maps for its correct use and		**X**	

navigation.			
2. Intuitive navigation system		**X**	
3. Includes navigation links in the footer		**X**	
4. Redirection at the entrance to the portal		**X**	
5. Clear identification of the linked elements		**X**	
6. Possibility of direct return to the home page at any time.		**X**	
7. Menu permanently with no more than 7 options		**X**	
8. Availability of a trace bar at all times.		**X**	
9. External links open in new windows		**X**	
10. Present icons and menus with concise and explanatory titles and text.		**X**	
11. The icons used are understandable		**X**	
12. Optimal page dimensions		**X**	
13. Viewed correctly with different screen resolutions.		**X**	
14. Balanced use of the visual space of the page to avoid oversaturation of elements.		**X**	
15. Information on limitations or conditions for navigation is offered.	**X**		
16. Technical aspects are specified for a correct presentation.		**X**	
17. Structure organized according to user profile criteria	**X**		
18. Adequate discharge time	**X**		
19. Absence of frames			**X**
20. Clear and concise labeling		**X**	
21. Existence of a search option at the top of the home page.	**X**		
22. Advanced search option	**X**		
23. No plugin needed to display the pages		**X**	
24. Features multimedia elements such as animations or music			**X**
25. The use of images/illustrations maintains a higher aspect ratio than text.			**X**
26. Typography has adequate font size and is legible.		**X**	
27. Descriptive page titles	**X**		
28. Absence of pop-ups		**X**	
29. Presence of drop-down menus, scrolling text, marquees, floating text, etc.	**X**		
30. Works in different browsers (Firefox, Chrome, Safari).			**X**

Table 6: Usability and functionality evaluation: Shopping Cart
Prepared by: the authors

The results obtained for each of the cards have been based on the 30 Usability and Functionality indicators extracted from: Methodological proposals for usability evaluation from (Nielsen 2003)

(Garcia 2004) and (Travieso et al. 2007) and indicators from the heuristic evaluation guide developed by Hassan and Martin to facilitate the evaluation of Web site usability (Hassan and Martin 2003). There are 3 pages of the website (Home page, business line category, and shopping cart), which were the main focus of the analysis. There are three gauges (yes, no, not applicable) that vary according to the page to be analyzed.

3.3.4 Usability and Functionality Evaluation: Home Page

As a result of the analysis of table 4, it is observed that based on the 26 Usability and Functionality indicators in the "Home Page" section of the Almacenes Juan Eljuri website, a formula will be used to calculate the percentage of hits and errors. There are 21 hits and 5 errors, which will serve as data for the calculation of the percentage. The formula is as follows:
Percentage formula: Usability and functionality evaluation: Home page.

$$X=\frac{21}{26} \quad : \quad X=\frac{21}{26} \quad \text{(Decimal: } x=0{,}80769\ldots\text{)}$$

Performed by: the authors

The home page of the www.eljuri.store website complies with 80.77% of the established parameters of usability and functionality within the site, while 19.23% belong to the indicators that were not met.

3.3.5 Usability and Functionality Evaluation: Commercial Line Category

As a result of the analysis of table 5, it can be seen that based on the 24 Usability and Functionality indicators in the "Commercial line category" section of the Almacenes Juan Eljuri website, a formula will be used to calculate the percentage of successes and failures. There are 19 hits and 5 errors, which will serve as data for the calculation of the percentage. The formula is as follows:
Percentage formula: Usability and functionality evaluation: Commercial line category.
Performed by: the authors

$$X=\frac{19}{24} \quad : \quad X=\frac{19}{24} \quad \text{(Decimal: } x=0{,}79166\ldots\text{)}$$

The business line category of the www.eljuri.store website complies with 79.17% of the established usability and functionality parameters within the site, while 20.83% belong to the indicators that do not comply.

3.3.6 Usability and Functionality Evaluation: Shopping Cart

As a result of the analysis of table 6, it is observed that based on the 23 Usability and Functionality indicators in the "Shopping Cart" section of the Almacenes Juan Eljuri website, a formula will be used to calculate the percentage of hits and misses. There are 19 hits and 4 errors, which will serve as data for the calculation of the percentage. The formula is as follows:
Percentage formula: Usability and functionality evaluation: Shopping cart.

$$X = \frac{19}{23} \quad : \quad X = \frac{19}{23} \quad \text{(Decimal: } x = 0{,}82608\ldots\text{)}$$

Performed by: the authors

The shopping cart category of the www.eljuri.store website complies with 82.61% of the established usability and functionality parameters of the site, while 17.39% of the indicators were not met.

3.3.7 Results of the Usability and Functionality Evaluation sheets

As a result of the analysis of the Usability and Functionality Evaluation tables (4, 5, 6), a formula will be used to average the general percentage of successes and failures of the Almacenes Juan Eljuri website. The formula is as follows:

$$X = \frac{(80{,}77 + 79{,}17 + 82{,}61)}{3} \quad : \quad X = \frac{242{,}55}{3} \quad \text{(Decimal: } x = 80{,}85\text{)}$$

Figure 9. Percentage formula: Interpretation of usability and functionality assessment results
Performed by: the authors

The website www.eljuri.store has an overall average of 80.85% hits and 19.15% misses in the Usability and Functionality evaluation. Therefore, it can be stated that they comply with favorable parameters within the usability and functionality category, standing out in indicators such as typography, site legibility, image-text relationship, visual balance and ease of use for the user.

3.4 Heuristic evaluation

HEURISTIC EVALUATION		
Heuristic analysis based on dimensions. The different criteria are classified into:	**YES**	**NO**
GENERAL		
1. The objectives of the website are well defined	**X**	
2. The overall design of the website is coherent	**X**	
IDENTITY AND INFORMATION		
3. The logo is significant, identifiable and sufficiently visible.	**X**	

4. It provides mechanisms for contacting the company.	**X**	
LANGUAGE AND WRITING		
5. The website offers different language versions		**X**
6. It uses clear and concise language	**X**	
LABELING		
7. Titles are found quickly and easily	**X**	
8. The organizational system maintains an alphabetical order.		**X**
STRUCTURE AND NAVIGATION		
9. Maintains a hierarchical navigation structure.	**X**	
10. The response of the system before clicking on the link is predictable.	**X**	
LAYOUT DE LA PÁGINA		
11. Information overload has been avoided.	**X**	
12. There are blank areas between the informative objects on the page to rest the eye.		
SEARCH		
13. The search button is easily accessible	**X**	
14. Enables advanced search		**X**
MULTIMEDIA ELEMENTS		
15. Photographs are well cropped, understandable and of good quality.	**X**	
16. The use of images and animations provides some added value	**X**	
HELP		
17. Help link is located in a visible area.	**X**	
18. Context-sensitive help is provided for complex tasks.	**X**	
ACCESSIBILITY		
19. The website is compatible with different browsers		**X**
20. The weight of the page has been controlled.		**X**
CONTROL AND FEEDBACK		
21. The user has full control over the interface.	**X**	
22. The user is informed of what has happened.	**X**	

Table 7: Heuristic evaluation
Performed by: the authors

The results obtained from the file were based on the 22 heuristic indicators corresponding to the principles of Jakob Nielsen and extracted from Yusef Hassan Montero; these are classified into different criteria, which are: general, identity and information, language and writing, labeling,

structure and navigation, page layout, search, multimedia elements, help, accessibility and control and feedback; the main focus of the analysis was the central page or landing page.

As a result of the analysis of table 7, it can be seen that based on the 22 heuristic indicators of the Almacenes Juan Eljuri website, a formula will be used to calculate the percentage of hits and misses. There are 17 hits and 5 errors, which will serve as data for the calculation of the percentage. The formula is as follows:

$$X = \frac{17}{22} \quad : \quad X = \frac{17}{22} \quad \text{(Decimal: } x = 0{,}77272\ldots\text{)}$$

Figure 10. Percentage formula: Heuristic evaluation
Performed by: the authors

Therefore, it is observed that based on the 22 indicators of heuristic evaluation of the Almacenes Juan Eljuri website, it complies with 77.27% of the parameters established within the site, while 22.73% belong to the criteria that were not fulfilled. Therefore, it can be stated that they comply with favorable parameters within Jakob Nielsen's heuristic principles, standing out in principles such as: visibility of the system status, user control and freedom, help and documentation.

3.5 **Hypothesis testing**

HYPOTHESIS TESTING				
UX METHODOLOGY EVALUATION				
STAGES	**INDICATORS**	**ACHIEVEMENTS**	**FAILURES**	**AVERAGE NUMBER OF HITS**
Research	24	17	7	0,71
Organization	4	2	2	0,5
Design	6	5	1	0,83
Test	3	3	0	1
	Total Indicators	**Indicators Met**	**Indicators not met**	**Average success rate Totals**
	37	**27**	**10**	**0,76**
UI METHODOLOGY EVALUATION				
ELEMENTS	**INDICATORS**	**ACHIEVEMENTS**	**FAILURES**	**AVERAGE NUMBER OF HITS**
UI Design Principles	7	5	**2**	**0,71**
User Interface Elements	4	4	**0**	**1**

User Interaction	3	3	**0**	**1**
	Total Indicators	**Indicators Met**	**Indicators not met**	**Average success rate Totals**
	14	**12**	**2**	**0,9**
USABILITY AND FUNCTIONALITY EVALUATION				
EVALUATED PAGES	**INDICATORS**	**ACHIEVEMENTS**	**FAILURES**	**AVERAGE NUMBER OF HITS**
Home	26	21	**5**	**0,81**
Business Line Category	24	19	**5**	**0,79**
Shopping Cart	23	19	**4**	**0,83**
HEURISTIC EVALUATION				
HEURISTIC CRITERIA	**INDICATORS**	**ACHIEVEMENTS**	**FAILURES**	**AVERAGE NUMBER OF HITS**
General	2	2	0	1
Identity and information	2	2	0	1
Language and wording	2	1	1	0,5
Labeling	2	1	1	0,5
Structure and navigation	2	2	0	1
Page layout	2	2	0	1
Search	2	1	1	0,5
Multimedia elements	2	2	0	1
Help	2	2	0	1
Accessibility	2	0	2	0
Control and feedback	2	2	0	1
	Total Indicators	**Indicators Met**	**Indicators not met**	**Average success rate Totals**
	22	17	**5**	**0,77**

Table 8: Hypothesis testing table
Carried out by: the authors

The validation of the hypothesis was carried out by means of UX/UI methodology evaluation sheets, heuristic evaluation and usability and functionality evaluation sheets applied to the website www.eljuri.store and using the data obtained from the interviews conducted with the website creation group, we can demonstrate that the existence of a methodological process of UX/UI design contributes favorably to the interaction, competitiveness and usability of the website. The aspects that were analyzed to demonstrate that there is a relationship between following a methodological process for the creation of a website containing UX/UI design elements and its incidence reflected in the levels of functionality were: the comparison between the methodology used by the design team of Almacenes Juan Eljuri when creating the website and the methodology according to Rodrigo Ronda León, adding the heuristic principles of Jakob Nielsen to analyze both the website and the user, fulfilling the parameters of the methodology in 77% of effectiveness.

IV. CONCLUSIONS

Through the use of research instruments and their interpretation, it was shown that there was a basic methodology for the creation of the www.eljuri.store website, from which indicators were compared that relate to the methodology used and the one proposed by Ronda. From the results it could be concluded that Almacenes Juan Eljuri's website maintains a high margin of successes compared to its shortcomings.

By researching the UI design principles of different authors and their various methodologies, it can be concluded that the elements that constitute the UI design work as a solid structure for the generation of engagement or user attraction, thus positioning the website in search engines as an SEO outreach strategy.

The principles of heuristic evaluation establish that through the use of UI design elements and navigation controls, customer attraction and retention on the website is increased. Therefore, user interaction increases when interconnected with a structure based on UI design, which translates into a strategy for the user to become loyal to the website, this being a fundamental indicator in e-commerce sites for its relevance as it creates new ways of distributing products and services.

The usability and functionality parameters of the www.eljuri.store website determined the level of incidence within the interface and thus the ease with which users can find information, concluding that, with effective navigation design and structure, visitors can discover the site's navigation controls intuitively.

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