SEO vs. UX in Web Design:
Are Companies' Digital Marketing Strategies Correct? A Neurotechnological Study

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ABSTRACT

This work addresses a research gap in digital marketing by attempting to compare the effort in achieving the best organic search engine ranking with the effort in providing the best user experience in web navigation. The objective is to validate companies' efforts in the digital world, and the study is focused on the toy sector in Spain, specifically on the Google search engine, measuring the user experience in web browsing through neuromarketing biometrics. The top 30 results for each Google search were collected for the 638 keywords related to toys in Spain. Subsequently, the three best-positioned websites for the Google search results were determined, and their user experience was measured using neuromarketing biometrics, triangulated with qualitative research. This approach allows for contrasting brand authority in the digital world (visibility in a search) with the user experience in navigation (trust and ease of purchase decision-making). Results indicate that the best-positioned websites do not necessarily correspond to the best web navigation experiences.

KEYWORDS

Digital Marketing, SEO, UX, Neuromarketing, Organic Positioning, Web Usability, User Experience, Toy

Digital technologies and online consumption are exerting a significant influence on consumer behavior, with an increasing number of people connecting to the internet worldwide (Hien & Nhu, 2022). Users can engage and interact with other consumers who share similar interests; interaction is no longer limited to businesses selling to consumers. Consumers who access the internet through any electronic device to explore a specific product, decide to make a purchase online, and receive it at the specified address are referred to as online consumers. They are characterized as highly sensitive, often sharing their experiences through social media and online forums (Moschini, 2012).

The purchasing behavior of users has changed dramatically and become more complex due to the increased use of social media and mobile phones. They now have the option to access products and services through both online stores and physical stores, as many brands have multiple points

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of contact with the user. This is one of the reasons why digital marketing through mobile devices is on the rise, as its purpose is to showcase and recommend products that meet user needs (Togawa et al., 2017). A poor experience in the customer journey map (physical and/or digital) can lead the consumer to switch to another company, while a positive experience is a result of all the interactions the consumer has had through any device and digital channel regarding the product, the service received from the company—including post-sales service—and the brand itself. Additionally, within user communications in digital environments, user trust in electronic word-of-mouth (eWOM) influences users' brand awareness (Jan et al., 2023). This eWOM, crucial for the decision-making of online users, is based on the certainty and connection users have with the brand, as well as relative value and their customer experience (Cuong Hung, 2021).

The emerging competitiveness among products and services has highlighted the need to emphasize digital marketing strategies in order to create intangible added value for users and potential customers, aimed at building a favorable image for the products being promoted (Buvar & Gati, 2023). To design a digital-marketing strategy, it is necessary to assess the target audience, its duration, what needs to be communicated, and the appropriate means for its dissemination. For a company to sell its services, it needs to have the highest possible number of leads. To achieve this, various techniques and strategies must be developed by taking action through the available digital channels of the company, as well as those that are not online (Meyer, 2021).

The objective of this work is to empirically compare, using available digital and neuromarketing tools, the effort devoted to achieving the best natural search engine positioning with the effort to provide the best user experience in web navigation, with the goal of validating whether these efforts are aligned by companies in the digital world. The novelty of the work is focused on a gap in digital-marketing research, which aims to correlate search engine optimization (SEO) efforts with user experience (UX). In order to empirically measure this, neuromarketing biometrics were used.

LITERATURE REVIEW

Digital Marketing

Internet marketing or digital marketing involves the transmission of information about a company's products or services through online media, helping companies interact with their consumers and build a brand identity for their products. In this way, companies build consumers' confidence, creating a compelling reason for consumers to make the decision to purchase from them (Wani, 2023). Currently, digital marketing plays a more prominent role in brand building for businesses in the modern world than does traditional marketing (Erhan et al., 2023), and users are more drawn to digital media than to traditional ones. This shift in purchasing behavior helps brands better understand consumers so they can devise suitable marketing strategies, both to retain current customers and to reach potential markets.

The use of digital marketing and its tools enables customer loyalty, increases the number of customers and sales, gains recognition of the brand from a significant portion of the population beyond regular customers, fosters company growth, and positions the brand in the market; consequently, the company becomes more competitive, enhancing business profitability (Hussain & Ayob, 2023). To achieve this, the most commonly used tools companies use to implement this strategy are websites and social media due to the substantial user base these platforms have (Moncayo Sanchez et al., 2023).

The Digital Consumer

Over the last 20 years, the proliferation of digital technologies has had a significant impact on business operations and how consumers gather information, interact, and make purchases (Sağkaya Güngör & Ozansoy Çadirci, 2022). Digitization has become an essential aspect of conventional consumption patterns, enabling significant growth in the use of mobile channels, sustainable consumption, user-generated content, and social-media engagement. The digital consumer can interact in both the online

store and the physical store to access products and services, as brands have various points of contact with the user. Digital technologies and online consumption have a profound influence on consumer behavior, leading to increased sensitivity and the sharing of experiences through social media and online forums. Digital communication is crucial in establishing a positive relationship between the brand and the consumer, making the latter an organic ambassador (Oliveira et al., 2023).

Field research conducted by major companies (Donze & Wubs, 2019) has demonstrated that customer-feedback stories enhance consumers' engagement with websites and are particularly influential in shaping the brand's position on social media. Currently, companies that do not provide experiences leveraging consumer feedback in brand-related stories are missing significant opportunities to connect directly with potential buyers (Gosline et al., 2017).

Digital-Marketing Strategies

To harness digital marketing in businesses, it is crucial to implement organized strategies, such as deploying a set of essential tools available on the internet. This includes creating profiles on major social-media platforms and publishing valuable content (Tüfekci & Akbiyik, 2023), as well as optimizing the website's positioning in search-engine results for user queries (Cai & Choi, 2023). It's essential for a company's website to adhere to key guidelines for organic positioning to ensure it is well prepared (Li et al., 2023) and meets the requirements to appear on the first page of search-engine results for keywords that users associate with the company and its activities. Additionally, using complementary paid digital services offered on search engines and social media (Seifert et al., 2023) can help achieve top positions in search engines, brand and product/service exposure, and contact information for interested individuals who accessed the company through these channels.

Companies can achieve positive outcomes through a sensible and effective implementation of a web-communication strategy across various digital channels. These must be impactful, user-friendly, and synchronized with the company's goals (YachouAityassine et al., 2022). To enhance the effectiveness of digital marketing, sales and marketing teams should focus their efforts on mutual communication with customers through digital channels (Melo Borges Tiago & Cristovao Verissimo, 2014). According to research on the effectiveness of using digital marketing as a positioning strategy for small and medium-sized enterprises in various sectors, nearly 90% of those who have implemented this strategy are experiencing benefits (Bastone et al., 2023). Furthermore, its use has proven significant and positive, resulting in a temporary increase in customers, sales, and profitability (Torres et al., 2017).

Organic Positioning

SEO has long been a key topic in market research (Chen & Senechal, 2023). The term search-engine marketing refers to all the development that needs to be carried out and kept up to date to ensure a brand (company) is locatable and visible through internet search engines. Essentially, it encompasses a series of clearly defined stages (Paniagua-Iglesias & Garcia-Ureta, 2023). Among the potential tools of digital marketing, SEO facilitates the use of appropriate data by providing relevant results based on the user's search priority (Vinutha & Padma, 2023). SEO is a set of techniques in which a company adjusts the information on its pages to naturally make the website appear in the top positions of search results for the most commonly used search terms by users in its market sector. This is crucial for gaining visibility in the digital world (Kim et al., 2022). This is especially important when the company's website offers products/services facing high competition in the market. Therefore, digital-marketing planning and the selection of keywords for search-engine positioning are crucial for attracting customers, with the associated investment becoming an increasingly relevant part of the marketing budget (Erdmann et al., 2022).

Usability and User Experience

User experience measures how a product or service performs in its context (Tayar López, 2018). In the case of digital products or services, this experience must be productive for the intended purpose.

This means that the user's experience with a digital service must include the necessary aspects of usability, accessibility, psychology, and ergonomics as well as have an inclusive design for people with disabilities (Ferrer-Mavarez et al., 2023). If the goal is to create a valid and well-organized product that provides a satisfactory user experience, an orderly design process is necessary, starting from the idea and progressing to the specific details. This ensures a robust design aligned with business goals, customer conversion, and results. User-centered web design, from which the user-experience methodology emerges, aims to enhance the useability and quality of user-centered digital portals, emphasizing the attributes of universal use and access (Lokman et al., 2022). The integration of cognitive, semantic, and affective elements is crucial in the conception and development of a product. The results obtained enhance the applicability of digital tools, assuming that design, accessibility, and ease of use serve as the starting point.

Neuromarketing and User Experience

Neuromarketing is a methodology that, through marketing and communication stimuli, facilitates the study and understanding of the neurological reactions they produce in users (Núñez-Cansado et al., 2024). Currently, the scope of user experience goes beyond the emotional response a person has as a result of experiencing a service or interacting with a product. It is the emotional response that the end user has to all aspects of their interaction with the brand, the company, its products, and its services (Juárez-Varón et al., 2023). The primary outcome of using these methodologies is to understand the sensations, perceptions, or beliefs ingrained in the user, commonly referred to as insight (Juárez-Varón et al., 2021). The method itself is applied by tracking associations as a means to understand the internal motives and thoughts of individuals. The planning of visual content on a website is a key factor in enhancing user-experience performance (Babac & Yuncu, 2022). The foundation of this methodology involves presenting a stimulus to the user and then collecting feedback, often using other methods such as focus groups, participatory creativity dynamics, and interviews (Mengual-Recuerda et al., 2020).

Toy Industry, User Experience, and Neuromarketing

According to the 2022 annual report from the Spanish Association of Toy Manufacturers (AEFJ, 2022), the characteristics of the products manufactured by the toy industry in Spain include high quality, excellent design, safety, and significant educational values. One notable characteristic of companies in the toy sector is their high level of geographical concentration. In the Spanish context, toy manufacturing is concentrated primarily in two geographic areas, the Valencian Community and Catalonia, which together represent 68% of the industry. The toy sector needs to adapt to the current global market facilitated by digital communication, addressing new challenges, opportunities, and threats by being innovative, digitizing services, fostering a sense of community within the sector, maintaining adaptability and agility, and undertaking valuable training, information, and communication initiatives.

Neuromarketing is applied in the toy industry to understand consumers' perception of the value of two very similar educational games when they see the packaging and how it influences their decision to purchase (Juarez et al., 2020). The perceived value of the product, the added value of being educational, and the quality of the item itself must be focused on, encouraging users to buy it and present it as a gift to a child. The use of neuromarketing tools facilitates the understanding and identification of purchase indicators based on the emotions felt by users when viewing packaging for children's items. Thus, the necessary variables for consideration in the creative design of educational games that are truly in demand by consumers are obtained and understood.

Applied neuromarketing also serves as a tool for companies in aiding strategic marketing decisions and communication (Juárez-Varón et al., 2020). In terms of applying neuromarketing as a tool to analyze and diagnose the user experience on websites, studies have demonstrated the use of this methodology to analyze the design of websites in the tourism sector. Through user navigation

and eye-tracking instruments, the measurement of attraction points and areas of interest generated by the website is carried out (Redondo-Rodríguez et al., 2023). In this way, with the input from users, the points that work well and need to be emphasized, as well as those that do not, and how they can become an opportunity for improvement in website redesign are identified. The result of improving website usability is an increase in turnover and profit (Lacarcel & Huete, 2023).

MATERIALS AND METHODS

The objective of this research is to empirically compare and contrast whether the effort in organic search engine positioning for the best-ranked websites in a sector corresponds to the effort aimed at optimizing the user experience in the usability of these websites. The research was carried out using tools related to digital positioning and neuromarketing biometrics. The chosen sector for this study is the toy sector in Spain. The research employs triangulation, combining in-depth interviews (qualitative study) with neurotechnologies that allow the analysis of emotional intensity and emotions experienced through eye tracking, galvanic skin response, and electroencephalography.

Objectives

This research aims to address questions about how consumers conduct toy searches compared to how brands define them and to assess the usability of those top-ranked websites organically, based on consumer perceptions and emotions. Once the best-positioned websites are identified, the main objective is to analyze the user experience by recording emotional intensity (arousal) and emotions felt using neurotechnology. Specific objectives include:

- Identify the keywords used by consumers in toy searches in Spain.
- Identify the websites that are best positioned organically for the keywords used by consumers in toy searches in Spain.
- Analyze the web usability (consumer perceptions and emotions while navigating) of the top-ranked websites in toy searches in Spain through the menu design proposed by these websites.
- Compare the user experience and usability of the top-ranked toy-selling websites in Spain with their organic positioning.

Research Instrument

Technological advances have enabled neuromarketing to go beyond traditional quantitative and qualitative research tools, focusing on consumers' neurological reactions to stimuli (Núñez-Cansado et al., 2024). Research using neurotechnologies aims to connect neuronal system activity with consumer behavior, offering a wide range of applications for brands, products, services, or communication. This can determine purchase intent, preferences, novelty level, knowledge, or emotions generated in the lived experience with the brand (Juarez et al., 2020). Theoretical research with neurotechnologies is grounded in neuroscience, using neuroimaging techniques in this emerging field to test hypotheses, enhance existing knowledge, and examine the effect of marketing stimuli on consumers' brains (Mengual-Recuerda et al., 2021). Studies have established that patterns of brain activity are closely related to behavior and cognition. Earlier schools of thought claimed that consumers, in their decision-making process, consider all possible market alternatives and select the one that maximizes "marginal utility." This assumption is no longer valid, as asserted by Daniel Kahneman (2017), psychologist and Nobel laureate in economics in 2002. His work focuses on decision-making in uncertain environments and the use of heuristics and mental shortcuts. The neurodata used are based on GSR (galvanic skin response), which records changes in emotional arousal state influencing cognitive perception of stimuli, and EEG (electroencephalography), which allows the interpretation of emotions experienced by the user group. The biometric responses were correlated with aspects of the user experience based

on the identification of notable peaks of emotional arousal (GSR), synchronized with eye tracking (ET), and interpreted with the performance metrics generated by EEG. These somatic markers were subsequently contrasted with the users themselves to establish the reasons for positive and negative emotions. Statistically, the biometric records are based on mental patterns (repetition of ET, GSR, and/or EEG patterns) from a minimum number of users (5 users for ET, 10 users for EEG, and 20 users for GSR) (Juárez-Varón et al., 2023).

The qualitative research method used was in-depth interviews, which involved a detailed and open conversation between the researcher and the participant, with the aim of obtaining rich and detailed information about the interviewee's experiences in web navigation during the product search and purchase process. In this specific approach, detailed conversations with participants were recorded with an audio recorder to explore their experiences and perspectives, which were then reviewed and analyzed. The recorded values were normalized to facilitate the comparison of measurements among all users. This allowed emotional arousal or intensity to be recorded, as well as attention, interest, engagement, excitement, relaxation, and stress, with values ranging from 0 (no impact) to 1 (maximum intensity). There were two main stages in which different methodologies were used.

Stage 1: SEO Positioning Methodology

Keyword research was conducted through a keyword program. In this case, the Semrush program, Version 2022, was used, and a total of 638 keywords were identified (Appendix 1). The selected keywords for the toy sector were provided by the keyword tool from the Ubersuggest application. The "search by keywords" option was selected, and the word "juguete" was entered. Subsequently, the language was set to Spanish and the location to Spain. The search was also conducted with the AnswerThePublic application using "juguete" with the language set to Spanish, the location to Spain, and Google as the search engine. This application generated all the expressions that internet users use when searching with the word "juguete." From these two applications, 638 keywords were identified, covering comprehensively the search characteristics of the toy sector in Spain.

Subsequently, a web application for automated searches on google.es, developed by MACOM Research Lab at the Universitat Politècnica de València, was utilized to obtain the first 30 URLs organically positioned (excluding sponsored searches) for each keyword, identifying a total of 19,140 URLs. The details of the URLs for the top 10 keywords found can be seen in Appendix 2. This process yielded results for the most searched keywords in this sector, which were further filtered to obtain a total of three results per search (the top three companies/brands) from the first six URLs (equivalent to nonsponsored and directly related results from the first page of Google in 2022). This was done after excluding wiki websites, magazines, newspapers, social media, and other topics related to the sector.

From this data filtering, the URLs that appear most frequently in the first, second, and third positions for each keyword were sorted and counted (the URLs that appear in the top positions for each keyword are not always the same, depending on the organic positioning efforts of each website). Due to the lack of a single ordering criterion, Stuart Pugh's decision matrix (Karnjanasomwong & Thawesaengskulthai, 2015) was applied, where a qualitative technique is used to classify different options based on various analysis criteria. Based on this work, three criteria were proposed to determine the top three websites that appear in searches for a set of keywords related to toys in Spain (top 1, top 2, and top 3).

Criterion 1. Determine the top three websites that appear most frequently in the first, second, and third positions. Then add up, for each website, the number of times it appears in the first, second, and third positions.

Criterion 2. We assigned a value of 3 points to the website that appeared in the first position, 2 points to the website in the second position, and 1 point to the website in the third position (weighting 3-2-1). After totaling the scores with the points obtained, we proceeded to order the top three websites based on the scores (from highest to lowest, top 1, top 2, and top 3).

Criterion 3. We assigned a value of 10 points to the website that appeared in the first position, 4 points to the website in the second position, and 1 point to the website in the third position (weighting 10-4-1). This maximizes the differences and rewards the appearance in the first position for a keyword. After totaling the scores, we proceeded to add the obtained points and identify the top three websites, ordering them based on the scores (from highest to lowest, top 1, top 2, and top 3).

From these three classification criteria in the SEO analysis (contrasting possible differences and similarities), the top three websites of brands/companies that are best positioned in relation to toys in Spain were determined.

Stage 2: Measurement of User Experience Through Neuroscience Biometrics Combined With Qualitative Research

For the second stage, a triangulated research approach was used that combined the use of neuromarketing biometrics (ET, GSR, and EEG) with in-depth interviews. The semistructured, in-depth interview protocol was designed to highlight the user's experience in online navigation and purchasing. The interviews were conducted face-to-face by the authors, recorded, transcribed, and analyzed in video format. The in-depth interview with each user consists of two parts. The first part includes questions to contextualize the person with the search and purchase experience they are about to undertake. The goal is for each user to make a purchase of a toy on each of the three top-positioned websites (the navigation order is random for each participant). The chosen toy for this experience was the LEGO Classic Creative Suitcase. It is a toy suitable for both boys and girls, aged 7 to 13, or for anyone of a different age who considers it appropriate to meet their personal needs. Before the search and purchase, each user is shown the product image, its name, and the category or game family to which it belongs (construction games). Prior to applying the biometric instruments to the user and starting the browsing experience, a series of preliminary questions are asked. These questions can be found in Appendix 3 (questionnaire, sections 1 and 2) and aim to help the user prepare and focus on the type of experience they are about to undergo.

The second part, after the browsing experience on the three websites, consists of nine questions that gather information regarding the experience and memories and that allow users to express any concerns and suggest opportunities for improvement for each of the websites. These questions are related to the perception of value, level of interest, and usability of the websites in an online purchasing process, as well as ideas and proposals for improvement in terms of usability and user experience (sections 3, 4, and 5 of the questionnaire).

The experimental phase, using neuromarketing biometrics to monitor the user experience in web navigation during the toy search and purchase process, aims to examine areas of interest, record peaks of generated emotion, and capture the sensations and emotions produced while navigating and using each of the websites. Eye-tracking biometrics, along with GSR and EEG, were used for this purpose. Eye tracking was conducted using a desktop eye-tracking bar, specifically the Gazepoint GP3 HD eye tracker, 150Hz system, using Gazepoint Analysis software Version 6.8.0 for data recording and exportation. Calibration involved tracking a moving point across nine points covering the entire screen to identify the alignment level of each eye. Skin galvanic response, measuring electrodermal activity or skin conductance, was recorded using the eSense Skin Response model from Mindfield Biosystems, with data recorded and exported using the Mindfield Biosystems mobile software, eSense Skin Response, Version 6.5. This app, available for both Android and iOS with free use options, allows for recordings and subsequent data export in .CSV format. This method does not require calibration, but the data need to be converted to a ratio for interuser comparison. Finally, brain activity and interpretation were conducted using an electroencephalography device from EMOTIV, specifically the EPOC+ model, with EmotivPRO software, Version 3.1.2, which was used for calibration, recording, and exporting emotional performance metrics data in .CSV format. Calibration involved 15 seconds with eyes open and 15 seconds with eyes closed to establish a baseline for the work. The recordings

of these three biometrics provide a temporal scale, making it easy to synchronize the data once processed and exported to Microsoft Excel.

Upon completion of the study, each user underwent an in-depth interview as part of the qualitative research, identifying key positive and negative moments for the user, and this information was contrasted with the data recorded through biometrics. After the first part of the qualitative interview, the participant is positioned in front of a computer to perform the following steps on the websites of Amazon (amazon.es), Juguettos (juguettos.com), and Toys "R" Us (toysrus.es). The order is varied for each participant to avoid the same sequence influencing the browsing experience. This approach ensures that all three websites are on an equal footing in the navigation experience for each user. Each user was instructed to search for the toy using menus and complete the purchase process to the end.

Sample Characteristics

In the present research, the sample consisted of men and women who had previously made an online purchase. A total of 30 participants (50% men and 50% women) participated randomly and voluntarily as study subjects after meeting the criteria, forming an age range between 29 and 50 years. After this initial filtering, it was expected that with this selection of participants, the research results would have a high degree of validity. As a token of appreciation for their effort and time, participants were given a gift after completing the experiment to reward their voluntary participation. A user-interaction protocol was implemented, aiming to detail the sequence of qualitative and neuromarketing tools, as they are integral parts of the triangulation research techniques.

RESULTS

SEO Positioning—Keyword Search

Stage 1 was conducted as described above. For Criterion 1, determination of the top three websites that appear most frequently in the first position, the top three websites that appear most frequently in the second position, and the top three websites that appear most frequently in the third position, the results are presented in Table 1.

Criterion 2 was weighting 3-2-1, assigning a value of 3 points to the website that appears in the first position, a value of 2 points to the website in the second position, and a value of 1 point to the website in the third position. After adding up the scores, the points obtained are totaled, and the top three websites are determined based on their scores (from highest to lowest, top 1, top 2, and top 3). The results are presented in Table 2.

Criterion 3 was weighting 10-4-1, assigning a value of 10 points to the website that appears in the first position, a value of 4 points to the website in the second position, and a value of 1 point to the website in the third position. This allows us to maximize differences and reward the effort of ranking first for a keyword. After adding up the scores, the points obtained are totaled, and the top

Table 1. Number of Appearances in Each Position and Result Obtained According to Criterion 1

URL	First Position	URL	Second Position	URL	Third Position	URL	Sum of Results
juguettos.com	141	amazon.es	114	amazon.es	78	amazon.es	310
amazon.es	118	toysrus.es	59	juguettos.com	57	juguettos.com	253
toysrus.es	28	juguettos.com	55	toysrus.es	40	toysrus.es	119

Table 2. Number of Appearances in Each Position and Result Obtained According to Criterion 2

URL	First Position	URL	Second Position	URL	Third Position	URL	Weighting 3-2-1
juguettos. com	141	amazon.es	114	amazon.es	78	amazon.es	660
amazon.es	118	toysrus.es	59	juguettos. com	57	juguettos. com	590
toysrus.es	28	juguettos. com	55	toysrus.es	40	toysrus.es	234

three websites are determined based on their scores (from highest to lowest, top 1, top 2, and top 3). The results are presented in Table 3.

Based on these three criteria for the SEO analysis (whose results coincide), the top three best-positioned brands/companies related to toys in Spain are determined: amazon.es (top 1), juguettos. com (top 2), and toysrus.es (top 3).

User Experience Recorded Through Neuromarketing Biometrics

In order to compare the data obtained from users across the three websites, three common phases were established to be carried out on all three sites. The following are the phases and their descriptions.

Phase 1: Find the Product

After opening the website in the browser, the user, through the web menus, has to search for the Lego Classic Creative Suitcase product (category search). This phase concludes when the user clicks on the specific product in the search results.

Phase 2: View the Product and Add It to the Shopping Cart

Once the product screen appears, the user reviews the description, photographs, and product details. This phase concludes when the user clicks on the button to add the product to the shopping cart or the equivalent action (e.g., purchase).

Phase 3: Process the Purchase

The participant enters the shopping cart, reviews it, and processes the purchase. This phase concludes when the website requests login or user registration to proceed with the purchase.

Table 3. Number of Appearances in Each Position and Result Obtained According to Criterion 3

URL	First Position	URL	Second Position	URL	Third Position	URL	Weighting 10-4-1
juguettos. com	141	amazon.es	114	amazon.es	78	amazon.es	2,112
amazon.es	118	toysrus.es	59	juguettos. com	57	juguettos. com	1,368
toysrus.es	28	juguettos. com	55	toysrus.es	40	toysrus.es	952

Table 4. Emotional Intensity Levels by Website

Web	Variable	Phase 1	Phase 2	Phase 3	Global Experience
Amazon.es	Average	0.44	0.28	0.30	0.38
	Std. Deviation	0.15	0.21	0.27	0.12
Juguettos.com	Average	0.43	0.29	0.25	0.38
	Std. Deviation	0.13	0.20	0.21	0.11
Toysrus.es	Average	0,50	0.34	0.27	0.42
	Std. Deviation	0.16	0.23	0.23	0.12

Eye Tracking

The eye-tracking technique, through aggregated data and heat maps, allows us to understand where the gaze has been concentrated in the first 10 seconds (elements that have captured attention, attraction, and interest). This provides insight into the order in which attention has been registered, unseen objects crucial to achieving the user's purpose, natural visualization routes on the web, usability issues on each website, and facilitating elements. This has enabled the identification of common navigation phases on each website, overall navigation times on each site, partial times per phase, and usability issues based on the website interface.

The highest average total navigation duration for the user group occurred on amazon.es, with 5 minutes and 6 seconds, followed by juguettos.com with 2 minutes and 12 seconds, and the lowest on toysrus.es, with 1 minute and 54 seconds. For these instructions, amazon.es requires 172% more time than the toysrus.es website.

Breaking it down by phases, in Phase 1, the website that requires the most time to locate the product is amazon.es (3 minutes, 48 seconds), followed by juguettos.com (1 minute, 36 seconds), and finally toysrus.es (1 minute, 6 seconds). Amazon.es requires 242% more time than the toysrus.es website in this phase. In Phase 2 (viewing the toy and adding it to the shopping cart), the highest average duration needed was on the amazon.com website with 1 minute and 12 seconds. Next is the toysrus.es website with 36 seconds, and lastly, the juguettos.com website with 24 seconds. Amazon.es requires 230% more time than the juguettos.com website in this phase. In Phase 3 (processing the purchase), the average times dedicated are similar across all three websites, around 24 seconds.

Partial conclusions regarding the times required for the navigation phases indicate that, for the user group, it was easiest to find the product, view it, and add it to the shopping cart on toysrus.es, followed by juguettos.com. This process was more challenging on amazon.es, with times exceeding 200% more.

Emotional Arousal (GSR)

After recording emotional-intensity levels during navigation for the 30 users across the three websites, the summary of the registered levels per phase and as an overall experience is presented in Table 4 (values expressed on a scale from 0 to 1).

At the overall experience level, the website with the highest level of emotional intensity is toysrus.es, with a value of 0.38 out of 1. When broken down by phases, toysrus.es exhibits a higher emotional intensity value in Phase 1 (0.50) and in Phase 2 (0.34), while amazon.es has the highest value in Phase 3 (0.30).

In an analysis of the number of notable peaks of emotional intensity (positive value increase equal to or greater than 0.3) per user and aggregated at the group level (Table 5), it is worth noting that amazon.es has a total of 167 peaks, with 136 peaks corresponding to Phase 1, 25 peaks to Phase

Table 5. Number of Notable Peaks of Emotional Intensity for the Group, by Website

Web	Arousal Incremental Peaks			
	Phase 1	Phase 2	Phase 3	Global Experience
Amazon.es	136	25	6	167
Juguettos.com	74	9	9	92
Toysrus.es	43	11	9	63

2, and 6 peaks to Phase 3. The majority of notable peaks in emotional intensity are associated with Phase 1 (search for the toy), indicating a higher emotional activation during that phase.

Juguettos.com has a total of 92 notable peaks of emotion, with 74 peaks corresponding to Phase 1, 9 peaks to Phase 2, and 9 peaks to Phase 3. The majority of the notable peaks in emotional intensity are associated with Phase 1 (search for the toy), indicating a higher emotional activation during that phase.

Toysrus.es has a total of 63 notable peaks of emotion, with 41 peaks corresponding to Phase 1, 11 peaks to Phase 2, and 9 peaks to Phase 3. Most of the notable peaks in emotional intensity are associated with Phase 1 (search for the toy), indicating a higher emotional activation during that phase.

At the global level, the website that generates the highest number of incremental arousal peaks is amazon.es, followed by juguettos.com and toysrus.es. When broken down by phases, amazon.es generates the highest number of incremental arousal peaks in Phases 1 and 2, while juguettos.com and toysrus.es lead in Phase 3.

Partial conclusions regarding the recording of emotional intensity levels, measured through GSR, indicate that the website with the highest level of emotional intensity (at the overall experience level) is toysrus.es, with a value of 0.38 out of 1, leading in Phase 1 (0.50) and in Phase 2 (0.34), while amazon.es has the highest value in Phase 3 (0.30). As for notable peaks of emotional intensity, the majority are concentrated in Phase 1 (finding the toy by searching through product categories), with amazon.es also leading this indicator globally.

Electroencephalography (EEG)

Below are the performance and emotion metrics recorded by EEG (Tables 6, 7, and 8), adding the emotional arousal results (GSR) from the participants' set for each website.

In the overall browsing experience for the group on the amazon.es website, there is a moderate level of emotional connection and interest, with a medium-low level of stress and a low level of relaxation. This indicates that the overall experience has been positive for a portion of the user group, albeit not intensely. In Phase 1, finding the toy on the amazon.es website, there are no significant differences in emotions compared to the complete browsing experience. This is because the average duration of this phase accounts for almost 75% of the total duration of the experience on this website.

Table 6. Values of Performance and Emotion Metrics Recorded With EEG for the Amazon.es Website

Amazon	Duration (min/sec)	Engagement	Excitement	Stress	Relaxation	Interest	Focus	Arousal
Phase 1	3 m 54 s	62%	30%	35%	27%	54%	38%	44%
Phase 2	1 m 12 s	59%	29%	37%	25%	51%	37%	28%
Phase 3	0 m 12 s	62%	38%	42%	28%	56%	39%	30%
Global Experience	5 m 6 s	62%	32%	37%	26%	55%	40%	38%
Std. Dev.		14%	9%	11%	9%	8%	10%	

Table 7. Values of Performance and Emotion Metrics Recorded With EEG for the Juguettos.com Website

Juguettos	Duration (min/sec)	Engagement	Excitement	Stress	Relaxation	Interest	Focus	Arousal
Phase 1	1 m 36 s	65%	31%	36%	27%	54%	41%	43%
Phase 2	0 m 24 s	62%	27%	34%	23%	53%	39%	29%
Phase 3	0 m 12 s	64%	29%	38%	27%	56%	39%	25%
Global Experience	2 m 12 s	64%	30%	36%	26%	55%	40%	38%
Std. Dev.		11%	11%	10%	7%	6%	6%	

Table 8. Values of Performance and Emotion Metrics Recorded With EEG for the Toysrus.es Website

Toys "R" Us	Duration (min/sec)	Engagement	Excitement	Stress	Relaxation	Interest	Focus	Arousal
Phase 1	1 m 6 s	64%	27%	34%	25%	52%	38%	50%
Phase 2	0 m 36 s	64%	27%	35%	25%	52%	38%	34%
Phase 3	0 m 12 s	63%	26%	35%	26%	52%	34%	27%
Global Experience	1 m 54 s	63%	27%	33%	25%	52%	37%	42%
Std. Dev.		11%	11%	10%	7%	6%	6%	

In Phase 2 of browsing, there is a slight reduction in emotional connection and interest, along with a small increase in stress and a decrease in relaxation. Emotional intensity has significantly decreased, suggesting that, although it is a positive stage for a portion of the user group, it is not as emotional. In Phase 3 of browsing, there are no significant differences in emotions compared to Phase 2. There is a slight increase in emotional connection, interest, and stress by 5 points, indicating that the positive experience is maintained with low emotional intensity.

In the overall browsing experience for the group on the juguettos.com website, there is a moderate level of emotional connection and interest, with low stress. This indicates that the overall experience has been positive for the user group, although not intensely. In Phase 1 of juguettos.com, there are no significant differences in emotions compared to the complete browsing experience. This is because the average duration of this phase accounts for 75% of the total duration of the experience on this website. However, these emotions have a higher level of emotional intensity (both for the three phases and the overall experience), revealing that the experience in Phase 1 on juguettos.com has been clearly positive for the group with a slightly higher emotional intensity (5% more) compared to the overall experience. In Phase 2, there are no significant differences in emotions compared to Phase 1, and while there is a slight reduction in emotional connection, the emotional intensity has significantly decreased, although it remains a positive experience stage for the user group. In Phase 3, there are no significant differences in emotions compared to Phase 2. There is a slight increase in emotional connection, interest, and stress, indicating that the positive experience is maintained for the group, albeit to a lesser extent, as emotional intensity continues to decrease slightly further in this phase.

In the overall browsing experience for the group on the toysrus.es website, there is a moderate level of emotional connection and interest, with low stress. This indicates that the overall experience has been positive for the user group, albeit with moderate intensity. For the entire group, in Phase 1, there are no significant differences in emotions compared to the complete browsing experience. This is because the average duration of this phase accounts for almost 60% of the total duration of the experience on this website. However, these emotions have a higher level of emotional intensity (both for the three phases and the overall experience), revealing that the experience in Phase 1 on toysrus.es has been clearly positive for the group, with a 10% higher emotional intensity compared to the overall experience. In Phase 2, there are no significant differences in emotions compared to Phase 1, although

Table 9. Values of Performance and Emotion Metrics Recorded (EEG), Arousal (GSR), and Time Dedicated to the Overall Experience (% Compared to Amazon.es)

Global Experience	Amazon	Juguettos	Toys "R" Us
Engagement	62%	64%	63%
Excitement	32%	30%	27%
Stress	37%	36%	33%
Relaxation	26%	26%	25%
Interest	55%	55%	52%
Focus	40%	40%	37%
Arousal	38%	38%	42%
Time	100%	42%	36%

emotional intensity has significantly decreased (30% less). This means that, although it remains a positive stage for the user group, it is with much lower emotional intensity. In Phase 3 of browsing for the group on the toysrus.es website, there are no significant differences in emotions compared to Phase 2, indicating that the positive valence is maintained for the group, albeit to a lesser extent, as emotional intensity continues to decrease a little further in this phase (20% less) compared to Phase 2.

Below is a graphical representation of the emotional response of the user group to the three websites in the overall experience (Table 9 and Fig. 1).

The overall experiences are similar, as observed in Fig. 1, except for the time, which is much longer on amazon.es, and the user experience on toysrus.es, which has a higher level of arousal and less stress. Amazon.es has a higher level of emotional activation linked to stress, requiring more attention and interest, similar to juguettos.com.

The website with the highest engagement level is juguettos.com, at 64%, with similar values for the other two websites, with the lowest on amazon.es (62%). The website with the highest excitement level is amazon.es, at 32%, followed by juguettos.com (30%), and the lowest registered value is on

Figure 1. EEG Metrics and Emotional Arousal for the Overall Experience on the Three Websites
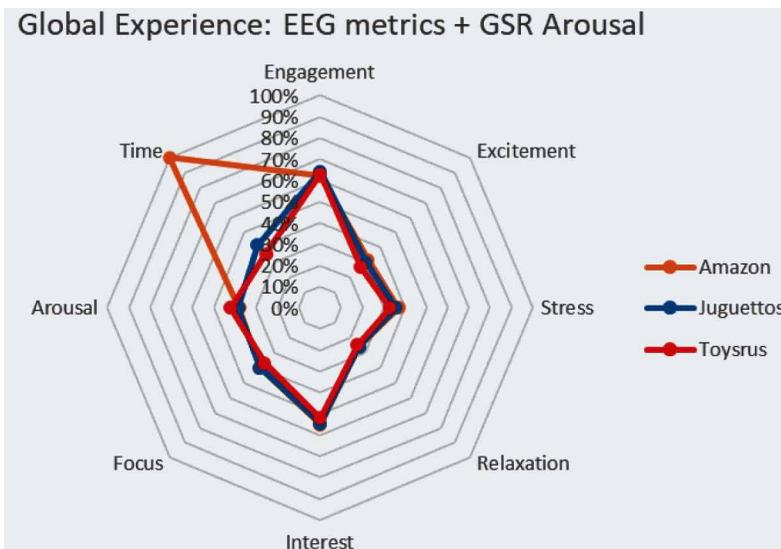
Table 10. Values of Performance and Emotion Metrics Recorded (EEG), Arousal (GSR), and Time Dedicated to Phase 1 (% Compared to Amazon.es)

Global Experience	Amazon	Juguettos	Toys "R" Us
Engagement	62%	65%	64%
Excitement	30%	31%	27%
Stress	35%	36%	34%
Relaxation	27%	27%	25%
Interest	54%	54%	52%
Focus	38%	41%	38%
Arousal	44%	43%	50%
Time	100%	41%	28%

toysrus.es (27%). The website with the highest stress level is amazon.es, at 37%, similar to juguettos.com (36%), and the lowest registered value is on toysrus.es (33%). Amazon.es and juguettos.com have identical relaxation values (26%), similar to the lower value for toysrus.es (25%). Amazon.es and juguettos.com have identical interest values (55%), followed by toysrus.es (52%), as well as identical focus values (40%), followed by toysrus.es (37%).

Regarding the differences between the values obtained for each website, there is a considerable standard deviation for amazon.es. This indicates that the values obtained from users are diverse, and therefore the experience is positive for some but not for the entire group. Additionally, it is worth noting that amazon.es involved the longest search of the three websites, indicating greater difficulty for the user group in achieving the goal. Juguettos.com had the highest levels of emotional connection, attention, and interest, which indicates that the overall experience was positive for the user group, albeit not intensely. Finally, on the toysrus.es website, where the intensity of emotional connection and lower stress was higher, the overall experience was positive for the user group. Separating the EEG metric records by phases gives the results shown in Table 10.

In the phase shown in Fig. 2, which has the longest duration, with significantly more time required on amazon.es, toysrus.es stands out with the highest level of arousal.

In the phase shown in Fig. 3, whose duration is shorter than that of Phase 2, although amazon.es still requires the most time, there is a notable overall reduction in emotional arousal, a decrease in excitement, and a slight increase in stress. In terms of arousal, toysrus.es continues to dominate in this phase.

In the phase shown in Fig. 4, with an average duration being the same for all three websites, there is a notable overall reduction in emotional arousal. There is a considerable increase in excitement and stress for amazon.es and an increase in interest for juguettos.com.

Partial conclusions regarding performance and emotion metrics (EEG) for the entire user group's browsing experience indicate positive emotional activation on the toysrus.es and juguettos.com websites (with toysrus.es having a higher level) and negative emotional activation on amazon.es. Therefore, overall, the user experience on toysrus.es has the best web usability, juguettos.com has average usability, and amazon.es has the poorest usability.

There are no significant differences in the emotions felt by the user group in Phase 1 on the three websites compared to the overall browsing experience. However, these emotions have a higher value in this phase compared to the overall experience: an 8% increase on toysrus.es and a 5% increase on juguettos.com. Both toysrus.es and juguettos.com provide a positive experience for the group, while amazon.es has a negative experience because, for the majority of users, finding the product is not

Figure 2. EEG Metrics and Emotional Arousal for Phase 1 on the Three Websites
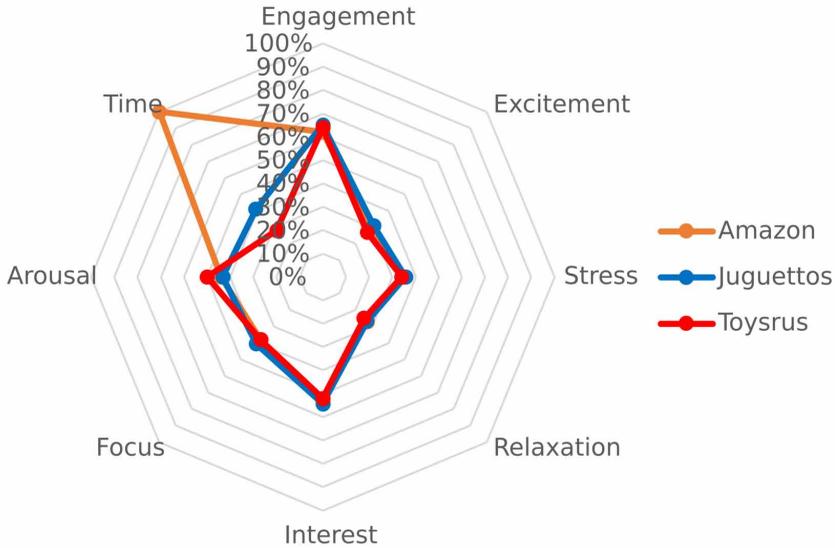
Table 11. Values of Performance and Emotion Metrics Recorded (EEG), Arousal (GSR), and Time Dedicated to Phase 2 (% Compared to Amazon.es)

Global Experience	Amazon	Juguettos	Toys "R" Us
Engagement	59%	62%	64%
Excitement	29%	27%	27%
Stress	37%	34%	35%
Relaxation	25%	23%	25%
Interest	51%	53%	52%
Focus	37%	39%	38%
Arousal	28%	29%	34%
Time	100%	33%	50%

straightforward due to the huge range of product options available on Amazon, leading users to feel overwhelmed with alternatives.

Regarding the emotions felt by the user group in Phase 2 for the three websites, on the Amazon website, there is a lower emotional connection (59%), less relaxation (25%), and higher stress (37%) compared to the values of the previous phase. Additionally, the intensity of these emotions is also the lowest (28%) among the three websites. The duration of this browsing phase is twice that of toysrus. es and more than double that of juguettos.com. This is due to users' difficulty in adding the product to the shopping cart, given the multitude of options available (the cart does not appear directly for adding the product due to more than 30 purchasing options and no direct add-to-cart option). In summary, the experience for a significant portion of users in this phase on amazon.es is negative due to low usability.

Figure 3. EEG Metrics and Emotional Arousal for Phase 2 on the Three Websites
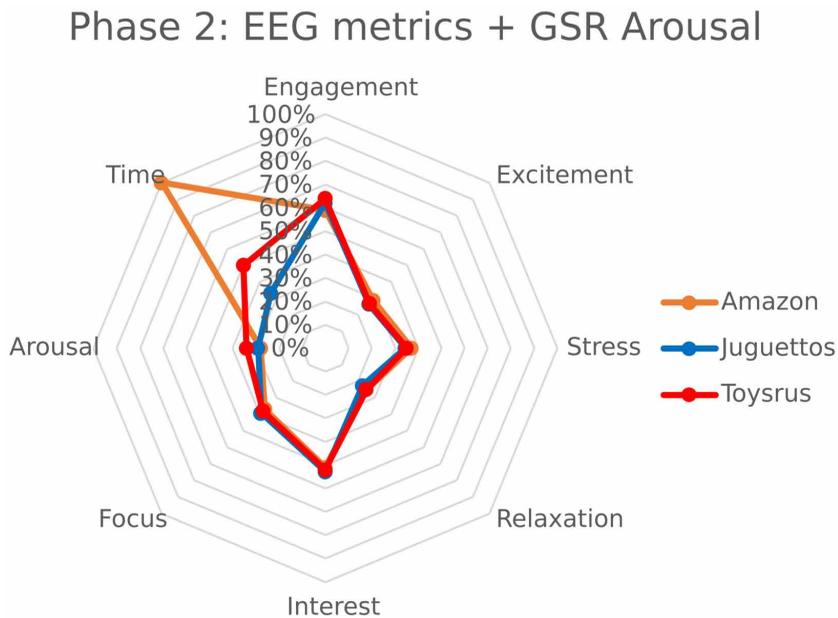
Table 12. Performance and Emotion Metrics Values Recorded (EEG), Arousal (GSR), and Time Dedicated to Phase 3 (% Compared to Amazon.es)

Global Experience	Amazon	Juguettos	Toys "R" Us
Engagement	62%	64%	63%
Excitement	38%	29%	26%
Stress	42%	38%	35%
Relaxation	28%	27%	26%
Interest	56%	56%	52%
Focus	39%	39%	34%
Arousal	30%	25%	27%
Time	100%	100%	100%

In Phase 3, stress increases on the amazon.es website (42%) compared to the previous phase due to users' difficulty in finding the checkout button. Consequently, the experience in this phase on amazon.es is negative. With lower stress levels and the same levels of emotional connection as in the previous phase, and thanks to the ease with which users can verify the order and confirm the purchase, the experience is positive on both juguettos.com and toysrus.es. Therefore, in Phase 3, the usability of these two websites is better than that of amazon.es.

Qualitative Research—In-Depth Interviews

Within the framework of the experiment, an in-depth interview was conducted, organized into two main sections: the purchasing process and the recall of the experience. Regarding the purchasing

Figure 4. EEG Metrics and Emotional Arousal for Phase 3 on the Three Websites
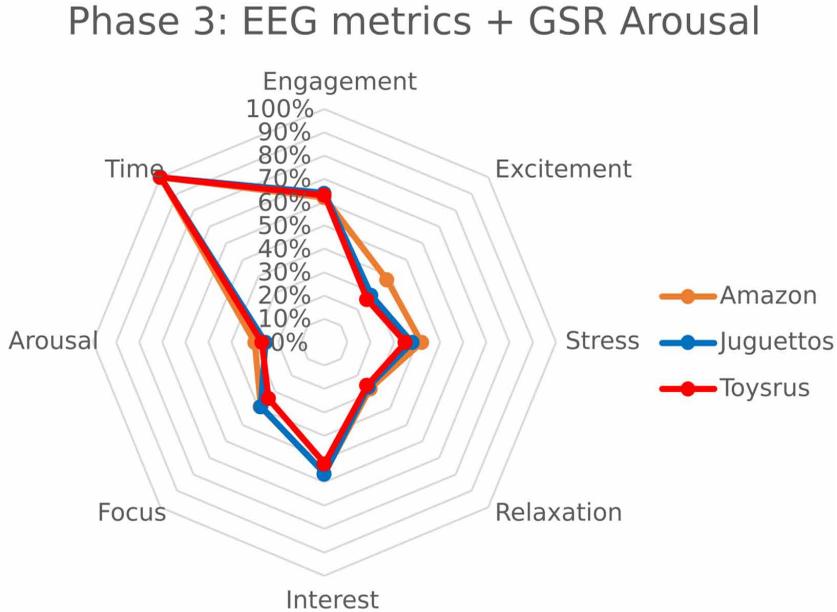
process, the majority (73%) had the intention of buying for a family member, with 27% purchasing for friends' children. Most of the user group had previously made purchases on amazon.es (97%), while 40% had made at least one purchase on juguettos.com or toysrus.es. Additionally, only a third of the users (33%) had previously made an online toy purchase on amazon.es, less than 10% on toysrus.es, and no user had made a purchase on juguettos.com.

Regarding the recall of the experience, users' perceptions of amazon.es are as follows.

Positive Aspects

- 20% value the trust offered by the brand, low prices, and shorter delivery times.
- 40% appreciate the extensive range of categories and filters available through the menus.
- 20% value the product page display options, such as images featuring people holding the product and tools such as video and magnification.
- 20% appreciate recommendations based on ratings and reviews from other users.
- 23% value the presentation of alternatives with related products after finding the desired item.
- 3% of users consider the product search speed through the menus to be quick.

Negative Aspects

- 63% believe there are too many categories and filters that make it difficult to find the product. Their perception is that the search does not maintain the specified criteria, and there is no brand filter.
- 70% declare that the search is not intuitive. The product doesn't appear on the first screen, making it difficult to find the toy and causing stress.
- 23% do not know how to complete the purchase due to confusion caused by seeing many similar options from different sellers.

Users' perceptions of juguettos.com are as follows.

Positive Aspects

- 17% appreciate the friendly, colorful web design with beautiful photos.
- 10% value that it is a company specializing in toys.
- 57% find it easy to search by categories because it's simple, direct, and intuitive.
- 43% appreciate the option to browse by brands, making it easier to find the toy.

Negative Aspects

- 13% think there is a lack of information on the product page and a lack of interactivity to view other photos and people with the product in hand. Juguettos prioritizes showing brands and internal reference codes.
- 47% experience difficulty due to a lack of filters, as only sorting criteria can be selected. The lack of retention of criteria means the user has to go back and forth between menus multiple times to find the product. Juguettos provides too much information, and the age range is only up to 14 years.
- 20% consider the price higher than on the amazon.es website.
- 18% miss reviews and ratings from other users, reducing trust in the website.

Users' experience of toysrus.es are as follows.

Positive Aspects

- 70% find it easy to search by categories; it's intuitive to chain through different category filters, brands, etc., in the search for the toy.
- 67% positively value being able to find the toy through the brands featured on the homepage.
- 40% consider the website well organized, with the menu at the top of the page. Additionally, the product information is very visual.
- 10% find it convenient to complete the purchase process.

Negative Aspects

- 27% consider the price higher than on the amazon.es website, and this always includes shipping costs, as there is no option for in-store pickup.
- 17% of users have seen a "product not available" message, shown at the end of the purchase. Time could have been saved if this had been indicated after finding the toy.
- 10% of users could not view the cart or modify its contents, as it is done directly in the last step of the purchase. Additionally, in the final part of the purchase, it is not intuitive to remove a product.

Participants' Recommendations

- 76% of users would recommend purchasing a toy on the amazon.es website due to brand trust, product variety, and pricing.
- 57% of users would recommend purchasing a toy on the juguettos.com website because they have had a good experience, finding it simple and direct when searching for a product. However, some users would not recommend it, citing a lack of previous experience and comparing it unfavorably to Amazon's security, reliable delivery times, and, in some cases, lower prices.

- 70% of users would recommend purchasing a toy on the Toys "R" Us website because they have had a positive experience, stating that the website is well organized and intuitive, making it easy to search for and find products quickly by categories. However, some users would not recommend it due to higher prices compared to the other two websites and the trust they have in amazon.es.

DISCUSSION

This research work aims to contrast whether the top organically positioned websites on internet search engines (related to the toy sector in Spain) coincide with those having the best usability and user experience. Digital communication is essential for corporations in all industries. Corporate web positioning reflects companies' interest in online communication with their customers, partners, competitors, and the general public (Ruban & Yashalova, 2022). The content analysis of the websites focuses on five key aspects of corporate web positioning: customer satisfaction, national leadership, the company itself, business approach, and innovative technologies, and complementary themes such as natural/ecological products, healthy products, and proprietary products (full-cycle production).

The first part of the work was carried out by selecting keywords and conducting corresponding searches on google.es, followed by filtering and sorting based on three criteria. This determined that the best organically positioned websites for the toy product are amazon.es, juguettos.com, and toysrus.es. Subsequently, the user experience (perceptions and emotions of consumers while navigating) of the top-ranked websites in toy searches in Spain was recorded using neuromarketing biometrics. This involved analyzing emotional activation levels (engagement, emotion, stress, relaxation, attention, and interest) on each website, as well as the task difficulty in each phase (dedicated times) to complete the experience. This comparison allowed us to evaluate the usability of the top organically positioned toy-selling websites in Spain based on user experience.

Possible gaps in the research are expected to arise from the impact of interactive and immersive technologies on consumer practices (Sağkaya Güngör & Ozansoy Çadirci, 2022) and their potential to enhance brand engagement through consumer-to-consumer interactions. On the amazon.es website, for most users, emotions were negative due to the difficulty of finding toys easily amid numerous categories and filters, as well as the challenge of completing the purchase due to the many options of related products and sellers for the same toy. Users recommend the Amazon website for trust in purchases, lower prices, and faster delivery times. On juguettos.com, for most users, emotions were positive, as it was easy and intuitive to search for toys by categories. However, almost half of the users experienced negative emotions due to the difficulty finding items on the website, as only sorting criteria can be selected. Additionally, a fifth of the users mention higher prices compared to the Amazon website as a reason not to recommend the site. On toysrus.es, for most users, emotions were positive, as it was easy and quick to search and find toys by categories. The search is intuitive due to various filters such as category and brands. These users would recommend the website. Only less than a third of users would not recommend it because the prices are higher than the other two websites and due to the trust they have in the Amazon brand.

Search-engine algorithms do not consider brain responses linked to emotions, such as levels of attraction and visual attention, stress and engagement peaks, and the intensity of emotional experiences. These search algorithms are based primarily on the prenavigation phase (search queries) and the textual content of the website, but not on the distribution of elements, colors, and the customer journey map within the website. Currently, the closest approximation between design and user experience is achieved with tools like Hotjar, which provides information about mouse movements, but this is not very informative, and at times the data provided can be counterproductive for drawing conclusions about the user experience. Somatic markers (Damasio, 2006), or emotional footprints, are capable of altering user behaviour during the web-navigation process, regardless of the brand's correct SEO positioning efforts. Search engines are the primary access point to website content. SEO attempts to increase the quantity and quality of traffic to a website through organic search-engine results. SEO

aims to satisfy the search intent behind the keyword used as well as to provide the best possible user experience on the landing page, thereby ranking search results (Alcaraz Martínez, 2021). Academic studies of SEO have focused mainly on understanding how general search engines like Google work, studying SEO in relation to libraries and repositories, and investigating positioning techniques in general and in specific business sectors (Lopezosa et al., 2023). However, there is a research gap in demonstrating the relationship between search-engine ranking and user experience. Search engines are focused on providing users with an enhanced, personalized, and well-targeted experience on the web. Along with the focus on content quality and user preferences, search engines have also been striving to integrate Semantic Web primitives to enhance their intelligence (Mavridis & Symeonidis, 2015).

Previous studies aim to improve the visibility of single-page applications (SPAs) and user experience by focusing on the complexities of SEO, contrasting with the challenges in optimizing SEO in SPAs instead of conventional multipage applications (MPAs) (Kowalczyk & Szandala, 2024). The author proposes an innovative approach to client-side rendering for initial page load, combined with traditional SEO practices, performance enhancements, and customized methodologies for specific technologies, facilitating SEO optimization in SPAs to a level comparable with MPAs. The findings of this work have significant implications for web developers, offering practical insights and strategies to increase visibility and performance in search results. The work highlights the critical role of SEO optimization in the context of SPAs, emphasizing its importance for search-engine rankings and overall user engagement and satisfaction.

A study on interactivity, navigability, and visibility dimensions in digital media that have won the Online Journalism Awards and the World Digital Media Awards provided data for the creation of new services and products focused on user experience (Santos-Hermosa et al., 2023). Specific levels of attributes such as consumer advice-taking, search-engine optimization, perception-based interactivity, consumer message forums, product risk, and discounted pricing are crucial for motivating customers to purchase online (Sharma et al., 2019). The findings of this work are applicable to other sectors and geographic regions, applying the same methodology and comparing SEO and UX results. The results enable a better understanding of issues such as consumer collaboration, consumer trust, and service satisfaction (Kusa et al., 2022).

CONCLUSION

In terms of user experience, the best web usability for the user group was observed on toysrus.es, followed by juguettos.com, and finally amazon.es. Eye-tracking biometrics on amazon.es showed that only 37% of users found the toy on the first attempt. Additionally, 33% of users were unsure how to add the item to the shopping cart or complete the purchase. The average duration was the longest of the three websites, at 5 minutes and 6 seconds. On juguettos.com, the results showed that only 33% found the toy on the first attempt. The overall average duration was much shorter, at 2 minutes and 12 seconds. Although users faced initial difficulties, it was easier for them to find the toy, with the duration being half the time compared to amazon.es. On toysrus.es, 76% found the toy on the first attempt during the search, with the overall average duration being the shortest of the three websites, at 1 minute and 54 seconds. Therefore, this website was the easiest on which to find the toy and required the least amount of time.

Regarding the intensity of emotions felt by users, toysrus.es (arousal = 0.42) was 4 points higher than the other two websites. In terms of the quantity of significant peaks, the highest number occurred on amazon.es (167), followed by juguettos.com (92) and toysrus.es (63). Regarding the divergence of emotions formed and related to these peaks of emotional intensity, it should be emphasized that on Toysrus.es, the most intense and positive emotions for users were emotional connection (63%), lower stress (33%), relaxation (25%), and interest (52%). Users expressed that it was easy to find (83%) and would recommend the website (70%). In the case of juguettos.com, the emotions levels were similar, with slightly more stress (36%) and interest (55%), but less intense, although still positive for users.

Users indicated that it was easy to find (60%), although less so due to the usability difficulty of having sorting criteria that do not persist while navigating, causing users to get lost. Despite a higher price than amazon.es, users would still recommend the website (57%), as they positively value the fact that it is a specialized company in the sector, generating more trust.

Finally, on amazon.es, the peaks of emotional activation show levels similar to the other websites but with higher stress (37%) and the same level of relaxation (26%), confirming the users' difficulty in completing the task and feeling overwhelmed. Users (70%) communicated that it was difficult to find the toy because the search was not intuitive. In Phase 1, the emotions of stress are more intense (44%), as users were initially annoyed by the large number of menu categories (13) to choose from at the start of the search. Subsequently, with many possible filters and numerous product options displayed, they feel frustrated in finding what they are looking for or because they cannot find it. Users perceive that the website does not maintain the marked criteria during the search, and there is no filter by brand. They communicate (60%) that there are many categories and filters that make it difficult to find the product. This results in a negative experience due to low usability in completing the task, in which the time spent is in fact 260% more than on the other two websites.

In Phase 2, with less intensity, emotional connection (59%) and interest (51%) decrease and stress (37%) increases slightly compared to the previous phase. The reason is that users cannot find the shopping cart, as only options like "View all buying options" and "Add to wish list" appear. In Phase 3, once inside "Buying options," users face the additional difficulty of choosing from many sellers (60) to complete the purchase, generating even greater setbacks due to the many possible options and increasing the stress level to 42%. Despite this, the majority of users (76%) would recommend the website for toy purchases due to Amazon's security, product variety, and lower prices.

Limitations of the Study

There may be variability in user experience due to individual differences in preferences. However, the neuromarketing study is based on mental patterns, identifying such patterns in the study from a minimal number of users.

Future Lines of Research

The balance between SEO and UX can be assessed across various sectors and products in the future to validate the existing gap between these two key disciplines in digital marketing. SEO is an essential tool for digital communication and aids in preferred placement on search engines, encouraging users to visit the website. However, UX is crucial for retaining users for longer durations and ensuring that the website achieves its intended objectives, thus preventing users from prematurely ending their experience. Consequently, digital-marketing teams must work on both fronts to ensure proper integration.

This research focused on toy products in Spain. The geographical scope could be expanded using online programs to measure user experience based on emotions (browser-based platforms) that do not require physical presence or specific equipment, as they use webcams for eye tracking and face coding (emotion tracking). Additionally, future work may include an analysis of navigation from smartphones and tablets to record emotional responses and understand user needs through these browsing formats.

Future research lines could explore the potential existence of similar trends in different industries or whether the observed phenomena are exclusive to the toy sector in Spain. Similarly, longitudinal studies could be useful for tracking changes over time or experiments to test specific improvements in user experience. This would allow for an expansion of the study's impact.

CONFLICTS OF INTEREST

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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REFERENCES

AEFJ. (2022). *2022 yearbook*. Spanish Association of Toy Manufacturers. https://aefj.es/anuario-aefj/

Alcaraz Martínez, R. (2021). User-centered SEO: A paradigm shift aimed at better meeting the needs of people in the Google search engine. *Cuadernos de Documentación Multimedia*, *32*, 1–14. doi:10.5209/cdmu.81156

Babaç, E., & Yüncü, H. R. (2022). Determination of user experience on food business websites using neuromarketing techniques. *Tourism & Management Studies*, *18*(3), 49–64. doi:10.18089/tms.2022.180304

Bastone, A., Schiavone, F., Carli, M. R., & Juárez-Varón, D. (2023). How to shorten the market entry innovation in a highly regulated market. The case of Early Access programs in the pharmaceutical industry. *The International Entrepreneurship and Management Journal*, *19*(4), 1561–1581. doi:10.1007/s11365-023-00893-y

Buvár, Á., & Gáti, M. (2023). Digital marketing adoption of microenterprises in a technology acceptance approach. *Management & Marketing*, *18*(2), 127–144. doi:10.2478/mmcks-2023-0008

Cai, Y.-J., & Choi, T.-M. (2023). Omni-channel marketing strategy in the digital platform era. *Journal of Business Research*, *168*, 114197. doi:10.1016/j.jbusres.2023.114197

Chen, J.-C., & Sénéchal, S. (2023). The reciprocal relationship between search engine optimization (SEO) success and brand equity (BE): An analysis of SMEs. *European Business Review*, *35*(5), 860–873. doi:10.1108/EBR-02-2023-0045

Cuong Hung, P. (2021). Online consumer goods purchase behavior, e-wom. *International Review (Steubenville, Ohio)*, (1–2), 46–54.

Damasio, A. R. (2006). *Descartes' error: Emotion, reason, and the human brain*. Penguin Books.

Donzé, P.-Y., & Wubs, B. (2019). Storytelling and the making of a global luxury fashion brand: Christian Dior. *International Journal of Fashion Studies*, *6*(1), 83–102. doi:10.1386/infs.6.1.83_1

Erdmann, A., Arilla, R., & Ponzoa, J. M. (2022). Search engine optimization: The long-term strategy of keyword choice. *Journal of Business Research*, *144*, 650–662. doi:10.1016/j.jbusres.2022.01.065

Erhan, T. P., van Doorn, S., Japutra, A., & Ekaputra, I. A. (2024). Digital marketing innovation and firm performance: The role of decision-making comprehensiveness in dynamic environments. *Asia Pacific Journal of Marketing and Logistics*, *36*(2), 435–456. doi:10.1108/APJML-01-2023-0097

Ferrer-Mavárez, M. Á., Aguirre-Villalobos, E. R., & Valecillos-Pereira, J. B. (2023). Applicability of the user experience methodology: Communication and employment web portal for older adults. *Media and Communication*, *11*(3), 63–76. doi:10.17645/mac.v11i3.6775

Gosline, R. R., Lee, J., & Urban, G. (2017). The power of consumer stories in digital marketing. *MIT Sloan Management Review*, *58*(4), 10–13.

Hien, N. N., & Nhu, T. N. H. (2022). The effect of digital marketing transformation trends on consumers' purchase intention in B2B businesses: The moderating role of brand awareness. *Cogent Business & Management*, *9*(1), 2105285. doi:10.1080/23311975.2022.2105285

Hussain, W. M. H. W., & Ayob, A. H. (2023). Trends in digital marketing research: A bibliometric analysis. *International Journal of Marketing. Communication and New Media*, *11*(20), 142–165. doi:10.54663/2182-9306.2023.v11.n20.142-165

Jan, A., Khan, M., Ajmal, M. M., & Patwary, A. K. (2023). From traditional advertising to digital marketing: Exploring electronic word of mouth through a theoretical lens in the hospitality and tourism industry. *Global Knowledge, Memory and Communication*, ahead of print. 10.1108/GKMC-08-2022-0199

Juarez, D., Tur-Viñes, V., & Mengual, A. (2020). Neuromarketing applied to educational toy packaging. *Frontiers in Psychology*, *11*, 2077. doi:10.3389/fpsyg.2020.02077 PMID:32982857

Juárez-Varón, D., Mengual-Recuerda, A., Capatina, A., & Núñez Cansado, M. (2023). Footwear consumer behavior: The influence of stimuli on emotions and decision making. *Journal of Business Research*, *164*, 114016. https://doi.org/https://doi.org/10.1016/j.jbusres.2023.114016. doi:10.1016/j.jbusres.2023.114016

Juárez-Varón, D., Mengual-Recuerda, A., Ferrándiz-Bou, S., & Alarcón-Valero, F. (2021). Aspects of industrial design and their implications for society. Case studies on the influence of packaging design and placement at the point of sale. *Applied Sciences (Basel, Switzerland)*, *11*(2), 517. https://www.mdpi.com/2076-3417/11/2/517. doi:10.3390/app11020517

Juárez-Varón, D., Tur-Viñes, V., Rabasa-Dolado, A., & Polotskaya, K. (2020). An adaptive machine learning methodology applied to neuromarketing analysis: Prediction of consumer behaviour regarding the key elements of the packaging design of an educational toy. *Social Sciences (Basel, Switzerland)*, *9*(9), 162. https://www.mdpi.com/2076-0760/9/9/162. doi:10.3390/socsci9090162

Kahneman, D. (2017). *Thinking, fast and slow*. Macmillan.

Karnjanasomwong, J., & Thawesaengkulthai, N. (2015). TRIZ-PUGH model, new approach for creative problem solving and decision making. In *2015 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)* (pp. 1757–1761). IEEE. doi:10.1109/IEEM.2015.7385949

Kim, J., Hahm, B., Lee, H., & Choi, J. (2022). An optimization system for search engine marketing: Keyword efficiency analysis and bidding optimization. *Journal of the Korean Institute of Industrial Engineers*, *48*(6), 584–594. doi:10.7232/JKIIE.2022.48.6.584

Kowalczyk, K., & Szandala, T. (2024). Enhancing SEO in single-page web applications in contrast with multi-page applications. *IEEE Access : Practical Innovations, Open Solutions*, *12*, 11597–11614. doi:10.1109/ACCESS.2024.3355740

Kusa, R., Suder, M., Barbosa, B., Glinka, B., & Duda, J. (2022). Entrepreneurial behaviors that shape performance in small family and non-family hotels during times of crisis. *The International Entrepreneurship and Management Journal*, *18*(4), 1545–1575. doi:10.1007/s11365-022-00812-7

Lacarcel, F. J., & Huete, R. (2023). Digital communication strategies used by private companies, entrepreneurs, and public entities to attract long-stay tourists: A review. *The International Entrepreneurship and Management Journal*, *19*(2), 691–708. doi:10.1007/s11365-023-00843-8

Li, S., Shi, Y., Wang, L., & Xia, E. (2023). A bibliometric analysis of brand orientation strategy in digital marketing: Determinants, research perspectives and evolutions. *Sustainability (Basel)*, *15*(2), 1486. doi:10.3390/su15021486

Lokman, A. M., Isa, I. G. T., Novianti, L., Ariyanti, I., Sadariawati, R., Abd Aziz, A., & Ismail, A. (2022). Emotional user experience in web-based geographic information system: An Indonesian UX analysis. *International Journal of Computer Science and Network Security*, *22*(9), 271–279. doi:10.22937/ijcsns.2022.22.9.37

Lopezosa, C., Codina, L., & Rovira, C. (2023). Investigating SEO from social sciences: Scoping review. *Bid-Textos Universitaris de Biblioteconomia I Documentacio (51)*, December. 10.1344/BID2023.51.07

Mavridis, T., & Symeonidis, A. L. (2015). Identifying valid search engine ranking factors in a Web 2.0 and Web 3.0 context for building efficient SEO mechanisms. *Engineering Applications of Artificial Intelligence*, *41*, 75–91. doi:10.1016/j.engappai.2015.02.002

Melo Borges Tiago, M. T. P., & Cristóvão Veríssimo, J. M. (2014). Digital marketing and social media: Why bother? *Business Horizons*, *57*(6), 703–708. doi:10.1016/j.bushor.2014.07.002

Mengual-Recuerda, A., Tur-Viñes, V., & Juárez-Varón, D. (2020). Neuromarketing in haute cuisine gastronomic experiences. *Frontiers in Psychology*, *11*, 1772. doi:10.3389/fpsyg.2020.01772 PMID:32849050

Mengual-Recuerda, A., Tur-Viñes, V., Juárez-Varón, D., & Alarcón-Valero, F. (2021). Emotional impact of dishes versus wines on restaurant diners: From haute cuisine open innovation. *Journal of Open Innovation*, *7*(1), 96. doi:10.3390/joitmc7010096

Meyer, M. (2021). *Evolving marketing strategies for Swiss ICT SMEs: A marketing strategy canvas in the light of digital transformation* [Unpublished doctoral dissertation]. Edinburgh Business School, Heriot-Watt University.

Moncayo Sánchez, Y. P., Vallejo Sánchez, D. P., Gavilanes Sagñay, M. A., & Camacho Gaibor, V. P. (2023). Knowledge management and ICT as tools of digital marketing in business administration. *Bibliotecas—Anales de Investigacion, 19*(1).

Moschini, S. (2012). *Claves del marketing digital: La nueva comunicación empresarial en el mundo* (*Keys to digital marketing: The new business communication in the world)* (Vol. 3). La Vanguardia Ediciones, S.L.

Núñez-Cansado, M., Carrascosa Méndez, G., & Juárez-Varón, D. (2024). Analysis of the residual effect using neuromarketing technology in audiovisual content entrepreneurship. *Sustainable Technology and Entrepreneurship, 3*(3), 100069. https://doi.org/https://doi.org/10.1016/j.stae.2023.100069

Oliveira, Z., Silva, A. F., & Teixeira, S. (2023). Factors affecting the relationship between brands and digital consumer in Portugal. *International Journal of Marketing*. *Communication and New Media*, *11*(20), 226–256. doi:10.54663/2182-9306.2023.v11.n20.226-256

Paniagua-Iglesias, A., & García-Ureta, I. (2023). In their own words: How new ad agencies call themselves. Analysis of their organic positioning and web pages. *Methaodos.Revista de Ciencias Sociales, 11*(2), m231102a06. 10.17502/mrcs.v11i2.647

Redondo-Rodríguez, L., Yábar, D. C. P.-B., & Díaz-Garrido, E. (2023). Impact of technological innovation on digital entrepreneurship and the effects on the economy. *The International Entrepreneurship and Management Journal*, *19*(3), 1501–1526. doi:10.1007/s11365-023-00873-2

Ruban, D. A., & Yashalova, N. N. (2022). Corporate web positioning as a strategic communication tool in agriculture. *Agriculture*, *12*(8), 1101. doi:10.3390/agriculture12081101

Sağkaya Güngör, A., & Ozansoy Çadirci, T. (2022). Understanding digital consumer: A review, synthesis, and future research agenda. *International Journal of Consumer Studies*, *46*(5), 1829–1858. doi:10.1111/ijcs.12809

Santos-Hermosa, G., Lopezosa, C., & Codina, L. (2023). Interactivity, searchability and web visibility in award-winning digital journalism. *Cuadernos.Info*, *54*, 51731. doi:10.7764/cdi.54.51731

Seifert, R., Otten, C., Clement, M., Albers, S., & Kleinen, O. (2023). Exclusivity strategies for digital products across digital and physical markets. *Journal of the Academy of Marketing Science*, *51*(2), 245–265. doi:10.1007/s11747-022-00897-0

Sharma, G., Bajpai, N., Kulshreshtha, K., Tripathi, V., & Dubey, P. (2019). Foresight for online shopping behavior: A study of attribution for "what next syndrome.". *Foresight*, *21*(2), 285–317. doi:10.1108/FS-11-2017-0069

Tayar López, R. (2018). *CRO. Diseño y desarrollo de negocios digitales (CRO. Design and development of digital businesses)*. Anaya Multimedia.

Togawa, T., Sato, T., & Saito, J. (2017). Media processing technologies for affective digital marketing. *Fujitsu Scientific and Technical Journal*, *53*(5), 38–46.

Torres, R., Rivera, J., Cabarcas, R., & Castro, Y. (2017). La efectividad del uso del marketing digital como estrategia para el posicionamiento de las PyMEs para el sector comercio en la ciudad de Barranquilla. *Investigación y Desarrollo en TIC*, *8*(2), 3–5.

Tüfekci, Ö. K., & Akbiyik, F. (2023). Conceptual level strategy recommendations for understanding marketing communication efforts in digital consumption culture with neuroscience technique. *Journal of Mehmet Akif Ersoy University Economics and Administrative Sciences Faculty*, *10*(2), 1710–1723. doi:10.30798/makuiibf.1282255

Vinutha, M. S., & Padma, M. C. (2023). Insights into search engine optimization using natural language processing and machine learning. [IJACSA]. *International Journal of Advanced Computer Science and Applications*, *14*(2). Advance online publication. doi:10.14569/IJACSA.2023.0140211

Wani, J. A. (2024). The current research landscape in digital marketing scientific literature in libraries: Exploration through performance and science mapping. *Digital Library Perspectives*, *40*(1), 35–52. doi:10.1108/DLP-07-2023-0059

YachouAityassine, F. L., Al-Ajlouni, M. M., & Mohammad, A.YachouAityassine. (2022). The effect of digital marketing strategy on customer and organizational outcomes. *Marketing and Management of Innovations*, *4*(4), 45–54. doi:10.21272/mmi.2022.4-05

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