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WEB NEURODESIGN AND THE USER EXPERIENCE. ANALYSIS OF A PRACTICAL CASE: ZARA

EL NEURODISEÑO WEB Y LA EXPERIENCIA DEL USUARIO. ANÁLISIS DE UN CASO PRÁCTICO: ZARA

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ABSTRACT

Introduction: It is proposed that neuroscience offers a theoretical framework to understand and improve user interaction with websites, influencing their decisions and behaviors. This study aims to explore whether the application of neuroscientific principles to web design can significantly enhance the user experience, using the Zara website as a case study. **Methodology:** Qualitative and observational, based on a literature review and a detailed analysis of the design and functionality of Zara's website. The theoretical foundations are built upon key works in neuroscience and neurodesign, including those by Lisa Feldman Barrett and Daniel Kahneman. The analysis focuses on observing how design elements, such as images, visual simplicity, and information organization, affect user perception and behavior. **Results:** They reveal that applying neuroscientific principles to Zara's web design generates a positive user experience. Elements such as the use of large editorial images and minimalist design help capture and maintain user attention, promoting intuitive and efficient navigation. Heat maps indicate that users focus their attention on key areas of the page, suggesting careful design planning to maximize visual and emotional impact. **Discussion and Conclusions:** It is confirmed that web neurodesign can improve user experience and increase conversions. It is concluded that, although these techniques can be highly effective, it is crucial to apply them ethically to avoid user manipulation. The study also highlights the need for future

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research that integrates more advanced neuroscientific tools, such as eye tracking, to validate and extend these findings. Finally, it is recognized that while neurodesign offers great potential, its implementation must balance the benefits for the user and the commercial objectives of the company.

Keywords:

Neuroscience; Web; Design; Internet; Marketing.

RESUMEN

Introducción: se plantea que la neurociencia ofrece un marco teórico para entender y mejorar la interacción del usuario con los sitios web, influenciando sus decisiones y comportamientos. Este estudio tiene como objetivo explorar si la aplicación de principios neurocientíficos al diseño web puede mejorar significativamente la experiencia del usuario, utilizando el sitio web de Zara como caso de estudio. **Metodología**: cualitativa y observacional, fundamentada en una revisión de la literatura y un análisis detallado del diseño y la funcionalidad de la página web de Zara. Las bases teóricas se construyen a partir de obras clave en neurociencia y neurodiseño, incluyendo los trabajos de Lisa Feldman Barrett y Daniel Kahneman. El análisis se centra en observar cómo los elementos de diseño, como las imágenes, la simplicidad visual y la organización de la información, afectan la percepción y el comportamiento del usuario. **Resultados:** revelan que la aplicación de principios neurocientíficos en el diseño web de Zara genera una experiencia de usuario positiva. Elementos como el uso de grandes imágenes editoriales y un diseño minimalista ayudan a captar y mantener la atención del usuario, promoviendo una navegación intuitiva y eficiente. Los mapas de calor indican que los usuarios focalizan su atención en áreas clave de la página, lo que sugiere una planificación cuidadosa del diseño para maximizar el impacto visual y emocional. **Discusión y Conclusiones**: se confirma que el neurodiseño aplicado a la web puede mejorar la experiencia del usuario y aumentar las conversiones. Se concluye que, aunque estas técnicas pueden ser altamente efectivas, es crucial aplicarlas de manera ética para evitar la manipulación del usuario. El estudio también destaca la necesidad de futuras investigaciones que integren herramientas neurocientíficas más avanzadas, como el *eye tracking*, para validar y extender estos hallazgos. Finalmente, se reconoce que, aunque el neurodiseño ofrece un gran potencial, su implementación debe equilibrar los beneficios para el usuario y los objetivos comerciales de la empresa.

Palabras clave:

Neurociencia; Web; Diseño; Internet; Marketing.

1. INTRODUCTION

To deeply understand what man expresses either in conversations or through other means such as art or audiovisual media has been a recurrent theme in the last centuries of history. This research has given rise to questions such as: to what extent can humans control their actions? What actions trigger an impulsive or slightly thought-out response? What is an impulsive answer? Is it conditioned by the subconscious?

Neuroscience aims to study the nervous system to understand how emotions, thoughts, behaviors, and basic bodily functions (The National Institutes of Health, 2019). Therefore, to answer the above questions, one must look to it for the answer. But in what discipline could this knowledge be applied? Are there tools that can directly influence decisions?

One of the great revolutions of this century is the arrival of the Internet and with it all the platforms, applications and other communication facilities that have been developed as a result of its existence. The choice of an outfit, check the weather, and a host of information required on a daily basis becomes a quick and more or less effective or pleasing inquiry through the network. Even in the case of online stores, the virtual catalog can be considerably more extensive than what can be found in physical stores.

The study carried out through this research seeks to analyze the combination of two disciplines: neuroscience and web design, i.e., web neurodesign. The study will analyze whether both factors can be merged to offer customers a better user experience. It will be done through a case study in a Spanish online store: Zara.

2. OBJECTIVES

The general objectives of this study are:

- To learn in depth about neuroscience, how the human brain works and its impact on decision making.
- To research the scientific bases of neuroscience and neurodesign to create a solid foundation that will help new companies to know what aspects of their website they need to enhance to offer a better user experience.
- To encourage the web design community to use the tools that neuroscience offers to provide a better service and have more satisfied customers.

Specific objectives:

- To know what factors influence web users as soon as they land on an online store.
- To foster knowledge of neuroscience applied to web design in a simple and accessible vocabulary.
- To discover to what extent the customers are autonomous in their purchasing choices.
- To verify whether the order of the products on Zara's website is driven by neuroscience.
- To confirm whether or not neurodesign is featured on Zara's website.
- To carry out cooperative work between both disciplines to create an experiment that allows us to reach empirical conclusions.

3. METHODOLOGY

All work has a documentation behind it that provides coherence, solidity and credibility. If an analogy is made, this article is the tip of the iceberg, while its hidden part is the research and documentation necessary to carry it out.

The article has been constructed by conducting qualitative research with the theories of different authors. The foundations of neuroscience have been created thanks to Lisa Feldam Barret and her book *The secret life of the brain: how emotions are built* (2018), the unconscious has been known by the hand of Daniel Kahneman in *Thinking, Fast and Slow* (2012). And finally, neurodesign was explored in depth by Darrer Bridger in *Neuro design: neuromarketing insights to boost engagement and profitability* (2017).

4. RESEARCH DEVELOPMENT

Since the beginning of medicine, the brain has always been a great unsolved mystery. In the words of Norman (2002) "Human beings are, of course, the most complex of all animals with brain structures that are accordingly complex" (p.40). The complexity of this organ is also reflected in the information that is known about it. However, "with the advent of noninvasive techniques, knowledge about the nervous system has grown substantially by slightly shedding light on this great mystery" (Pérez et al., 2016, p. 85).

Neuroscience is not a single discipline, but "a set of sciences and scientific disciplines whose purpose is to know the relationship between human behavior and the nervous system and which parts of the nervous system are activated depending on the task we are performing" (Araya-Pizarro et al., 2020, p. 3). Consequently, "the knowledge given by this discipline to design is very interesting, specifically cognitive neuroscience, since it focuses on perception and the way we interact with reality" (Pérez et al., 2016, p. 85).

4.1. Cognitive neuroscience and design

The classical view of emotions speaks that emotions are the result of evolution and refinement of the nervous system after years of survival (Barrett, 2018). Because of this, each emotion has a unique "fingerprint" that is identified regardless of origin, culture, or age; that is, emotions are universal (Barrett, 2018, pp. 17-18). Consequently, "the way we express different emotions such as fear, joy or surprise, have the same facial and bodily expressivity, recognizable by all of us" (Barrett, 2018, p. 23).

This scientific basis, falls mainly on Paul McLean's triune brain theory. According to McLean, the brain is divided into three interconnected parts: the reptilian, the limbic and the neocortex. The reptilian, the oldest, is the brain that deals with survival from a binary system (yes or no), with basic tasks such as eating or sleeping (McLean c.p. Suárez, & Barrios, 2012, pp.149-150). This is the one that regulates fast and automatic decisions, which would correspond to Kahneman's System 1.

The reptilian brain, on the other hand, is the emotional brain and gives the capacity to desire and feel. "It is in charge of processing emotions, instinct and behavior" (Suárez, & Barrios, 2012, p.151). Finally, "the neocortex will be the newest evolutionarily speaking, dealing with the most complex cognitive functions such as rational, sequential and linear intelligence, in addition to associative, creative and holistic intelligence" (Suárez, & Barrios, 2012, p.152).

To make it more graphic, David Juárez Varón explains in the TEDx Talk (2012) that the reptilian brain will be the lazy and selfish one, the limbic brain will only want to live in the moment while the neocortex will be the scientific and rational one. When it comes to making a decision, these three brains will debate, always having the reptilian brain as the

basis. Depending on which brain wins, a more emotional (limbic) or rational (neocortex) decision will be made.

On the other hand, cognitive neuroscience indicates that the brain in its first years of life creates a computational system that begins to order experiences (Barrett, 2018, p. 124). These experiences, will be received through sensory input that will be giving validity or dismissing the predictions of the brain while saving and storing the experiences in memory (Barrett, 2018, p. 87).

In short, when you observe something, you do not interpret what you see merely with the sensory inputs that arrive. Rather, when a new input is received, the brain asks the memory which parts are familiar, and thereafter creates a prediction of what, from experience and knowledge, the brain believes is most likely to be what it is looking at, hearing, or touching (Bar, 2009).

However, "Why does our brain create these predictions? To save energy, considering its size, the brain has a high energy demand" (Buen, 2013, p. 23). That is why, "once we unconsciously feel satisfied with that sensory input, our attention ends so as not to waste energy" (Buen, 2013, p. 37). In short, "we notice the unusual, register the anomalous and remember the extraordinary" (Buen, 2013, p. 91).

4.1.1. Reason vs. emotion

"Not all decisions are easy to face; some of them, the most challenging ones and the ones that affect us the most, require us to pay more attention" (Cortado-de-Kohan, 2008, p. 68). Consequently, the question arises: are decisions completely rational or are they linked to emotions?

It has always been considered that human beings are rational beings, which is what differentiates them from other animals. However, a new perspective on decision making has recently been raised: "it is not a completely rational process, but emotions acquired through our experiences influence when solving a problem" (Luis-Felipe et al., 2017, pp. 32-33). Moreover, "this speed will depend on the experience we have on that issue" (Barón et al., 2018, p. 33).

The Nobel Prize in Economics Daniel Kahneman (2012) in his book *Thinking, fast and slow* addresses two systems of the human mind:

1. System 1: we have no sense of control, it works quickly and autonomously. It is the one that guides the automated actions by making associations between ideas and the knowledge that has been stored throughout life.

2. System 2: it is the one that guides those actions which we consciously perform them. Therefore, we need to focus our attention on what we are doing, otherwise, it will be done worse or not done at all. In short, it is the one we use when we perform an activity that we do not normally do and needs extra attention, awareness.

System 2, will also be activated when something happens that is not in accordance with what System 1 knows, for example, seeing a person walking backwards (Kahneman, 2012, pp. 13-15).

These two systems are further developed into Intuition (System 1) and Reasoning (System 2). System 1, being performed automatically and using intuition, tends to be emotionally driven. While System 2, being slower, rational and analytical needs more attention, so it tends to be emotionally neutral (Luis-Felipe et al., 2017, p. 34).

4.1.2. What is neurodesign?

Design and technology are closely linked, since the latter continuously modifies the course of work of the former. In addition, thanks to technology, new ways of designing and new spaces appear that require design for technological development, as is the case of web design (Herrera, 2012).

Therefore, although it cannot be said that there is a science that creates effective designs per se without the help of human work. It can be stated that, "thanks to neuroscience and the designer's own intuition, it is possible to render a more effective and straightforward work for the consumer" (Bridger, 2017, p. 4). Being able to define: "the set of data and motivations born from neuroscience, feasible to be used when designing" (Muñoz, 2018, p. 4).

Thus, in short, it can be stated that, thanks to scientific advances in the field of neuroscience, more specifically non-invasive techniques such as A/B testing or eye tracking, it is possible to create more powerful and effective designs. Moreover, "the cheapening of these techniques allows more designers and/or companies to access and use them" (Bridger, 2017, p. 210).

4.2. Case study analysis: Zara

> Zara, always one step ahead, is a driving force for change in the fashion arena, with trends and inspiration available to everyone. Its raison d'être is to provide everyone, whoever they are, with the fashion they deserve: always up-to-date, inspiring and responsibly produced (Inditex, 2022c).

In recent years, Zara has achieved great popularity. But where did it originate? Where does it have its roots? In 1963, Amancio Ortega founded a small workshop in A Coruña, which 12 years later became Zara. In 1988-90 the brand began to expand across the globe. And it was not until 2007, that its brands launched into the electronic market, offering its customers a close relationship and the latest trends at an affordable price (Inditex, 2022b). Zara, specifically, started its website in September 2010 (López, 2022, p. 24).

4.2.1. The unconscious and Zara

As previously presented, the system that controls the subconscious according to Kahneman is System 1, "being the system that has a preference for images and a privileged access to them, as well as a direct impact on our way of feeling and emotions" (Bridger, 2017, p. 10). On the other hand, according to a study conducted by the University of Ottawa, Canada, during the first fifty milliseconds the viewer creates the first impression

about a web page (Lindgaard et al., 2006, p. 125). However, "during these seconds we value not only the visual appeal, but also the website's usability, credibility and novelty" (Papachristos et al., 2011, p. 490).

It is concluded that Zara decided to quickly attract the attention of the viewers' subconscious by offering them a format that is different and new from the usual format of online clothing sales websites. Zara offers, already in the first instance, novelty, visual appeal and credibility. This is because users define how reliable a website is according to its color and simplicity, as well as how modern it seems to them (Hasan et al., 2013, p. 35).

Simplicity is clear since, apart from the logo and the large carousel of images, the other elements are minimal. And the novelty fulfills it by going for a different and unique home page in its sector.

All these details will create a positive or negative feeling in the users that will last during the subsequent navigation on the web, being this emotion difficult to change. This phenomenon is known by psychologists as "the halo effect", "the tendency for a positive feeling about something to subsequently non-consciously bias us to rate it positively on other factors too" (Bridger, 2017, p. 83). Making you like a particular design and attract you without following logical reasoning.

On the other hand, it should be noted that the vast majority of the photographs showing the garments are editorial style. That is, the garments are shown in real situations, not with a flat white background. Indeed, "when we receive sensory input, our brain looks to those experiences stored in memory to predict what we are looking at" (Bar, 2009, p. 1235). Therefore, placing images that the memory can relate to live experiences, will always benefit the viewer's vision of the product.

The use of editorial style images that can be seen on Zara's website is not exclusive to this store. Stores like H&M also use them to show some of their garments. Although not as strongly as Zara.

4.2.1.1. The attention of the unconscious on Zara's website

When looking at an image, "we unconsciously focus first to the center, if in this position we find nothing, our second point to look at is the upper left side and subsequently we already open our gaze" (Bridger, 2017, p. 168). The vast majority of the garments on Zara's website are arranged in the center, which makes the attention fall from the first moment on the garments.

On the other hand, it is also worth noting the position on the screen of the website's logo: top left, the second place to which people unconsciously look. Moreover, because of its density, size, color and background, irrevocably, the attention will go there. If we compare Zara's website with H&M's, its logo is located at the top center of the screen, giving less weight to the brand than Zara.

As a result, it can be deduced that Zara itself does not want mental energy to be wasted looking in more places for its garments other than the ones that have naturally already been seen. Although, on the other hand, it is giving almost equal importance to all the garments, since they are all in the same place. With the exception of those that stand alone on the screen or those that take up the entire web page.

However, this way of arranging the images on the screen also has a negative or positive effect depending on where the emphasis is placed. On the one hand, by having only two or one garment that fit on the web, the customer has to scroll with the mouse constantly. This effect is known as scrolling, "causes our eye to have to continually readjust to the information it is receiving, which affects the mental representation of the text and the compression of it" (Mangen et al., 2013, p. 65). But, on the other hand, it also urges the customer to scroll infinitely down with the goal of finding something they like.

A recent study has shown that this factor is due to the accessibility of processing similar information. That is, if the content that follows is familiar or similar to what is being consumed at that moment, it is easier to process it. Because of this, it is believed that what is coming next will also be enjoyed. The problem lies in the fact that "it is easier for our brain to keep scrolling down than to change activity, which makes us keep looking at, in this case, garments, and invest more time than expected" (Woolley et al., 2022). From the user's point of view, this can become negative, as they get hooked on the web without being aware of it. But from Zara's point of view, this will increase the time a user spends on their website and the possibility of purchase.

On the other hand, the scrolling effect leads us to believe that the products at the top of the website are the ones that Zara wants to draw attention to. However, the brand itself changes the products it places at the top every day, and the most expensive products are not always at the top. Therefore, the previous theory is discarded, and it is not clear what criteria is followed to order the products. However, the most logical theory is that they put those products that they want to highlight or that are not selling as they expect at the top to increase their sales and that is why every day, they modify the location of the products.

4.2.2. Heat maps and Zara

When a potential customer looks at a website, they do not distribute their attention evenly, but rather certain content is looked at for longer and more times than other content (Pernice, 2017). Heat maps are the result of eye tracking, a technique used in neuroscience to discover where the eyes look for how long to try to discover why.

These maps, by using different colors, show the degree of fixation that customers have on different components of the web. Corresponding red to a higher fixation of users and blue to little fixation, passing before orange and yellow (Moran, 2017). Although heat maps help to see how the end customer interacts with the products, they do not enable us to know why they do so; further analysis will be needed.

In this case, the heat map creation has been simulated thanks to Zyro (zyro.com), which, with the help of artificial intelligence, makes it possible to recreate an idea of what the result would be like. The resulting heat map serves to confirm the theory that is proposed: the minimalism of the entire web page makes the viewer's attention go directly to the center of the image as shown in Figure 3. Although in this case, because the letters of the Zara logo are in bold, added to its size, color and position, the logo has more visual weight than the clothes themselves.

Figure 1. Heat map.

Source: Elaborated by the authors based on Zara's official website. (https://www.zara.com/es/)

All in all: "[...] people tend to spend very little time reading most web pages. Instead, we scan (or skim) them, looking for words or phrases that catch our attention" (Krug, 2006, p. 39).

4.2.3. Zara user satisfaction

Zara's strategy consists of anticipating customers' desires and offering them a unique experience (Inditex, 2022c). Its entire marketing plan has its target audience at the very center of its strategy, by offering "a unique fashion proposal, built on creativity, emotion, innovation, quality and, most especially, a permanent attitude of listening to the needs and desires of our customers" (Inditex, 2022a).

Thanks to this, it can be seen in its Annual Report 2022 (see Figure 4) that in recent years there has been an exponential growth in Zara's sales, with an increase of 4.175 million euros.

Table 1. *Economic indicators of the evolution over the last 5 years published in the Inditex Group Annual Report FY2022.*

	2022	**2021**	**2020**	**2019**	**2018**
Turnover (in million euros)					
Ventas	32.569	27.716	20.402	28.286	26.145
Ventas *on line*	22,4%	25,5%	32%	14%	12%
Sales broken down by chain (in millions of euros)					
Zara (Zara+Zara Home)	23.761	19.586	14.129	19.564	18.021

Source: Inditex, 2022a.

Taking into account these data and their marketing strategy, it is concluded that their customers must be satisfied, otherwise they would not have experienced such an increase in sales from one year to the next. And since they do not invest in advertising, this increase must be linked to the quality of their garments, their price, speed of delivery and customer service.

On the other hand, based on data obtained from the Spanish Organization of Consumers and Users (OCU), Zara's website has an overall rating of five stars in all aspects: product information, purchase process, delivery and after-sales service, legal information and, most importantly, user satisfaction (OCU, 2022).

5. CONCLUSIONS

In the section “Case study analysis: Zara” we have delved into its origins to understand how it is today and where it has been going. In this section an analysis was made of its profits, strategy and slogan, as well as its website and user satisfaction.

After analyzing the brand's website, the organization of its elements and the colors and photographs used. It has been concluded that Zara thinks carefully what pictures and colors to use thanks to the use of heat maps. And all this information has led to the conclusion that its function is to improve the user experience and, consequently, increase sales.

After conducting this research, the hypothesis can be confirmed with the evidence that Zara's website is created in such a way that the customer thinks little and moves almost instinctively through the web. This is achieved through the use of a low visual complexity, keeping in its minimum expression those elements that are not the garments, and through the use of photographs in which the products are shown in real situations that appeal to the human memory.

However, neurodesign has its limitations. Although it makes it easier to understand the mind of users and to test designs with the end customer to find out which elements work best, it does not help in the creation of designs and ideas. This task belongs entirely to the human being.

On the other hand, looking out for the integrity of the user, neuroscience work has great benefits for improving education and providing a better user experience to the design recipient. However, it can also manipulate the viewer's mind to make decisions they are not even aware they are making.

First, it is stated that the last two general objectives have been met. A neuroscience, web neurodesign and user experience base has been created. When properly applied, this base can help new companies to get off to a good start in their business. Through this base, at the same time, the use of the tools offered by neuroscience is also encouraged, since, in order to properly apply the previous statement, they must be used.

On the other hand, the first general objective has not been met. When approaching neuroscience, a subject has been discovered. Although exciting, it is complicated to understand in depth due to the use of medical terminology that requires previous knowledge. Nevertheless, it has been possible to create a base from which to begin. It is

suggested to continue this study in the future together with specialized personnel in neuroscience, who will be able to shed light and simplify the technicalities, just as the authors will be able to do in their own field.

Regarding the specific objectives, first of all, it was possible to discover the factors that influence users when landing on a website. However, these factors are not generic or applicable to any website. These would be the use of large images that appeal to the subconscious and emotions and the minimal use of other elements that distract the viewer in this task.

Secondly, it is considered that a simple and accessible vocabulary about this technical know-how, which can be understood by people from other backgrounds, has been kept throughout the entire study.

Thirdly, the advantages of neuroscience for the web user have been determined, as it offers a more accessible, easy and intuitive product to use. The danger is that it appeals so much to the unconscious that sometimes the user is not aware of the actions they are taking and why they like or are attracted to a particular product.

Fourthly, it has not been possible to draw a clear conclusion as to why Zara arranges the products in the way they do, since they change every day. Although the theory that has been put forward is that, they place the garments they want to highlight or sell more at the top of the web so that the customer does not have to do an extensive search. And so, this position is modified every day, since it is based on the previous day's sales.

Fifthly, the last specific objective has been confirmed. As the stated hypothesis suggests, it can be affirmed that neurodesign is featured on Zara's website.

Finally, it would be of great value to scientifically confirm the hypothesis through the use of specific neuroscience apparatus such as eye tracking. This would shed new light on the hypothesis and confirm something that is difficult to find reliable information on.

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