Changes in product design and development processes: design thinking, service design and user experience.

Del Giorgio Solfa, Federico, Alvarado Wall, Ticiana Agustina y Amendolaggine, Guido.

Dirección estable: https://www.aacademica.org/del.giorgio.solfa/522

ARK: https://n2t.net/ark:/13683/pa9s/uzu

Good practices

CHANGES IN PRODUCT DESIGN AND DEVELOPMENT PROCESSES: DESIGN THINKING, SERVICE DESIGN AND USER EXPERIENCE

CAMBIOS EN LOS PROCESOS DE DISEÑO Y DESARROLLO DE PRODUCTOS: DESIGN THINKING, DISEÑO DE SERVICIOS Y EXPERIENCIA DEL USUARIO

Federico Del Giorgio Solfa [I] *   https://orcid.org/0000-0002-0962-531X

Ticiana A. Alvarado Wall [I]   https://orcid.org/0000-0002-5305-3638

Guido Amendolaggine [II]   https://orcid.org/0000-0002-6572-8081

[I] National University of La Plata, Buenos Aires, Argentina
[II] Politecnico di Milano, Milan, Italy

*Corresponding author: delgiorgio@fba.unlp.edu.ar

Abstract

This article addresses the new theories and concepts of design management: design thinking, user experience (UX) and service design. They consider people's experiences and focus on the characteristics of each one of them. From industrial design, the scope and relationships between these definitions - now better visible - were analyzed, which always belonged to the design field of the discipline, from which an attempt was made to identify how they influence innovation, design and development of new products. To account for the evolution that the design field has had, the most significant processes are contrasted to visualize the differences that make this change fundamental. Finally, it is concluded on its strategic relevance for the application in public and private organizations. Also taking into account how these theories are methodologically incorporated into the set of activities inherent to industrial design.

Escuela Superior de Cuadros del Estado y del Gobierno

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Keywords: industrial design, design process, user experience, design thinking, service design, human-centered design

Resumen

Este artículo aborda las nuevas teorías y conceptos de la gestión del diseño: pensamiento de diseño, experiencia de usuario (UX) y diseño de servicios. Consideran las experiencias de las personas y se centran en las características de cada una de ellas. Desde el diseño industrial, se analizaron los alcances y relaciones entre estas definiciones -ahora más visibles-, que siempre pertenecieron al campo del diseño de la disciplina, desde el cual se intentó identificar cómo influyen en la innovación, diseño y desarrollo de nuevos productos. Para dar cuenta de la evolución que ha tenido el campo del diseño, se contrastan los procesos más significativos para visualizar las diferencias que hacen fundamental este cambio. Finalmente, se concluye sobre su relevancia estratégica para la aplicación en organismos públicos y privados. También teniendo en cuenta cómo estas teorías se incorporan metodológicamente al conjunto de actividades inherentes al diseño industrial.

Palabras clave: diseño industrial, proceso de diseño, experiencia de usuario, pensamiento de diseño, diseño de servicio, diseño centrado en las personas

Introduction

What we call Design Thinking is practiced in one way or another by all great thinkers, whether in literature or art, music or science, engineering or business. But the difference is that, in design, there is an attempt to teach it as a systematic method of creative innovation that defines practice. It is intended to be the normal way to proceed, not the exception.[1]

The new definitions that complement the activity of industrial design, at first can be overwhelming and later become confusing, if not deepened. The professional profile of the industrial designer is continually evolving and resignifying itself. Therein lies the importance of reflecting and being able to define these new functions that push the boundaries forward - now blurred - that professional reality imposes on it.

This new context requires a type of product design focused on people (Human Centered Design), which are no longer seen as mere consumers. It must act in favour of the kindest, most human and emotional aspects of the individuals' experience, of what they may not know how to describe, but they feel inside. This results in a deepening of the study of their experiences, lived or developed by users when accessing and interacting with a product or service.

Likewise, work is done on the experiences of the personnel that provide the product or service. Designers not only have to understand the cultures of others, but also their own and assume that their emotions, practices, and belief systems inform what, how, and why they do what they do. Dialogue is encouraged between all those who experience/live/compose the product or service ecosystem, consulting with the members of the organizations, their partners, brand representatives and final users.

From this perspective, the implementation of Design Thinking allows, on the one hand, to deploy (unlock) the potential of the different tools that industrial design has today seeking to create new concepts of experiences that make it possible to satisfy everyone the actors of the project, production and social complex of consumption.

On the other hand, Service Design is in charge of organizing the processes and internal actors of companies, in order to reach the end user with a product or service that satisfies their needs efficiently, considering the particularities of their consumption experience. The user experience comprises the last stage, the moment in which the user comes into direct contact with the product or service to satisfy their particular and specific needs, seeking to ensure the best possible experience with the least effort.

The article is structured in three parts, theoretical background, focus analysis and the changes in the traditional design process.

Theoretical background

Design Thinking

Since Rowe introduced the term design thinking in 1987, a set of ideas have been discussed over the years.[2,3,4] Even Brown consolidated and extended its application in the academic field. In his article, Brown,[5] explains the importance of design from an anthropocentric and collaborative perspective, through which the resolution of design problems reaches new frontiers.

The impact of these articles on design thinking is reflected in a dissemination and popularization of the design profession, since this practice can become a strategic tool to reach innovative solutions to problems and, in this way, obtain differentiating results. It is proposed to understand the discipline as a complex design system and not as a tool limited to the aesthetics and functionality of products, and to use the design process as a holistic approach to problem solving.[6]

According to Gasca & Zaragozá,[7] the main reason for the existence of Design Thinking is to emerge as a novel tool that combines rational, logical and intuitive thinking due to optimize the decision-making process. To specifically explain Design Thinking, Brown[5] clearly states that this methodology seeks to think about the problem from the broadest perspective, not focusing on a product, but looking at the entire context. That is why in his article he states that the practice of design thinking as such exists before the designer's profession.

Many of the innovations that man has made throughout human history, such as the railroad, the steam engine, electricity, to name just a few, would not have been possible if at that time the inventors had not thought about the problem comprehensively. In these cases, they not only created a specific product, but developed the entire system. Of course, at that time they did not call themselves design thinkers, nor did they explain that they worked under this methodology. The terminology of design thinking appears much later and is a term that seeks to explain this perspective in order to systematically confront problems and find effective and concrete solutions.[3]

This, may explains why the role that the industrial designer has taken in recent years has gone from being tactical, that is, as a late complement in the value chain, to being strategic. It has placed

Del Giorgio Solfa F, Alvarado Wall T, Amendolaggine G

organizations in a position to create the idea that best meets the desires and expectations of consumers.[4] The decision to position design in a strategic place is a mainly business measure. The organizations' strategy and management system has been experiencing a process of crisis due to the lack of innovation and differentiation from competitors, is now seeking novel ways of organizing and producing better effects. Design (and, with it, designers) now appears as a differential innovation factor that can change paradigms, not only in terms of business, but, and above all, in the collaborative and interdisciplinary way of working it proposes for achieve new results.

The design process proposed by design thinking seeks constant feedback at each stage to obtain the best solutions. The role of the designer in each step of the project serves to coordinate the participating actors with an empathetic and intuitive profile, who can guide the participatory process and obtain the most significant contributions from each one. The main authors divide this process into five stages: 1) empathize (learn from the user for whom it is to be designed); 2) define (a starting point according to user needs); 3) devise (generate creative solutions for the defined need); 4) prototyping (making the idea tangible); and 5) testing (the prototype with the user and learning from their feedback).[2,3,5,4,8]

Service Design

As we saw earlier, these trends have an anthropocentric vision, which includes a series of practices around the understanding of the needs, wants and constrains of users. All of them seek to enhance strategic decision-making and increase the effectiveness of individual programs and services. But, for the product or service to arrive effectively, it can satisfy their needs and, above all, provide a good user experience the internal elements of organizations must be organized and properly operated.

Here is where the concept of SerDes appears, a design methodology based on organizing the interactions between people, infrastructure, communication and material components to improve the quality of the provision of products and services. According to Mager: "Service Design aims to ensure service interfaces are useful, usable and desirable from the client's point of view and effective, efficient and distinctive from the supplier's point of view" (p. 355).[9]

We can say that it transforms something intangible and abstract —as a service is— into something visible and understandable. It helps people to experience goods and services, offering them something extra to improve everyday life. In other words, the activity of an organization is approached from within, reviewing its work dynamics, thinking about the experience of each of its sectors. These processes are invisible doors outside organizations, but for the most part they have a direct impact on the overall user experience. According to Fritsche: "Service Design is a holistic segment of the business, which consists of rethinking how a company works, through the planning and organization of people, infrastructure, communication and material components of a service, but also through the use of the human factor of emotion." (p. 9).[10]

The incorporation of service design generates a series of benefits in the operation of an organization; it provides a context for reflection and discussion around the systems that must be implemented to provide a service in an adequate way; fosters discussion of procedures or policies, exposes weaknesses or deviations, and thus designs appropriate solutions; and it helps order and align certain aspects of internal functioning such as functions, processes, and workflows.[11]

User Experience

User Experience is a definition introduced by Donald Norman in the mid-nineties to describe a type of design focused on comprehensively solving the particular and specific needs of users, allowing them to achieve the best experience and satisfaction of use with the least effort, from a multidisciplinary work and taking into account the subjectivity of the different users.[12]

These models came up from a variety of disciplines: sociology, psychology, marketing, and of course Design. Consequently, the models vary in their terminologies and analytical commitments. However, on closer inspection, some common threads emerge from this analyses.[13]

User Experience differs from the concept of usability, which is not limited only to improving performance in the product-user interaction, but seeks to a systemic solution for strategic problems of product utility, psychology of pleasure and satisfaction of use.[14,15,16,17] To enable user experience actions, professionals study every aspect about users, their behaviours, their actions and reactions, observe and measure the degree of ease with which they interpret and use the interface of a product.

What has happened over time with the concept of user experience is that it has been relegated almost exclusively to the development of digital interfaces, such as websites or applications for mobile devices, through which it seeks to improve the customer relationship or of the user with the organization that provides the service. However, Norman makes an appreciation of this problem and proposes to understand the life of a person as a set of experiences that must be designed and rethought and not just focus or stay tied to the design of the digital experience.[1]

Focus analysis

The contact points

By integrating the concepts developed so far, we came out with an end-to-end experience approach, at the initial end of which we have service design, which organizes the internal elements and processes of the organization to ensure a product or service, and at the end of which we have the user experience, which examines the particular and specific needs of users when acquiring each value (product or service) [**Figure 1**]. This communication between both extremes can be defined as touch points, which take place in a given instance of time, in a certain place and through a specific delivery channel. Generally, we will find multiple points of contact, such as material artifacts, environments, interpersonal encounters, and others.[18,19,20]

In accordance with Clatworthy: "Every time a person interacts or relates to the product or service, a point of contact is given, they have a service meeting. This provides an experience and adds something to the person's relationship with the service and its provider. The sum of all interactions and experiences forms the opinion that the user has about the product or service and its supplier." (p. 25).[20]
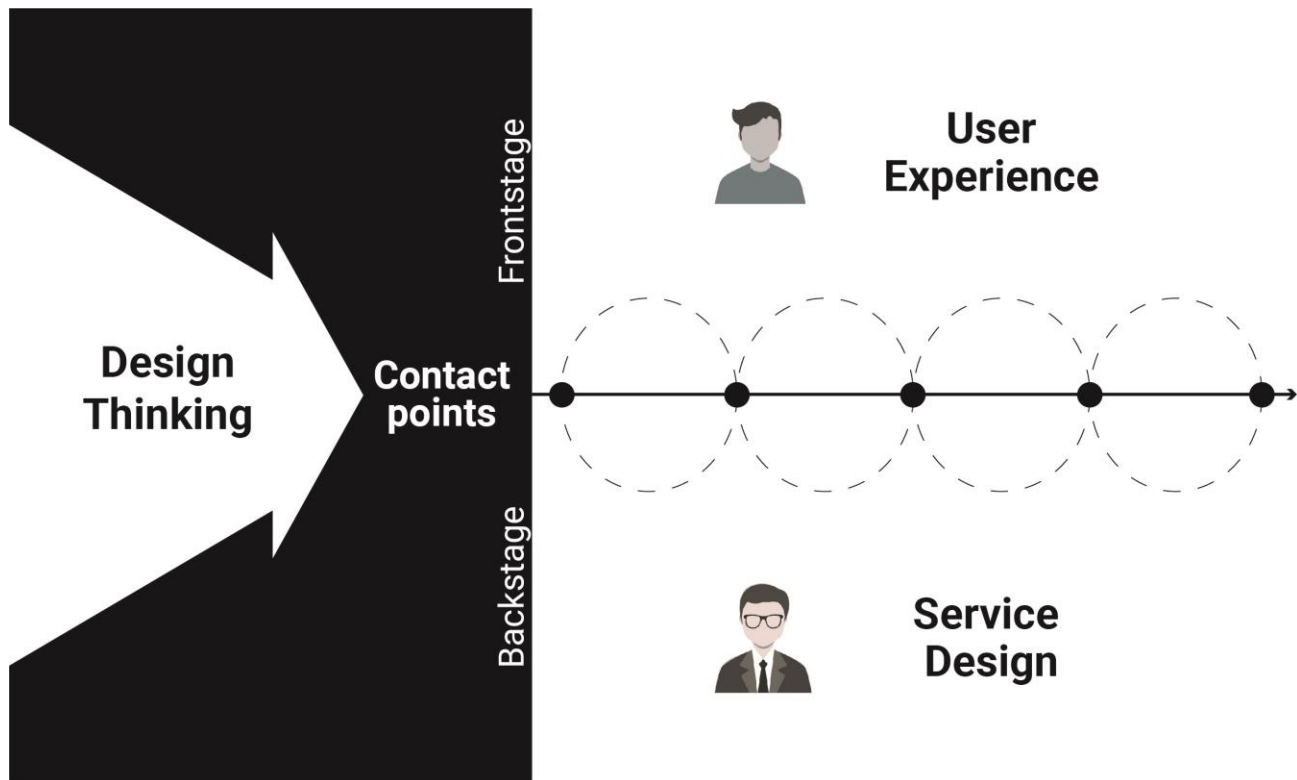
Del Giorgio Solfa F, Alvarado Wall T, Amendolaggine G

Figure 1. Main concepts related to design thinking

Source: Own elaboration based on Martenson (2009) and Lemon & Verhoef (2016)

Martenson[18] provides a categorization to understand contact points depending on where they are originated, either internal or external to the organization that we consider valid for product design.[13] The internal or inside-out are those generated within the organization, while the external or outside-in are those initiated by customers. Both types are necessary for the proper functioning of an organization and for the product or service to satisfactorily reach the user.

The Internet and advances in computer technology offer new ways to connect with organizations and allow users to actively participate and thereby shape their own experiences. Depending on the degree of intervention that organizations can have on them, the contact points can be controllable, influenceable or uncontrollable.[21]

Dunn and Davis,[22] they add another useful point of view for the classification of contact points based on the process of purchasing a product or service. Depending on the time of the User Experience, the contact points may be prior to the purchase, during the purchase or after it.

Contact points of pre-purchase experience are very important, since they represent the first encounter of the user with the brand. They involve communication between users through advertising and the internet, but also through word of mouth. Those that happen during the purchase are those that determine the acquisition of a product or service, and have to do with the points of sale and the quality of the sale service, as well as with the customer service centers.

And the post-purchase experience contact points are those that are given once the user acquires the product or service and are related to guarantees, after-sales services and satisfaction surveys.[15,16,17]

Iteration

Another important factor is adopting an iterative mindset throughout all the development process. Iterating means making constant prototyping and testing to receive feedback about our solution, and reframe it from the feedback received, learning from our previous "mistakes". Many authors, not only designers, agree in the importance of failing and learning from this process of trial and error. "In fact, early failure can be crucial to success in innovation. Because the faster you find weaknesses during an innovation cycle, the faster you can improve what needs fixing." (p. 41).[23]

Iteration brings some benefits to the design process; you can get feedback early in the development lifecycle, it is a regular testing in which you learn something new from each iteration, you can measure in real times if you meet user needs, and last but not least it gives stakeholders a clear visibility of the progress and evolution of your process.

To sum up, this is not just a step in the design process, but it represents a continuous process of testing and integrating feedback throughout all the development, it will take few rounds of iterations before reaching the final solution that best address users' needs.

Discussion: changes in the traditional design process

From the study of the design currents that have become protagonist in recent times, we can make an analysis of the evolution that the traditional design process has had, arising from materials on industrial design by Löbach[24] and Quarante[25]. Its theoretical and methodological bases allowed the profession to be conceived as a project activity, perfectly inserted in the complex productive world.

However, this new millennium presents multiple and unexpected events, which cause new uncertainties. Industrial design, not oblivious to these changes, was evolving and repositioning itself and reached new stages of leadership in industrial projects and developments based on design management.

The new currents described throughout this work are based on classical design theories and take part in their processes and methodologies, but they propose new points of view for approaching and solving problems that are better adapted to current reality. It is a comprehensive methodology based more on different complementary approaches than on participatory construction, which evaluates and proposes solutions throughout the entire cycle and where the productive, commercial and consumer spheres interact. In this sense, it is characterized by having a comprehensive approach that contemplates the entire production and consumption sequence and which, being a two-way process, allows communication and feedback between the different stages and going back to make better decisions or solutions previously raised [Figure 2].
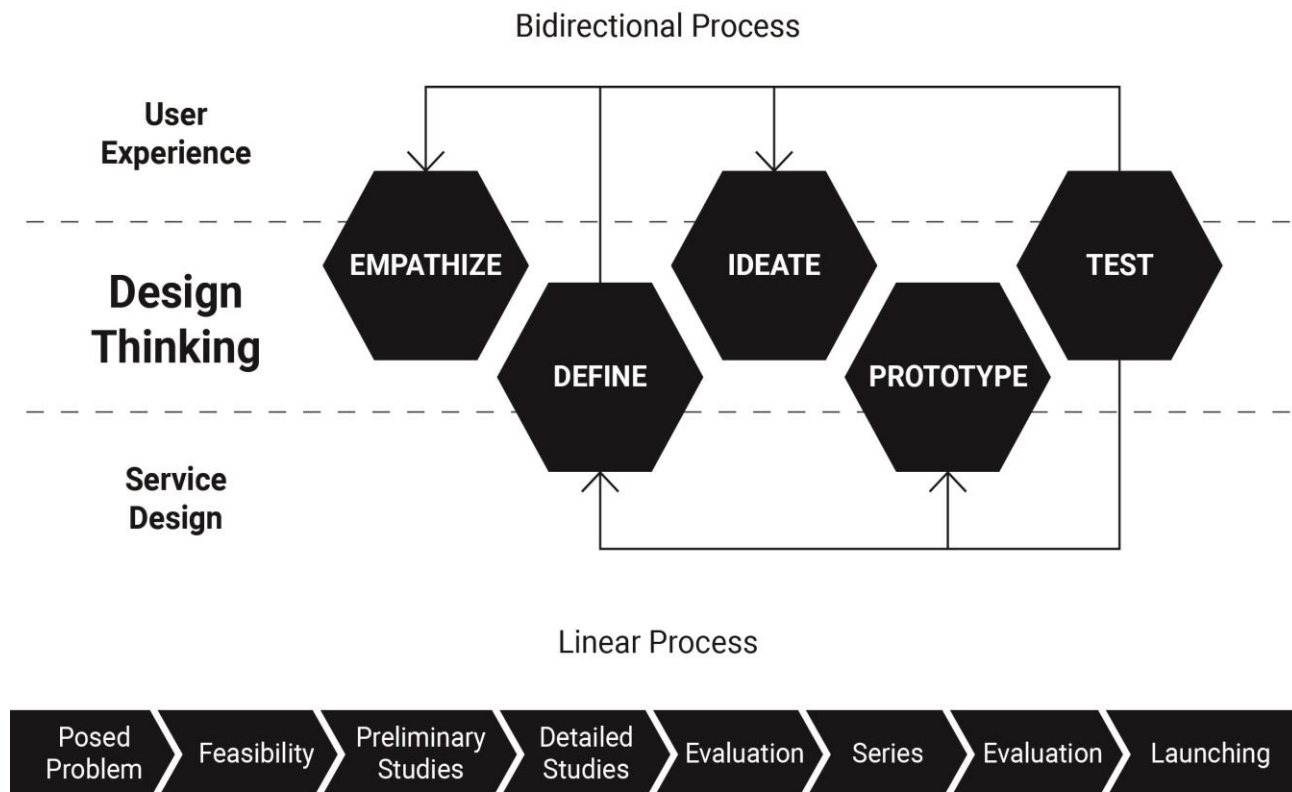
Figure 2. Comparison between industrial design processes
Source: Own elaboration from Quarante (1994) and Brown (2008)

Conclusions

At this point, we have reflected about some of the current concepts that redefine design in general and industrial design in particular, and shape new paradigms or models to act on product and service innovation. In the framework of design thinking, by studying the concepts of service design and user experience as complementary, we discover the importance that touch points acquire to reach systemic, comprehensive and more precise design solutions.

In particular, design thinking allows the participatory development of technological innovations reorganizes all the productive resources available and includes the user in decisions throughout the process. Service design obliges professionals and productive decision-makers not to ignore or disregard the multiple services that derive from the design and development of products. The user experience — which by its focus on the human-machine system relationship— appears as an evolution of ergonomics (physical and psychological) and keeps design in the leading role of the tireless search for satisfaction of experiences.

As a corollary, we understand that many times it is not sympathetic (or politically correct) to use concepts in English in the Latin American context, but, at the same time, we maintain that these should

ISSN 2664-0856 / Vol. 5 No. 3 / September-December (2021) / e178
Del Giorgio Solfa F, Alvarado Wall T, Amendolaggine G

8

not be ignored, especially when they are internationally recognized and, furthermore, they rank the design against other current approaches to administrative science.[26]

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Conflict of interests

The authors declare that they have no conflicts of interest.

Authors' contribution

- Federico Del Giorgio Solfa: Conceptualization, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing.
- Ticiana Agustina Alvarado Wall: Conceptualization, Investigation, Methodology, Visualization, Writing – original draft, Writing – review & editing.
- Guido Amendolaggine: Conceptualization, Investigation, Methodology, Writing – original draft.