



Redesigning Design Education: Four Teaching Actions Facing the Challenges of the 21st Century

Rediseñar la educación del Diseño: Cuatro acciones docentes frente a los retos y desafíos en el siglo XXI

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Abstract

There have been over 100 years since the founding in Weimar, Germany, of the Bauhaus school of design, architecture, and applied arts. The advance of industrial society and other world events that occurred at that time influenced the way of understanding and practicing design. From then on, a clear link was established between the discipline and the industrial and economic production system based on commercial competition. However, society has undergone profound changes during that time. The advance towards post-industrial society, the technological revolution, added to many other factors, have drastically transformed social reality. As of today, rethink and restate design education in the face of the new reality and new challenges. Starting from the evident differences between the society that saw the birth of design as an academic discipline and today's society, four lines of action are presented to reorient design education. It is proposed to configure a designer profile that is no longer a player, but a *transformer of the system*, a *true agent of change*. These proposals arise from a theoretical research process where the analysis, synthesis, criticism and conceptual re-elaboration were carried out based on various documentary and information sources, as well as academic publications and their own experience as design teachers. The objective of this research is to determine the priority educational actions to reorient the practice of design, transform teaching to transmute professional practice.

Keywords: social design, design education, eco-design, design ethics, change agent

Resumen

Han pasado ya más de 100 años de la fundación en Weimar, Alemania, de la escuela de artesanía, construcción y diseño la Bauhaus. El avance de la sociedad industrial y otros acontecimientos mundiales ocurridos en aquel momento decantaron la forma de entender y ejercer el diseño. A partir de entonces, se estableció un claro vínculo entre la disciplina y el sistema de producción industrial y económico basado en la competencia comercial. Sin embargo, la sociedad ha vivido profundos cambios durante ese tiempo. El avance hacia la sociedad postindustrial, la revolución tecnológica, sumada a muchos otros factores, han transformado la realidad social de manera drástica. Hoy es tiempo de revisar, repensar y replantear la educación del diseño frente a la nueva realidad y los nuevos desafíos. Partiendo de las evidentes diferencias entre la sociedad que vio nacer al diseño como disciplina académica y la sociedad actual, se presentan cuatro ejes de acción para reorientar la educación del diseño. Se propone configurar un perfil del diseñador que no sea más un reproductor, sino un transformador del sistema, un verdadero agente de cambio. Dichas propuestas surgen de un proceso de investigación teórica en donde el análisis, la síntesis, la crítica y la reelaboración conceptual se realizaron con base en diversas fuentes documentales e informativas, así como en publicaciones académicas y en la propia experiencia como docentes de diseño. La presente investigación tiene como objetivo determinar las acciones educativas prioritarias para reorientar la práctica del diseño, el transformar la docencia para transmutar el ejercicio profesional.

Palabras clave: diseño, educación, ecología, responsabilidad social, ética

◆ **Introduction: The only constant is change**

There is no doubt that the changes experienced by society from the first civilizations to the present day are impressive, but in recent years the speed with which the changes have occurred is unprecedented. Technological advances, globalization, the digitization of social and commercial relations, pollution, among many other phenomena, bear witness to this. Faced with this reality, it is necessary to reflect on the social demands regarding education and the practice of design. This article analyzes and reflects on some of the great challenges facing society, assuming that reorienting education will allow the practice of design to be transformed. It is necessary to configure a designer profile that is no longer a player, but a transformer of the system, a true agent of change.

Four actions are suggested that cannot be postponed in the training of new designers as a result of this work. Under the theoretical research approach, a conceptual re-elaboration is sought (Barahona Quesada, 2013) on the development, practice and education of design.

- ◆ *Objective:* To determine the priority educational actions to transform the professional practice of design.
- ◆ *Method:* Based on official documentary sources, as well as academic articles or books and their own experience as design teachers, the ideas expressed here are analyzed, reflected upon, synthesized and constructed.

The document is organized in three parts. As a starting point are highlighted both the role that design has played in the economic model of industrial society as the challenges of post-industrial society. Subsequently, the ideas expressed here around the four themes that constitute this document are analyzed, synthesized and built. Finally, the discussion of each topic and the conclusions are developed.

◆ Design and its role in the industrial model

Although design as a creative activity has accompanied man since its ancestral civilizations, it can be assumed that its character as an academic discipline linked to the industrial system arose with the founding of Bauhaus in 1919. Ever since, design has been linked to the production model. in series and for mass consumption (Sparke, 2013).

Currently, and despite the elapsed time, design as a creative and professional activity remains clearly linked to the global economic model. The products, spaces, and services resulting from the project activity are fundamentally objects of commercial activity, i.e., goods that compete in the market for the preference of customers or users.

It is clear that this dynamic of commercial competition drives innovation and generates important advances in design. The current offering of products and services is by far the greatest of all time. The diversity of options that a user finds in the market is not only wide, but is often excessive and overwhelming. However, and despite this vast offer, in many cases the options do not really represent substantial differences¹. It is important to recognize that, along with the advances and benefits of the design, there are also errors or inconsistencies to consider.

On the other hand, the leading role of design linked to mass consumption characterized by postmodern society has not always been well regarded by the designers themselves, as they consider that "The profession's time and energy is used up manufacturing demand for things that are inessential at best" (Barnbrook *et al.*, 1999, p.2).

The link between the discipline of design and the dominant economic model has promoted innovation and development, but it has also contributed, in some way, to increase severe problems. Already Papanek (2006, p.ix) stated that "There are professions more harmful than industrial design, but only a very few of them". In the same sense, Berman (2018, p.22) argues that "Designers are at the core of the most efficient, most destructive pattern of deception in human history".

The world is facing an economic model characterized by *The Pathological Pursuit of Profit and Power*, which privileges the accumulation of capital over the public good and the protection of the environment. And it is clear that design is inextricably linked to it. Sparke and Fisher (2016) claim that design contributes to create the world in a way that is already unsustainable. All of this is a consequence of the practice of "market-led design" (Fisher & Gamman, 2019, p. 207). That is why it is important to promote fundamental changes in the way of understanding and exercising the practice of design. It is urgent to redefine the role and profile of the designer so that they stop being a reproductive agent of the system

¹ According to Berman (2018, p 21) during the second half of the 20th century, "people consumed more goods and services in the second half of the 20th century than in half all previous generations put together"

and become a true agent of change². In this sense, academic spaces are the environments from which these changes can be promoted.

Although it is fair to recognize that commercial competition has driven the development of design, it is also true that advances in this discipline have focused asymmetrically on economic benefit and not on human or environmental well-being. Of course, it is not a false Manichaeism between making design with a commercial focus and making design with a social focus. It is about expanding the scope of the design towards other possibilities that have been ignored until now. Looking at design only from an economic perspective is having an incomplete vision of reality and of the discipline itself.

On the other hand, despite the time that has elapsed since the foundation of the emblematic Bauhaus, there are reminiscences of its beginnings that still survive in the teaching of design. As Ursula von der Leyen points out: "The historical Bauhaus movement blazed the trail, and its traces are to be found to this day all over the world" (in Boninge, Frenkler & Schmidhuber, 2021, p. 9). However, it is clear that society has changed since then and, with it, the challenges. It is necessary to reorient the practice in order to reduce the negative impacts that the current model brings with it, such as environmental degradation and inequality in the design focus on marginalized social sectors. It is about strengthening ethical values and improving the practice of design without renouncing the qualities that distinguish the profession and that have given it recognition in today's society. Below are four lines of action considered essential to take into account in design education.

Suggested actions *Ecological responsibility in design*

The first action is, of course, the reinforcement of ecological responsibility in design. One of the biggest disasters that the model oriented towards mass production and consumption has brought is environmental deterioration. In this process, design plays a fundamental role, since a large part of the waste generation comes from the production of designed objects. Here, both the design decisions and the type of materials, the way in which they are produced, the real possibilities of reuse or recycling, etc. are key in terms of ecological impact.

Another more or less worrying part derives from the packaging, storage and, above all, the marketing of the mentioned products. It is common that, when acquiring a new piece of equipment, furniture or another type of object, it is accompanied by an excessive amount of plastic,

² Towards the great challenges faced by current society, several authors see the necessary potential to build a true change agent in the figure of the designer.

wrappers and other materials. Designers and marketers know very well the importance of the image of the product before the consumer, so they do not skimp on the use of labels and other materials. For example, it is common to see in supermarkets natural products such as fruits and vegetables inside plastic packaging, and colorful labels that are single-use materials. All this with the purpose of promoting economic gains, even when this implies high environmental or other costs. In this regard, Berman (2018, p.22) argues:

The largest threats to our world today are rooted in overconsumption, spurred on by rapid advances in the psychology, speed, sophistication, and reach of communications technology. Designers are at the core of the most efficient, most destructive pattern of deception in human history.

The problem is really serious. According to Ethel Eljarrat (2019)³: “Every year a total of 300 million tons of plastic are produced. Of these, it is estimated that eight million end up directly in the seas and oceans of our planet” (1st par). As if that were not enough, toxic chemicals are added to plastics to obtain specific properties. Eljarrat (2019) points out that “plastics are made up of polymers, normally derived from petroleum, to which various chemical compounds are added, which can constitute more than 50% of the weight of the plastic” (5th par).

It is regrettable that, even though the environmental issue has been discussed in the field of design for decades as *eco-design*, many of the strategies have not given real results. Some of the proposals promote the recycling of waste, but in many cases the process of reusing certain materials is just as polluting as or more polluting than simply discarding it. *Tetra pack* packages, for example, use cardboard, aluminum and polyethylene, which makes recycling very difficult. The discourse on the “*Green Deal*” is considered by Berman (2018) as a “convenient lie”. In this regard, he says that “overconsumption is a learned addiction that will not be fixed solely by 'greening' every process and product” (Berman, 2018, p.26) and adds that “humans consuming too much stuff are causing us to tear at the Earth, upset the oceans, melt the poles, and litter our sky” (Berman, 2018, p.26).

It is clear that what is indicated here fundamentally involves industrial design and graphic design, but environmental responsibility is something unavoidable for any field of design. For instance, in architecture, design decisions regarding solar orientation, thermal comfort mechanisms, energy and water savings, etc., have a very important environmental impact.

³ Tenured scientist of the Environmental Chemistry department, Institute of Environmental Assessment and Water Research IDAEA-CSIC

The environmental problem is not something that can be advanced from the perspective of a single discipline. It requires the participation of many academic and research fields and institutions. For this reason, it is essential to open educational spaces to the joint participation of design students with other disciplines and encourage collaborative work.

In addition, it is important that teachers and students consider not only the formal and functional characteristics in the evaluation of their projects, but also anticipate their ecological repercussions and explore the possibility of using alternative materials and procedures. In the same way that producers of processed foods are required to put nutritional information on their labels, designer products must indicate the level of environmental impact of the materials that make up each designed object that is put on the market; after all, environmental health is also a public health issue.

Thus, it is no longer possible to speak of an ecological approach to design, since all design must be approached from an environmental perspective. In this way, the idea of *eco-design* should be changed simply for design, and assume that it is no longer an approach, but rather an intrinsic and obligatory process of design. That will be a natural attitude of the designer as a *change agent*. As Irwin (2015, p.236) points out: "The transition to a sustainable society will require new design approaches informed by different value sets and knowledge".

Social responsibility in design

In addition to environmental deterioration, the economic model has generated other major problems. Although industrial society has focused on increasing the production of goods and services and promoting economic growth, the reality is that large sectors of the population still continue to live without access to basic guarantees, such as the right to health, housing, education and decent work. According to the Organization for Economic Cooperation and Development (OECD, 2015): "There is widespread concern that economic growth has not been fairly shared, and that the economic crisis has only widened the gap between rich and poor" (1st par). That is why the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2017) affirms that "Inequalities are on the rise around the world" (0.04") and not only that, but we have reached the extreme that "The richest 1% control more wealth than the remaining 99% of the population" (UNESCO, 2017, 0'15").

For Grassi (2019), social inequality and the precariousness of work and life are characteristics of neoliberal capitalism. This situation of social inequality is also manifested through design. Objects reflect the organization of the society of which they are a part. As Baudrillard (2002, p.138) pointed out: "The social order was what gave objects their standing".

In this sense, and under the logic of the prevailing economic model, it is clear that the design has concentrated on the most economically favored social sectors, neglecting those social groups that do not represent an economically important market. Polak (2008, p.64) affirms that "The problem is that 90 percent of the world's designers spend all their time working on solutions to the problems of the richest 10 percent of the world's customers".

In the same way that economic inequality is increasing day by day, the gap between common designer objects and luxury objects is also growing. Currently, extreme luxury objects can be found on the market to please the ego of the excessively rich society. French designer Philippe Patrick Starck urged designers to "stop creating elitist products" (McDermott, 2001, p. 143).

Apart from the figures mentioned here, it is clear that there are sectors that need design intervention, but are hardly paid attention. Fortunately, Cynthia E. Smith (2007) and Emily Pilloton (2009) present excellent examples of design focused on the neediest sectors, which shows that it is possible to carry out quality designs with a social focus and at low cost.

On the other hand, the problem is not only economic, but also cultural. It is clear that the globalized world promotes lifestyles and tends to standardize behaviors, aspirations, etc. With this, the original peoples tend to lose their own identity and to be incorporated into a standard lifestyle. Faced with this trend towards standardization in the world, Escobar (2018, p.4) proposes the *ontological design*:

as a means to think about, and contribute to, the transition from the hegemony of modernity's one-world ontology to a pluriverse of socio-natural configurations; In this context, designs for the pluriverse become a tool for reimagining and rebuilding local worlds.

In this way, universities (especially public ones) should be considered as constituents of the ideal spaces to promote design work aimed at these groups. Creating awareness and sensitizing future designers about this problem (cultural and economic) is a task that cannot be extended in the academic field. It is through the teaching of design that the "social change and transition to sustainability" should be promoted (Mouchrek and Krucken, 2020, p. 123).

Ethics in design

Good intentions are useless or very little if, finally, the actions are not guided by the ethics of the designer. As has been seen, there is a design debt with respect to the care of the poorest sectors of the population. Likewise, there is an unavoidable commitment of design to the environment. However, these commitments can only be faced based on

foolproof professional ethics. As Dieter Rams points out: “Design can only be as good as are the designers themselves” (in Boninge *et al.*, 2021, p. 13).

It is clear that society always expects ethical behavior from a graduate of higher education, and design is no exception. Ethics should occupy a relevant place in higher education in general. The training of all types of professionals must be guided by principles and values among which they stand out. In the case of designers, ethics should be as important as other content. José María Valverde⁴ said that “without ethics there is no aesthetics”. This idea should be applied here to bring both ethics and aesthetics to the same level in design.

Unfortunately, higher education in professional disciplines has focused on teaching technical and operational content, rather than on reinforcing attitudes and values. Definitely, the strengthening of ethics in design is a priority social demand. As Mañach (2013) points out: “The University has an important role. Uniting the teaching of skills and abilities and educating in values that materialize in project decisions. Design faculties must teach to design with ethical values that generate goods for humanity” (p. 2).

The problem is that the business competition model is highly susceptible to unethical behavior. Today it is easy to find products on the market whose labeling suggests nutritional or health properties that are not real. For example, when a food is made to appear nutritious when it is not. Unfortunately, there are many examples where design is used to mislead the consumer. It is due to “the relentless illusion painted by an industry tirelessly eager to twist our behaviors” (Berman 2018, p.24) that design is often used to induce people to excessive consumption through.

Milton Glaser (2004) comments that when he asked design students if they would be willing to apply deceptive practices on product packaging and labels to better market them, some of them said they were willing to do so. Faced with this type of situation, we agree with Boninge *et al.* (2021, p.13) by pointing out that “we need an expanded ethics of design”.

There is no doubt that there is an urgent need for design practice in the 21st century to be guided by sound ethics. It is imperative to act with social and ethical responsibility, that is, always act in favor of the common good. As Armstrong, Bailey, Julier and Kimbell (2014, p.15) point out: it is about “generating and realizing new ways to make change happen

⁴ In 1965, Jose Maria Valverde Pacheco, poet and academic at the University of Barcelona, expressed with emphasis “nulla estetica sine etica” meaning, “there is no aesthetics without ethics”, by doing so,, he quitted to his class as a protest for the firing of other scholars Aranguren, Tierno-Galvan, Sacristan and Garcia-Calvo in the last stage of the Francoist dictatorship.

towards collective and social ends, rather than predominantly commercial objectives”.

Lamentably, “Design has mainly operated to embody, and to reify, a world view based on competition and individualism, its hegemonic discourses have privileged profit logic ('I', before 'we') obscuring the value of collective action” (Fisher & Gamman, 2019, p.207).

The prevailing economic model worldwide seems to have directed design towards a practice clearly oriented towards commercial competition and, with this, ethics has lost ground. However, in this century there is a clear social demand to recover the ethical value in the practice of design. Given this, various authors have raised their voices and others have taken action. As an example, we can cite the Canadian associations of Registered Graphic Designers (RGD), Design Professionals of Canada (DesCan) and *Société des designers graphiques du Québec* (SDGQ) which created a code in which they define themselves as a society committed to “the highest professional and ethical standards when working for clients, as employees and in service to the general public” (Vaughn Strebly, Johnathon Tschudin and Warburton, 2019, 1st par). In this document, they also highlight their responsibility to society and care for the environment.

Following this example is that they insist on rethinking the exercise of design and strengthening ethical practice, as well as social commitment and environmental responsibility, from academic environments. It is time to reverse the order of priorities and place ethics and social and environmental well-being over economic benefit.

Strengthening design skills

Design emerges and develops as an academic discipline within a thriving industrial society, eager to generate new products and explore new markets. During this period, design reached a relevant place as a factor of innovation and commercial competition. Later, during the second half of the 20th century and under the protection of the technological revolution, the advancement of design spread even further, incorporating digital products into its field of action. Thus, it was consolidated as a strategic resource for the market and an indisputable discipline within the academic world.

Today, the designer is recognized not only for his skill in handling form and visual language, but also for his ability to generate ideas and solve problems. Today, the designer's way of working is adopted in many different fields under the so-called Design Thinking.

These skills attributed to the designer are usually developed during their training process from the systematic and constant exercise of design practice, generally under the experienced guidance of the teacher.

According to Gabriel Simón Sol (2009): "Design teaching focuses on design workshops with an emphasis on activist pedagogy: learning by doing" (p. 169). This is where students learn to design by designing.

In this sense, the characteristic creative thought of designers is a consequence of the exercise of design itself, but it is not necessarily due to a strategy or plan conceived by institutions or teachers specifically for that purpose. Generally, the development of these skills is an intrinsic effect of the project practicing.

However, in the face of the great challenges that are being imposed in the 21st century, unconventional and innovative solutions and proposals are required. It is necessary to promote the development of creative thinking and critical thinking specifically in the training of designers. It is not enough to develop these skills in a collateral way, but intentionally and deliberately. Subjects specifically focused on developing thinking skills should be included in design programs. As Boninge *et al.* (2021, p.13), "Design is first and foremost a process of thinking".

In this regard, there are multiple proposals that have been widely tested. Arthur L. Costa, already from the end of the 20th century, documented almost three dozen programs widely applied in different educational institutions. Among these programs we can mention: *Structure of Intellect (soi)*, *Instrumental Enrichment*, *Creative Problem Solving and Creative Learning and Problem Solving* (Costa, 1991). Many of them continue to apply to this day. In addition, authors such as De Bono (2015) and Guilford (1967), among others, have studied and developed clear strategies to promote creative thinking that can be adopted in educational design spaces.

On the other hand, tackling the great current challenges also requires collaborative work. Problems can no longer be faced from an individual perspective or from a single discipline. Pollution, social inequality, poverty, etc. they require solutions based on collaborative work and innovation.

In this sense, the capacity or competence for collaborative and interdisciplinary work is another of the skills that designers develop during their training process. It is a fact that the discipline of design has a natural vocation for working with other fields of knowledge, that is, in design the incorporation of multiple disciplines and collaborative work is natural and recurring. However, it is not only necessary to continue promoting this practice, but it is important to strengthen it. It is required that educational institutions carry out constant projects aimed at solving real problems that involve the participation of personnel from other educational fields, such as anthropologists, engineers, sociologists, artists, to name a few.

Currently, the design is called for a comprehensive rethinking to have a more sustainable development (Boninge *et al.*, 2021). To achieve this,

it is necessary to strengthen and potentiate the skills for innovation and creative thinking that characterize the designer, as well as their ability to work in collaboration with other disciplines and society itself.

Faced with these challenges, the teaching strategies applied to date in the training of designers will no longer be sufficient. It is necessary to develop and apply specific strategies to strengthen critical thinking, creative thinking, innovation, and awareness of society and the environment. According to Boninge *et al.* (202, pp.63-64), "Design studies at present hardly teach critical thought, feedback, empathy and the integration of different perspectives. Contexts, processes, research and innovation are all given to little consideration".

For Arthur L. Costa (1991, p.2), promoting the development of thinking skills is an increasingly pressing need for society. According to the author:

Societal demands for higher-order thinking are increasing. Employability studies document the need for a future work force capable of more sophisticated thinking than was generally required in the past. Such skills as independent analysis, flexible thinking, and collaborative problem solving are now considered basic requirements for many jobs

It is clear that the complexity and magnitude of the challenges to be faced as a society require truly innovative solutions, creative responses that truly contribute to improving the quality of life of humanity in general, as well as to safeguarding the planet. Although creative thinking and the capacity for innovation have always been a fundamental part of design practice, today, given the level of complexity in which we live as a society, it has become an increasingly relevant skill. Regardless of whether the purpose of a design project is motivated by commercial or social reasons, the ability to generate novel ideas is necessary. A design process cannot be conceived without the ability to produce new solutions. And it is that, as Bonsiepe points out: "Design is related to innovation. The design act introduces something new into the world" (in Wolfgang, 2010, p. 66). However, from this perspective, and strictly speaking, the production of new objects, spaces or services does not always present true innovation. Many times, it is about the repetition of proven formulas, of standard solutions that finally represent only existing stereotypes.

In short, the four actions suggested so far are the following: assume environmental responsibility in design, promote social commitment, strengthen design ethics, and enhance designer skills for creativity, innovation, and collaborative work. In the following section, the changes in society and the environmental environment that have occurred during the last 100 years will be delved into, which justify these proposals.

Discussion Although the essence of design does not change throughout history⁵ (Synchronic Dimension), its means and settings are constantly being transformed (Diachronic Dimension), hence the transition from industrial society to post-industrial and postmodern society, unprecedented technological development, and the expansion of the market and of options for products and services of design skills (some on demand).

Post-industrial and postmodern society

Regarding the scenarios where design is carried out, it is clear that during the first half of the 20th century the discipline developed freely within industrial society, without much questioning. During this period the design was oriented, almost carefree, towards series production and large-scale consumption. In this process, small workshops run by experienced artists and craftsmen were displaced by large industries.

Under the protection of industrial production, design reached an unprecedented level of development and its place in the productive sector became increasingly relevant. Large companies based their success on the way of understanding and practicing the trade disseminated by the first schools of design⁶ during the first half of the 20th century. However, along with industrial development there are also a series of negative effects resulting from excessive production and mass consumption. Problems such as climate change, the increase in solid waste in the environment, the growth of extreme poverty, large migrations, among many others, are a consequence of large-scale industrial production.

This post-industrial period meant, in a way, a disenchantment with respect to the promise of a future of progress and social well-being for all. According to Lyotard (1984), this stage marks the emergence of postmodern society, as cultures enter the postmodern age as societies pass through the postindustrial stage. For the author, the postmodern can be understood as "incredulity towards metanarratives" (Lyotard, 1984, p. xxiv), where the narrative goals are discourses or promises about a higher stage of fulfillment and well-being for all, whose true intention is to legitimize proposals ideological as capitalism or communism (Lyotard, 1984).

Technological development and change in design media

As regards the media, it is clear that during the first half of the 20th century design ideas used to be captured and transmitted on material

⁵ Herrera Batista (2021) poses two dimensions of the act of designing; one is not temporary and permanent (Synchronic Dimension) while the other changes along with society (Diachronic Dimension).

⁶ The case of the German enterprise Bauhaus, which adopted a clear approach to design which characterized the Bauhaus along the first half of the 20th century is widely known.

substrates, using a wide range of techniques, whereas today they are expressed and disseminated through mostly digital supports.

It is evident that the use of technology transformed the way of doing and thinking about design. Today, some instruments that were essential for this profession just a few decades ago seem obsolete. In the same way, some manual skills that were considered essential for the practice of design have lost some relevance, while others are already essential. Today, digital technology pervades every stage of the design process in the same way that analogue tools and techniques once did. This knowledge is part of the technical knowledge that has always been in the practice of design.

Now, although knowledge of technological tools is essential in the current exercise of the designer, it is also important to take into account that, since technological advances do not stop, said knowledge tends to have a limited validity, since some tools tend to be replaced by others in short periods. For the experienced designer, however, this kind of knowledge comes rather quickly.

On the other hand, technological tools also open up the possibility for designers to work remotely, with which they can join work teams or users who are in different geographical spaces. For example, when carrying out collaborative design or co-design, or when using the BIM (*Building Information Modeling*) methodology in the case of architecture, or when participating with brought teams in Media-lab, etc.

Market expansion and diversification of product and service options

Although during the first half of the 20th century the design was oriented towards somewhat abstract and standard users, in recent years the interest in addressing a broader range of user profiles has become evident. Today, designs are produced on demand, services are personalized, and small-scale productions are made, among others. The number of product and service options on the market today is impressive when compared to what was available just a few decades ago. It can be argued, for example, that each user has an ideal type of sports shoes, sunglasses or cell phone, according to their characteristics, preferences and possibilities. Currently it is produced for popular sectors, but extreme luxury products are also designed.

It must be considered that objects today, regardless of their practical utility, have other important attributes for the user and determine their relationship with him. As Martín Juez (2002) points out:

Necessity by itself cannot explain the variety and novelty of human-created designs. We have to look for other explanations then; especially ones that can incorporate the most general assumptions about the meaning and goals of life. (p.49)

Indeed, users also purchase products for the meanings they may have for them or for a certain social group. For Csikszentmihalyi and Rochberg-Halton (2002), for example, objects usually have meanings linked to contemplation.

In reality, the competition for the market has prompted those who offer products and services to be interested in understanding the preferences of users and the factors that make them make the decision to select one option over others. Today, much of the design features are based on careful user research.

Press and Cooper (2003) highlight user research at various stages of the design process, both for market insight and idea generation, testing design solutions, and to minimize risks in developing new ones. products, among other things. Research on user experience also allows "develop new desirable products that enhance the user experience" (Press & Cooper 2003, p. 121). In this sense, ethnographic research allows us to better understand the consumer; his philosophy of life, beliefs, motivations, etc. According to Press and Cooper (2003, p.120), ethnographic research is "a very lucrative design consultancy service".

Regardless of the interests or motivations that drive a user to purchase this or that service or product, the market continues to work to offer new options. Given this, innovation and the generation of ideas are consolidated as an invaluable resource, increasingly relevant, which requires that the skills to think creatively take precedence. For all these reasons, teachers and educational institutions must be equally creative to decisively promote the development of thinking skills among design students.

◆ Conclusions From a broad perspective, the educational process involves the generation of knowledge, as well as the development of skills and the strengthening of attitudes and values. The great challenges facing today's society demand profound changes in the practice of design. These changes must be promoted from education, for which it is necessary to configure a new designer profile with critical awareness and social commitment, a new profile that places the designer as a true agent of change. With this purpose, four great challenges that design education must assume to guarantee a dignified and effective exercise of the discipline and, above all, to contribute in an important way to the solution of the great challenges of the 21st century, have been addressed here. In summary, the actions to follow are the following:

1. Strengthen the responsibility that designers have with regard to environmental deterioration.

2. Promote the designer's sense of social responsibility in the face of great inequality, extreme poverty and the neglect of some social sectors.
3. Reinforce ethical values in design practice.
4. Promote the development of skills to think and generate innovative ideas.

Such actions are increasingly important as society becomes more complex and diverse. And, furthermore, current challenges demand collaborative and coordinated work between disciplines. In this sense, this inherent ability of design to work in coordination with other disciplines must also continue to be promoted. As Boninge *et al.* (2021, p.120): "Along the core competence of visualization, the specific processual and methodological skills and ethics and conduct, the laterally interconnecting function is also characteristics of design".

Regardless of whether the designer works in the commercial field or pursues a social purpose, the answers given must be in accordance with the challenges that society faces. Berman (2018, p.125) points out that "Good design is a strategic, sustainable, ethical response to a business problem"; however, it is not limited to the commercial world, it also applies to social design.

It must be assumed that economic inequality and extreme poverty are not matters of compassion or empathy, but of social justice. And although for Scanlon (2018, p.1): "The extremely high levels of inequality now prevailing in the United States and in the world as a whole are open to serious moral objection", for us the problem goes beyond the moral, because it is a problem of conscience and commitment to the community of the whole world.

As Andreas Schleicher, OECD Director of Education, points out:

In the first decades of the 21st century, many actors and stakeholders have urgently argued that education needs to be transformed in order to meet the demands of rapidly changing technologies, new skill demands in the workplace and to foster equity, social cohesion and global citizenship (Kuhl, Soo-Siang, Guerriero and Dirk van, 2019, p.3)

It is in this area where the designer not only puts his skills and strategies into play in a creative way, but also his social and environmental commitment. Ultimately, it is about responding more effectively to the challenges of the 21st century. The work in the teaching field is to encourage and promote the necessary actions in order to achieve much better prepared Design graduates. ●

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