A PERSPECTIVE ON 21ST DESIGN CHALLENGES FACING THE URGENCY OF SOLUTIONS FOR GLOBAL SUSTAINABILITY. THE EMERGING OF AN EDUCATION AND DESIGN PROFESSION ALIGNMENT ABOUT CORE PRINCIPLES.

Uma perspectiva sobre os desafios de design no século XXI perante a urgência de soluções para a sustentabilidade global. O surgimento de um alinhamento da profissão e da educação e design sobre princípios fundamentais.

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ABSTRACT

Before the accelerated transformation of reality, we question the human role in the technological context, placing the need of thinking about the importance of intrinsically human competences. In the scope of design, a field of practice and academic discipline, the challenge for the profession and the future education is huge. Above all, these challenges have to do with large scale and with processes requiring the ability to deal with more complex conceptual frameworks, with a set of context dimensions involving economic, ecological, social, cultural, and political issues of societies in permanent change. The design community recognizes the value of designer's multidisciplinary skills and the ability to lead processes involving large socio-technical systems. However, today the designer faces the challenge of multidisciplinary working teams where skills go far beyond their traditional abilities. The thinking and practice of design reveals a set of core values and virtues of the designers that allows a strategic positioning of these professionals in the complex problem-solving context. Nevertheless, designers will have an increasingly demanding role in creating products, services and experiences which mean a profession under pressure to evolve towards a more complex activity requiring new general and specialized skills. The objective of our reflection is about designer's competencies transition demand, an imperative requiring technological and management skills and leadership capacity on sustainable solutions complex processes. Despite

RESUMO

Perante a transformação acelerada da realidade questionamos o papel humano no contexto tecnológico, colocando a necessidade de pensar sobre a importância de competências intrinsecamente humanas. No âmbito do design, campo de prática profissional e campo disciplinar, o desafio para a profissão e para a formação futura é enorme. Acima de tudo, os desafios têm a ver com a grande escala e com processos que exigem a capacidade de lidar com enquadramentos conceituais mais complexos, com um conjunto de dimensões de contexto que envolvem questões económicas, ecológicas, sociais, culturais e políticas de sociedades em permanente mudança. A comunidade de design reconhece o valor das competências multidisciplinares dos designers e a sua capacidade para liderar processos envolvendo grandes sistemas sociotécnicos. No entanto, hoje o designer enfrenta o desafio de equipas de trabalho multidisciplinares onde as competências vão muito para além das suas competências tradicionais. O pensamento e a prática do design revelam um conjunto de valores e virtudes fundamentais dos designers que permitem um posicionamento estratégico destes profissionais no contexto da solução de problemas complexos. No entanto, os designers terão um papel cada vez mais exigente na criação de produtos, serviços e experiências que significam uma profissão sob pressão para evoluir para uma atividade mais complexa que exige novas competências gerais e especializadas. O

this recognition, designers must be prepared about collaboration and cooperation skills, a necessity more and more in tension with a reality where the whole potential of design to deal with complexity remains unaware.

Design community reflects about designer's strategic value for facing global challenges and points out the complexity approach as a requirement of design education in the future. Considered a condition for design expansion this concern is also revealed in design education research contributions. This contextual disposition makes possible to regard an alignment about a direction to pursue.

This paper presents a reflection about this problematic field which intends to be a contribution to understand how design discipline can evolve meeting the designer's community recognition of the necessity of a set of updated critical dimensions for design activity. This reflection looks at the design community before a strong demand for an evolution, pushing to a design education deep transformation. This kind of evolution for design may occur first in the professional practice and will be primarily caused, in our perspective, by the desirable and the unavoidable impact on design processes of a design community's new mindset about core principles.

KEYWORDS

Design education. Design cognition. Design practice. SDG. Complex solving problems.

objetivo da nossa reflexão é sobre a exigência de transição de competências do designer, um imperativo que exige competências tecnológicas e de gestão e capacidade de liderança em processos complexos de soluções sustentáveis. Apesar deste reconhecimento, os designers devem estar preparados para a capacidade de colaboração e cooperação, uma necessidade cada vez mais em tensão com uma realidade onde todo o potencial do design para lidar com a complexidade permanece desconhecido.

A comunidade de design reflete sobre o valor estratégico do designer para enfrentar os desafios globais e aponta a abordagem da complexidade como requisito da educação em design no futuro. Considerada uma condição para a expansão do design é uma preocupação que também se revela nas contribuições da investigação sobre educação em design. Esta disposição contextual possibilita considerar a existência de um alinhamento sobre uma direção a seguir.

Este artigo apresenta uma reflexão sobre esta problemática que pretende ser um contributo para compreender como a disciplina de design pode evoluir indo ao encontro do reconhecimento da comunidade de designers sobre a necessidade de um conjunto de dimensões críticas atualizadas para a atividade de design. Olhamos para a comunidade de design perante uma forte pressão por uma evolução, empurrando uma profunda transformação da educação em design. Esta evolução para o design pode ocorrer primeiro na prática profissional e será causado principalmente, na nossa perspetiva, pelo impacto desejável e inevitável nos processos de design da nova mentalidade de uma comunidade de design sobre princípios fundamentais.

PALAVRAS-CHAVE

Ensino do design. Cognição em design. Prática do design. ODS. Solução de problemas complexos.

1. INTRODUCTION

The reality of increasing complexity and the impact of the rapid change puts pressure on skills development capable of facing the challenges placed by our major global problems. 21st century societies are increasingly dominated by intense information and knowledge processes. Intangibles intensify their dominance over consumption, often exceeding the importance and value of physical goods, with an increasing demand for sustainable products. Responding to all stakeholders at different levels must align with solutions requirements capable of climate change and environmental degradation global challenges approaches. Technology, increasingly integrated into our lives, in spaces, communication, and products, is seen not only as a strategic resource of innovation but also as a fundamental resource for planet sustainability. This macro scenario pushes the development of new solutions, products, and services, requiring strong competencies.

This paper focuses on the design profession and the competencies necessary to respond to the current demanding context. An approach to the profession must contemplate a multi perspective, as a practice, a discipline, and a cognitive activity. Design as a practice fulfill the demand for business solutions development and implementation, as a discipline deals with how knowledge and ideas are transformed into material artifacts and as a cognitive activity is about solutions development with information processing with a methodological oriented approach supported by a particular way of thinking about problems, responding to new and future needs (Cross, 2007). Looking at the professional community designers identify in their thinking and practice a set of core values and virtues that lead them to consider design a field with the potential to strategically position itself in solving problems with the breadth and complexity of the global problems we face today. To understand the concrete terms of this perception of designers we sought to understand the vision of reference European design organizations such as the Design Council (DC) and the Bureau of European Design Associations (BEDA). Although designers recognize their important role in responding to complexity, the design community continues to strive to validate its strategic value in different domains and dimensions of reality, such as the economy, policies, and society. Although this claim the profession is still understood mainly in terms of aesthetics and style, predominantly contemplating the response to the user's needs in terms of functional and emotional aspects.

2. THE CONTEXT OF DESIGN UNDER PRESSURE

2.1. The vision for the professional practice of design

In an environment of pressure for design expansion we look for understanding from major European design organizations, such as Design Council and BEDA, and the North American AIGA, the perspective of professionals facing these tensions. Recognized as one of the most prestigious members of the design community, BEDA assumes in its vision for the profession for the 2019/2021 triennium that *design should be embraced as the engine of sustainable growth and prosperity* (BEDA, 2014a). About the last decade, this organization recognizes in design practice an evolution from an intuitive and, above all, introverted process to an inclusive, participatory and a highly complex approach, operating on equal parts of empirical and theoretical fuel (BEDA, 2014b). For BEDA, the full realization of this potential implies operating in close collaboration and interaction with other knowledge areas, characterizing the design as a process that requires multidisciplinary cooperation to address complexity (BEDA, 2014a).

The perspective of another reputable European organization, the Design Council, is equally important in our analysis. In its vision for design, DC expresses the understanding of a

world where *design is recognized as a fundamental creator of value, enabling a happier, healthier, and safer life for everyone* (Design Council, 2020a). This role is not only related to the creation of goods, products, and services, but also the ability to improve processes leading to better human performance. According to DC, design is a particular way of thinking about problems, examining the pertinent issues of the addressed situations exploring different types of knowledge. Clearly focused on the solution, designers make the creative and challenging leap to answer the problem through data analysis. Empathy is considered a fundamental competence to respond fully and successfully, making it possible by integrating the effective needs of people and the solutions impact on the planet (Design Council, 2020b). Design praxis integrates theories, practices, principles, cases, guidelines, patterns and cognitive strategies to account for problems in processes of cumulative knowledge construction. In addition to knowledge designers are equipped with phenomena, instruments and analytical tools they use to practice the activity (Design Council, 2020b). These notions about "design knowledge" are components of the design nature formed by Herbert Simon's rational the approach to problems, presented in his work of 1981, The Science of the Artificial. With the notion of practice made of reflection in action, proposed by Donald Schön in 1983, is formed a fundamental contribution to the configuration of the specificity of the cognitive challenge of the territory of design (Maia, 2011).

Pursuing the vision of the professional design community, we analyze the perspective of the world reference organization AIGA (American Institute of Graphic Arts). This organization also highlights an evolution of design in recent decades, moving from a role focused on questions of form and technique to a more relevant position in relation to a broader context of approach. Continuing to elect creativity as a key competence in the 21st century, as a central and fundamental component to keep relevant the value of the profession in societies and in the world. For AIGA, design has evolved from a position at the end of the decision-making value chain to its front, integrating multidisciplinary teams (AIGA,2020a). This evolution implied a change in the content of the discipline, not only in knowledge but also in professional practice. The profession's focus has expanded to the impact of its solutions on people and how they are assimilated by the culture. The designer's more relevant roles happen because they are increasingly integrated into multidisciplinary teams, being able to deal with more complex problems at the systems level as AIGA recognizes. The approach to design problems, still according to the perspective of AIGA, implies the configuration of the problem from the knowledge about the complexity of the contexts of this changing reality. This contextual framework poses challenges to design beyond the traditional questions of form and content in designing and developing solutions. The approach to problem-solving must integrate knowledge from other areas, with the designer's ability to link information and multidisciplinary knowledge about people and contexts (physical, social, cultural, economic, environmental, and technological, among others) (AIGA, 2020b). The recognition of the concrete value of design knowledge and skills in addressing complexity is also present in the interviews carried out by Frascara in 2020 with eight reputable designers. From the conclusions drawn from these testimonies, Frascara highlights the importance of multidisciplinary knowledge for the profession, reinforcing the relevance of the research methods quality used by designers today, which are decisive in their competences to approach 21st century challenges. Frascara also points out that if the design process is not delimited from the beginning by the investigation with evaluation at its end design cannot claim to be a responsible practice. Underlying this assumption are the challenges of a rapidly changing world, where the development of skills and competencies that a life of flexibility and adaptability requires are fundamental for designer's being able to thrive and adapt to changing conditions (Frascara,2020). Frascara concludes that *designers must be educated to be culturally aware, socially responsible, and proactive.*

3. AN APPROACH TO A DEBATE BETWEEN PRACTICE AND EDUCATION

We pursue our investigation from a formulated hypothesis: there is an alignment between professional and academic design communities' views about the future of design practice. A debate with important reflections and contributions towards the idea of the possibility of a central core of principles for 21st century design practice and education is based on three pillars: ethics, justice, and environmental protection. The most visible application of the thinking process is the advocacy of solutions aligned with United Nations sustainable development goals, increased by the profound transformations underway determined above all by the gradual global cultural change.

But a notion prevails and, in that context, finding unique connections, ensuring valid solutions, will make the design process more chaotic and ambiguous, since it evolves dealing with a reality which implies synthesizing stimuli and information with large volumes of data in constant interaction.

The debate clarifies an idea: we cannot deny that the future of design involves learning about technology for more human and environmental solutions and for achieving this objective design may have to integrate new thinking, logic, and rationality which also implies projects with renewed visualization and communication techniques also proposed by technology. This requirement for design education is already visible since technology is slowly reconfiguring the environment and the educational programs with the exploration of new methodologies, in real context permanent simulation with users, consumers, and companies. There is an emerging agreement in the debate that design education must prepare students to work in multidisciplinary teams in new projects that respond to real needs in a world where creativity must serve our major global challenges. With framework conditions this idea is revealed in the design research which points out to the need of design curricular programs where technology, culture and ethics form a training central axis in future education.

3.1. Requirements of future of design education

From the design community's vision for the future is envisioned a particular strain on the needs for 21st century design education articulated with broader new skills development proposals. For this purpose, we carried out an analysis of relevant contributions on the ongoing reflection and debate within the design education research community. Reflecting about the future of design education the design research community perceive in designers the role of strategic thinkers, as epistemological agents, with a particular cognitive activity inherent to the professional practice of artefacts creation (Norman and Meyer, 2020). Recognizing the value of design in addressing complexity the design research community provides insights about the concrete terms of this contribution. Searching for key dimensions to complete our analysis on the existence of a possible alignment between professional and academic design communities about the future of design practice, we identify four major ideas in the ongoing debate between academics and researchers (Pontis and Van der Waarde, 2020). In our perpective before the position that designers will have to assume in face of complexity, in line with the professional community's recognition of the strategic role of design in the 21st century (Nöel, 2020a), these ideais form, in our perspective, four key dimensions for reflection.

4. KEY DIMENSIONS FOR DESIGNER'S APPROACH TO SUS-TAINABILITY

The first dimension is about the importance of 21st century designers to really nurture a broader approach to problems, in a holistic way, looking at design situations as a challenging demand requiring investigation. Since the focus on the solution is part of the cognitive nature of design, understanding the problem cannot be a subservient activity of finding the solution. Not focusing on the solution implies looking at persons needs and its contexts and simultaneously to reality interconnected bases to understand the impact of solutions at systems level. This means no longer responding just to business and stakeholder's interest, or government and global institutions requirements but above all to the interest of human cultures and ecosystems, biodiversity and major planetary challenges like climate change, natural resources management and pollution. The debate between designers might be how the design community look at their challenges at the project level and turn them into problems that must be addressed interconnectedly with sustainability and the known impact of unbalanced existing solutions. The designers focus on the problem as to be one of the main components of a transversal base, constituted by a collection of prepositions whose degree of truth will allow them to be successful in carrying out activities to improve the world (Sarwar and Fraser, 2019).

The development of a holistic view of reality implies, in the context of design practice, viewing the different actors in the process as people and not just as consumers or users, and understanding their different and simultaneous roles. This second dimension that we identified in the design research community's reflection will bring greater demands to the design process. Because this understanding must be based on important volumes of data about people's needs and their contexts, the information extracted may allow the identification of objectives to be answered in the first mental representation of the problem. This initial approach to the design process with a first methodological stage of demanding investigation is crucial once the previous solutions configuration happens first in the mind (Maia, 2011). The definition of the design process contemplating in its initial phase the collection and analysis of data may be one of the conditions of this transversal basis valid for the process in all the subjects of design (Sarwar and Fraser, 2019).

A third key dimension for a set of core principles has to do with the need to understand changes and their impacts, a challenge to many human activities that designers must critically address. Since technology is one of the main factors responsible for rapid changes, the most important will be the comprehensive understanding of its possible impacts on people's behavior and what this implies in the dynamics that occur in societies and its power to transform culture. With technology continually driving change and pushing culture transformation we assist to a greater demand for more sustainable consumption, with a new look at ethics and social justice, pressing the requirements of global governance. All these circumstances challenge the future of design activity (Lorraine, 2020).

The environment responsible for increasing complexity closes our reflection with a fourth dimension, made by the challenges of the discussion about the era we live in, defined as the Anthropocene, namely on the undeniable impact of our collective actions and choices. Despite not having absolute power to condition or shape reality, the requirements placed by global governance cannot be left out of this environment. Whether assumed at national or supra-government levels, the establishment goals not only keep the debate in the priority but guide the action direction to a reversing path (Wilde, 2020). In more concrete terms, we can refer to the establishment in 2015 of the goals of sustainable development by the United Nations, although with advances and setbacks, this reference may be the closest tool to an effective action in favor of major global challenges resolution. Assuming these objectives in the practice of the profession could be an element of consolidation and the immediate operationalization conditions of a transversal basis for design. This base can also contribute to reinforce the ethical and deontological position of the profession with conditions to contribute to enforce its external validation.

4.1. Challenges for the design community

This approach depends largely on the designers' willingness to re-examine the way they work, a fundamental condition much more relevant than any contribution coming from thinking about design within the community or outside the field of practice. At the center of this review are the requirements of the problem approach, aspects about dealing with the constant and rapid change and the inherent uncertainty (Nöel, 2020b). A holistic view and a multidisciplinary approach with diverse teams puts the need to master and apply different thought processes. Different approaches to problems with different patterns that imply dealing with more information and especially with information with different forms of organization that drive different ways of generating alternatives and different options for testing the suitability of solution proposals. Responding to all dimensions may depend more on the designer's self-reflection than on methods and tools and can push a revolution in the way we conceive solutions. For designers questioning means more immaterial activity - *Why do we do it? How do we do it? For whom do we do it? What should be the result?* – and inevitably brings more instability to the design process, shaking the current foundations of the profession (Swanson, 2020). Promoting connected thinking with collective action to address complexity, supported by methods and evidence-based, imply research skills that will have the potential to transform design from the original idea of the creator and author (Weil and Mayfield, 2020). This context requires leadership and communication with teamwork that includes emotional intelligence for team results that shape better and better-informed design decisions, predominantly solutions with less problem-solving strategies based on artifacts, and more on critical thinking and systems thinking (Muratovski, 2020; Rëdstrom, 2020).

5. CONCLUSION

As a conclusion from our reflection a set of core principles can be a way for design evolution and simultaneously a foundation for a designer's complexity approach facing the urgency of solutions for global sustainability. From the design community and design research education insights we settle the following compromises as principles:

- Commitment to the evolution of design towards the establishment of a profession as part of a collective action, based on multidisciplinary and collaborative work, towards more all-senses solutions capable of facing the global challenges.
- Commitment with design processes based on questioning, with critical thinking in addition to traditional questions closely related to designer's performance about artifacts creation.
- Commitment to solutions contemplating a response to persons' needs facing systemic change and the challenges of global sustainability.
- Commitment of design education and professional validation of creativity, curiosity, empathy, sensory capacity, and ecological consciousness as a fundamental set of 21st century competencies, assembled in a "designer cognitive device" for complexity approach.

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