

DESIGN COMMIT 1ST INTERNATIONAL CONFERENCE ON DESIGN & INDUSTRY 2024 BOOK OF PROCEEDINGS



BOOK OF PROCEEDINGS



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THE PROFESSIONAL PRACTICE OF DESIGN: A QUALITATIVE STUDY OF DESIGN PROCESSES AND THEIR SUITABILITY FOR TEACHING ACADEMIC DESIGN

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Product design education often needs to update its pedagogical practice to include new strategies that facilitate the acquisition of scientific and technical skills valued by the job market. Polytechnic higher education, which is oriented towards practice and guided by the application and development of knowledge, is constantly challenged to create or optimize learning contexts that allow students to experience the demands of professional practice in a guided way. In order to verify the current state of academic practice in product design education, compared to professional practice, the authors aim to gather evidence that will help guide the optimization or implementation of new methodologies. In a first phase, a survey was conducted with product/equipment/industrial designers working in the Portuguese job market. The data obtained through this instrument is complemented with interviews and non-participant observations of their professional practices. In the last phase, the results of this research will be academically tested, converted into one or more academic design project. In this article, the first results of the research will be presented. These results point to the multiplicity of approaches. The conclusion justifies that a review of the teaching and learning process in product design and the experimentation with new pedagogical strategies.

Keywords: Design Education; Pedagogy, Teaching, Design Process, Methodologies, professional competence

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1. Introduction

This research project is based on the mission of Portuguese polytechnic education, which is guided by an applied research and development perspective, aimed at understanding and solving concrete problems and aims to provide a solid cultural and technical training, develop the capacity for innovation and critical analysis and impart scientific knowledge of a theoretical and practical nature and its applications with a view to the exercise of professional activities (DGES, 2022).

"Due to a rapidly transforming world, design education needs to adjust itself. To do so, it is essential to understand curriculum gaps in the discipline." (Brosens et al, 2023). Over the past few years, there have been several attempts to bring the business community and academia closer together. This trend stems from the mutual recognition of the added value and advantages, for both parties, that the creation of synergies and knowledge sharing can bring both to design professionals operating in the labor market and to higher education in design. Therefore, this study lies in the need to contribute to the field of higher education in design the particularities identified in a professional environment, which can be introduced in the academic process and which better suit and prepare design students for the expectations and requirements with which they will be faced when entering the labor market. Bonsiepe (2012, p.15) speaks of the danger of excessive "academicization" of design education. For this researcher, "there is a risk of the predominance of traditional criteria of academic excellence, erudition and the production of papers, relegating the practice of design, which is the essence of design, to the background". Brosens et al (2023) found that "more 21st century learning objectives focusing on skills next to domain-specific knowledge need to be incorporated, and teaching and learning activities need to be more student-centred and better aligned to industry." With this, the distance between the academic world, on the one hand, and, on the other, the solutions to the real problems of companies and society tends to grow". According to Norman (2010) we need new types of designers, people who can work across disciplines, who understand human beings, business and technology and the appropriate means of validating claims. For Friedman (2012) the most important thing is the fact that designers need to learn more than they learned before to

succeed in a first-rate design program. Upon graduating, they must know more than they did before to work at the higher levels of the profession and require a higher level of integrative skills to succeed. Findeli (cited in Wang, 2010) argues that design education needs to develop a systemic theory that allows for an understanding not only of planned artifacts, but also of the invisible relationships between the inner worlds of the designer and the client(s) and the external worlds of society and the biosphere. "In recent years, design educators have examined a variety of ways to teach design to a generation described as 'post-millennial'. This diversity has created a disparate menu of projects and activities that can result in unclear learning objectives, portfolios that lack cohesion and students who may not appreciate the subtleties of design methods and process(...)"(Deeg et al, 2020).

Likewise, the authors, professors of design courses for more than 25 years, consider that among the skills and competencies related to academic performance in developing solutions to concrete problems are understanding the design process, time management, critical thinking, analytical capacity and logical reasoning. At the same time, they defend an adaptation of design education in relation to changes in companies, economy and technological and social advances. Hendricks & Meyer (2020) argue that design education "should not exist in a vacuum, rather it should prepare students to respond as innovative contributors to a global economy. Curriculum planning in design requires constant reflection. These curriculum revisions require one hundred percent buy-in from colleagues and could contribute significantly to a larger cultural transformation in our design schools." The question, therefore, is how to conceive the future of design education in a way that better corresponds to these changes. Throughout this study, it is intended to identify, in a first approach, criteria which may be the basis of a certain gap between the reality of the design professional and that verified in higher education environments in design, and which may be the basis of innovation pedagogy in the field of design. Furniss (2020, p.2) argues that a growing disconnect between practice and education calls for existing pedagogic models to be challenged, proposes alternative approaches and highlights the need for policymakers, practitioners and educators to work together to best prepare young designers to meet today's challenges"

2. Materials and methods

To gain a broader understanding of professional practices in the field of product/equipment/industrial design, a questionnaire survey was first conducted. This national survey was addressed to product/equipment/industrial designers, with higher education, who are professionally active in the labor market in Portugal. Through this instrument, it was possible to characterize the professionals, know the processes, phases of product development, time management, as well as the instruments and tools used in these same processes, elements of analysis and study that can provide relevant information to replicate in academic projects. In addition, it was possible to identify the professionals who were most available to receive the authors on a visit to their workplace, providing observation and semi-structured interviews as complementary qualitative means for extracting various data and clarifying ideas that were formulated from the survey. The combination of both methods for the study of the same phenomena, has the objective of making the research work more firm and producing more reliable results.

The survey was conducted in two phases. The first phase involved the distribution of a questionnaire to a sample of 100 product/equipment/industrial designers in Portugal. The questionnaire collected data on the professionals' demographics, work experience, and professional practices. The second phase involved visits to the workplaces of 10 of the designers who participated in the survey. The visits were conducted by the researchers to observe the designers' work practices firsthand and to conduct semi-structured interviews.

In a second part of the work, will be tested, through the exercises developed in the curricular units related to the design project, the knowledge obtained and its conversion into pedagogical practices. It is expected that after applying the assumptions arising from the study carried out, it will be possible to obtain quantitative data, compared to previous years, as well as qualitative data, resulting from criteria that are difficult to quantify, such as the motivation and interest of students in embracing the new practices.

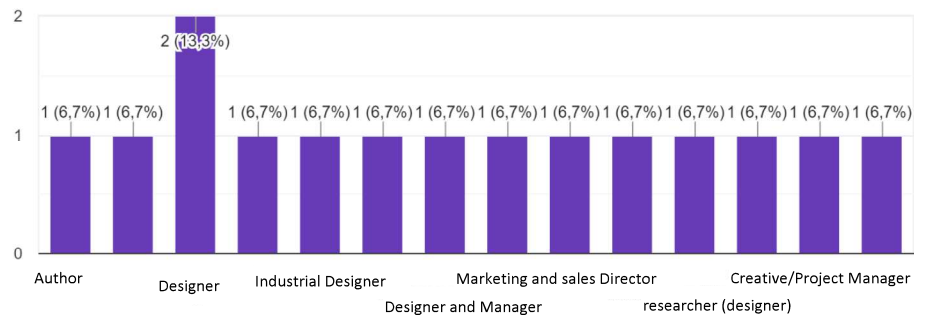
At the end of the study, actions to disseminate the results will be carried out, either through the creation of digital communication media.

3. Results

In order to make a first approach to professional designers, more specifically in the product area, an online questionnaire was submitted (<https://docs.google.com/forms/d/165nS8sZcP22RDTvhXNg-klzUNmHoDpsRG8Zk2ivkrow/prefill>), which aims to identify the phases, resources, and times that determine the current practices of designers in the market. This first immersion will be followed by fieldwork to verify in situ their daily lives and the work processes adopted by each one.

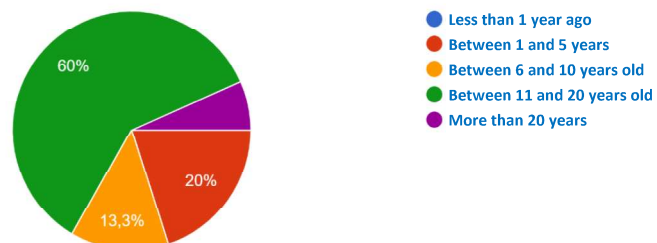
Of the 91 professional and licensed designers contacted, 15 responses were obtained, equivalent to 16,48% of the considered universe. The sample considered is characterized by the fact that most of them assume the roles of designers (13,3%), or as design researchers, as authors, project managers or marketing directors, all about 6,7% of the sample.

Role performed within the company/office/studio
15 answers



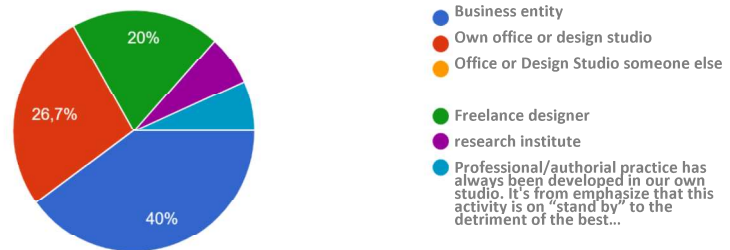
The group of interviewees shows experience as design professionals, with the largest percentage of respondents (60,0%) having between 11 and 20 years of experience, 20% between 1 and 5 years, 13% between 6 and 10 years, and 7,7% with more than 20 years of experience. It is noted that the vast majority work in the north region, with emphasis on the districts of Porto (30,8%), Aveiro (30,8%), and Braga (15,4%), with Lisbon and Viana do Castelo also identified with 7,7% each.

How many years have you worked professionally as a product/equipment/industrial designer?
15 answers



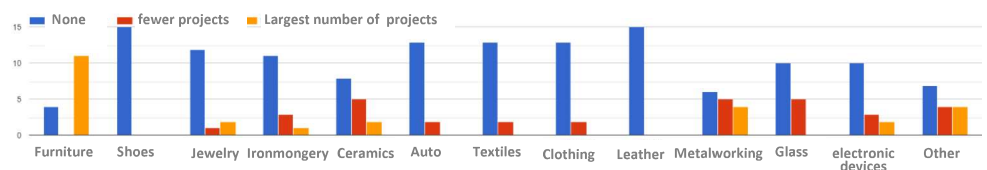
The workplace is mostly in a corporate environment (40%) and in a private office or studio (26,7%), for a total of 66,7% of the total sample, with the rest working as freelancers (20%) or included in a research institute (6,7%).

Role performed within the company/office/studio
15 answers



The scope of the product area is also manifested in the diversity of economic sectors in which designers operate. The furniture industry, being one of the most recognized industries in the Portuguese business fabric, especially in the North region, is the sector with the highest predominance of work of the respondents (77%). Other sectors, such as mechanical engineering (23.1%), or electronic devices (15.4%), jewelry (15.4%), and ceramics (15.4%) are also areas in which designers develop their work. Other unspecified sectors are also identified.

In which sector(s) of product/industrial/equipment design do you develop your professional activity?

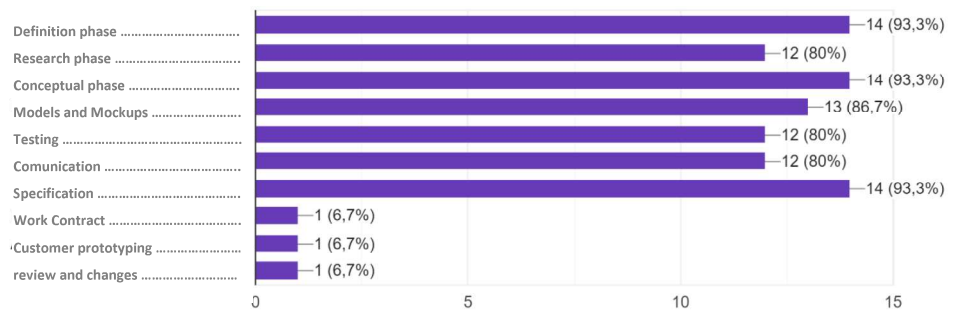


The work processes, the primary reason for the study, are appropriate according to the project typology that is developed in each of the designer intervention sectors, implying differentiated time expenditures, in the various intervention sectors considered, possibly appropriate to the complexity and dimension that the projects require in their conception and development.

The trend for the time spent on projects to be increasingly shorter is seen in the analysis carried out on the data collected, realizing that, from a transversal perspective, the processes are reduced, since in most of the project typologies the time spent is largely between 1 and 2 weeks in duration, which happens in all areas of intervention. Only in the field of furniture, ceramics and metal mechanics do projects take significantly longer than 8 weeks.

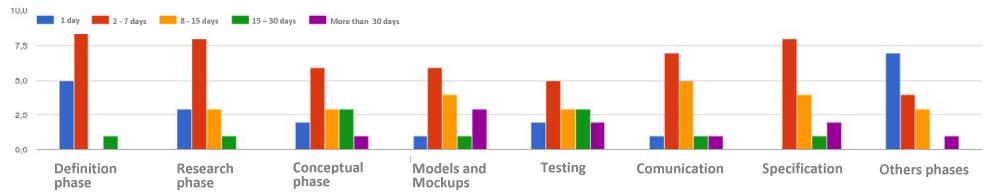
Project processes are commonly identical in terms of the phases through which the designer's work passes. The phases of problem definition, as well as the ideation phase, such as phases with a 100% completion rate, in which all respondents reveal that they are part of their work processes. Steps aimed at materialization, and of project specification, are also considered to be work levels for designers, in which they assume their execution on a recurring basis, only 92.3% of the respondents. Research phases, testing, and results communication register lower participation by designers (84.6%).

In the most recurring product/equipment/industrial area, identify the phases through which the project development passes



The need for shorter response times is reflected in each of the design stages, with a greater prevalence of the time spent in each of them being between 2 and 7 days.

In the most recurring product/equipment/industrial area, how long does it take, on average, in each of the following project phases



It is found that in the initial stages of the project, the preference for analysis and critique methods is predominant, with all respondents (100%) prioritizing "always" or "frequently", over preparation and planning tasks.

The use of specialized publications, both physical and online, is also revealed as the most common way of obtaining data on the problems and themes of the project in the contextualization or research phase. Consulting specific technical literature and consulting standards that may determine the context of action within the project are also ways that designers find to access information considered relevant to the project.

Regardless of the recognition of a multiplicity of aspects and factors that interfere in the creation processes, it is observed that the majority of designers favor traditional resources for exploring concepts. Examples of this are the use of drawings on physical media (86,95%), the conduct of brainstorming sessions (86,95%), or even the execution of three-dimensional study models (73,3%). Digital media, such as drawing, or the use of Generative Artificial Intelligence, although they are recognized as having value, have a lower expression in their use.

Physical three-dimensional representation elements such as mock-ups, models, or prototypes are recurring work tools in the development process and in the conduct of tests within the product design framework. As attested by the majority of responses obtained (73,3%), which recognize the relevance of

using these instrument elements, either for the visualization and verification of intermediate and final results, or for their inclusion in the conduct of usability tests.

The democratization of new technologies has allowed them to increasingly be an integral part of product development, however, designers identify manual production processes as the most used (93,3%), with mechanized resources such as laser cutting equipment (60%), 3D printing (53,3%), and milling (53,3%), already common and regularly used resources. Other equipment such as CNCs and others not specified assume a residual percentage.

The validation of solutions is also an important factor in the development of product design projects. In this sense, the conduct of tests is a method recognized for its importance in confronting the product with users (100% of the sample), as well as for testing the performance of the designed solution (73,3%).

As a way of communicating intermediate and final results, the means used are diverse. The use of computer programs throughout the process is registered, with modeling and rendering programs (61,5%) and image processing programs (53,8%) being highlighted. Other programs, such as those for creating technical drawings (38,5%) and graphic composition (38,5%), also assume themselves as instruments used in the project.

With regard to presentation, the resources used are equivalent in terms of physical and digital media, through the use of posters (69,3%) and visualization and content display programs (77%).

4. Discussion

The results showed that product/equipment/industrial designers in Portugal are a diverse group with a wide range of skills and experiences. Designers typically work in teams and use a variety of tools and techniques to develop their products. These professionals face a number of challenges, including tight deadlines, limited resources, and changes in customer needs. The ability to adapt methodologies and resources to the specific needs of the work context is a characteristic that should be enhanced by design professionals in order to meet the challenges of the contemporary world and meet the complexity, demands, and expectations generated about their work.

The findings of the study are important for a number of reasons. First, they provide a comprehensive overview of professional practices in the field of product/equipment/industrial design in Portugal. Second, they can be used to inform the development of educational programs and to improve the professional development of product/equipment/industrial designers. It is hoped that this immersion will contribute to bringing together the professional and academic realities in the context of design activity.

5. Conclusions

The study was well received by design professionals who participated in the first phase of the research project, responding to the questionnaire addressed to them, expressing their willingness to continue collaborating in the following phases, allowing their companies and their studies to be seen, so that the authors make direct observation of practical activities and carry out interviews.

The data obtained so far has confirmed the perception shared by the authors about the professional activity of design in the product/equipment/industrial field, in aspects related to more generic development processes. More specific aspects related to digital technologies seem to accelerate and make the practice of design activity more efficient, highlighting the need to see it reflected in academic practice.

In the last phase, the results of this research will be academically tested, converted into one or more academic design project.

6. References

- Bonsiepe, G. (2012). Design como prática de projeto. São Paulo: Editora Blucher.
- Brosens, L., Raes, A., Octavia, J.R. et al. How future proof is design education? A systematic review. *Int J Technol Des Educ* 33, 663–683 (2023). <https://doi.org/10.1007/s10798-022-09743-4>
- Deeg, L., Metz, T., Tursky, R. 'Catena: Collaboration, Cohesion and Continuity in Design Thinking and Making'. *Architecture_MPS* 18, 1 (2020): 3. DOI: <https://doi.org/10.14324/111.444.amps.2020v18i1.003>.
- Furniss, L. 'Beyond Discipline: Evolving Design Practice and Design Education in the Twenty-First Century'. *Architecture_MPS* 18, 1 (2020): 4. DOI: <https://doi.org/10.14324/111.444.amps.2020v18i1.004>.
- Hendricks, D., Meyer, M. 'Fostering Innovative Entrepreneurial Design Students: Exploring the Relationship between Innovation Characteristics and Attitudes towards Entrepreneurship in South African Design Students'. *Architecture_MPS* 18, 1 (2020): 5. DOI: <https://doi.org/10.14324/111.444.amps.2020v18i1.005>.
- DGES – Sistema de Ensino Superior Português na Direção-Geral do Ensino Superior [em linha]. Lisboa: DGES. [consult. 2022-02-01]. Retrieved from <https://www.dges.gov.pt/pt/pagina/sistema-de-ensino-superior-portugues>
- Friedman, K. (2012). Models of Design: Envisioning a Future Design Education. *Visible Language*, 46, 132-153. Retrieved from https://www.academia.edu/2508775/Friedman_2012_Models_of_Design.
- Norman, D. (2010). Why design education must change. *core77*, 26. Retrieved from <https://www.core77.com/posts/17993/why-design-education-must-change-17993>
- Wang, T. (2010). A New Paradigm for Design Studio Education. *International Journal of Art & Design Education*, 29(2), 173–183. <https://doi.org/10.1111/j.1476-8070.2010.01647.x> Retrieved from <https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1476-8070.2010.01647.x>