OIKOS
DESIGN FOR ECOSYSTEMIC SPACES

FÁTIMA POMBO (ORG.)

DRX: REGISTOS DE INVESTIGAÇÃO EM DESIGN
DRX: DESIGN RESEARCH RECORDS

ID+ INSTITUTO DE INVESTIGAÇÃO EM DESIGN, MEDIA E CULTURA
universidade de aveiro
U.PORTO
IPCA INSTITUTO POLITÉCNICO DO CÁVADO E DO AVE

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PORTUGAL

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DESIGN
Francisco Providência

OBJECTO CAPA COVER OBJECT
Ensaio de *extrusão* por abelhas em pré-molde de cera
Test of Wax preform *extruded* by bees
© Designer Raúl Pinto

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SOBRE ESTA COLEÇÃO

A presente coleção, **DRX: Registos de Investigação em Design**, vem assinalar dez anos de significativa produtividade académica e científica na Investigação em Design em Portugal. Por via da criação do Instituto de Investigação em Design, Media e Cultura [ID+] em 2008 foi possível potenciar esta disciplina científica a nível regional; é agora o tempo certo para congregar a sua correspondente produção de pensamento numa série de volumes, dotados de perspetivas próprias, mas convergentes no mote do ID+.

O ID+ é uma unidade de investigação centrada na área do Design, mas alargada a outras áreas criativas da Arte e da Cultura. Desde a sua fundação o ID+ tem norteado a sua atividade pelas seguintes orientações estratégicas: (1) intervir ativamente na produção e aplicação de conhecimento, potenciando a função de mediação cultural que caracteriza o Design, a par do questionamento social e da inovação poética que a Arte permite; (2) demonstrar a importância estruturante do Design e da Arte na definição e implementação multidisciplinar de cenários credíveis para o crescimento sustentá-

vel onde a qualidade de vida seja um pressuposto de prosperidade;
(3) validar o Design e a Arte enquanto agentes éticos de uma cidadania exigente, critica e participada, cultivando a sua apropriação e tradutibilidade a nível social, cultural e económico;
(4) escrutinar a contemporaneidade da herança cultural, na sua relação dinâmica com os novos paradigmas tecnológicos e mediáticos.

O ID+ desenvolve esta missão principalmente na região Norte de Portugal e noutras regiões periféricas, mas também em redes de cooperação nacionais e internacionais. Opera contextualmente produzindo, transferindo, traduzindo e comunicando o conhecimento científico e profissional sobre o design, os media e a cultura em ambientes onde poderá gerar benefícios.
O ID+ está atualmente organizado em oito grupos de investigação, cobrindo perspetivas específicas, mas mantendo a capacidade de reconfiguração e cooperação de acordo com os vários projetos e desafios em jogo:
– CAOS: interfaces com indústrias locais
– DESIS Lab: redes de inovação social e sustentabilidade
– LUME: laboratório para os media inesperados
– MADE.PT: design crítico para o crescimento e prosperidade
– OIKOS: Design for Ecosystemic Spaces
– PRAXIS & POIESIS: prática e teoria da arte
– SD Lab: estratégia e gestão do design
– THEME: teoria e memória.

Para além dos grupos referidos, PERIPHERIES é um grupo em fase de criação na Universidade da Madeira, que pretende investigar a relação do Design com a Natureza, a Cultura, o Turismo e outros conteúdos relacionados com o Oceano.
A escala regional do ID+ é assegurada através de uma estrutura de consórcio baseado num acordo formal de cooperação entre a Universidade de Aveiro, a Universidade do Porto e o Instituto Politécnico do Cávado e do Ave. A convergência das respetivas competências institucionais garante um grau de hibridação e massa crítica que favorece um território de investigação expandido.
A equipa conta, atualmente, com 168 membros, dos quais 69 são doutorados integrados. Além das Universidades de acolhimento e do Politécnico acima mencionados, a proveniência dos membros alarga-se a outras dez instituições de ensino superior e de investigação. O ID+ reúne um número significativo de jovens investigadores formados em Design e em outras áreas criativas e culturais. Nesse contexto o ID+ tem sido pioneiro na construção de um modelo operacional para uma cultura de investigação adequada ao Design, gerada entre a primeira geração estruturada de programas de doutoramento a nível nacional.
A consolidação de uma cultura de investigação exige tempo e é por isso que decidimos incluir na celebração dos dez anos de existência do ID+, o desenvolvimento do corpo editorial já iniciado, preocupado tanto com a validação da investigação de acordo com os cânones científicos, como com a tradução e o impacto dessa investigação junto de públicos mais amplos e diversos.
A publicação desta primeira coleção de **DRX: Registos de Investigação em Design** tem como objetivo sistematizar as dinâmicas de cada grupo, que se apresenta à comunidade nacional e internacional com a escolha dos artigos científicos mais relevantes que produziu ou escritos por personalidades de referência internacional com os quais trabalham ou trabalharam. A todos eles – Alastair Fuad-Luke, Bruce Brown, Clive Dilnot, Sophie Van der Linden e Victor Margolin – o nosso agradecimento pelas suas valiosas colaborações e, em especial, aos familiares da saudosa Anna Calvera (1954–2018), por terem autorizado a publicação de um texto da sua autoria.

Com esta frente editorial que agora se inicia, o ID+ pretende incrementar a visibilidade do seu trabalho de investigação. Esperamos que conduza a novos desafios, ao fortalecimento de parcerias, à promoção de novas colaborações, qualificando novos horizontes de produção de sentido, conhecimento e valores com impacto no futuro coletivo.

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ABOUT THIS COLLECTION

The present collection, **DRX: Design Research Records**, marks ten years of significant academic and scientific productivity in Design Research in Portugal. By means of the creation of the Research Institute for Design, Media and Culture [ID+] in 2008 it was possible to promote this scientific discipline at a regional level; it is now the right time to bring together their corresponding written output into a series of volumes, with their own perspectives, both specific and convergent in the motto of ID+.

ID + is a research unit focused on the area of Design, extended to other creative areas of Art and Culture. Since its foundation, ID+ has guided its activity through the following strategic guidelines:
(1) to actively intervene in the production and application of knowledge, while enhancing the nature of cultural mediation that characterises Design, while maintaining the social questioning and poetic innovation that art provokes;
(2) to demonstrate the structuring importance of Design and Art in the multidisciplinary definition

and implementation of credible scenarios for sustainable growth where quality of life is a prerequisite for prosperity;
(3) to legitimize Design and Art as ethical premises of a demanding, critical and participating citizenship, fostering its appropriation and translatability at social, cultural and economic levels;
(4) to scrutinize the contemporaneity of cultural heritage in its dynamic relationship with new technological and media paradigms.
ID+ develops this mission primarily in the Northern region of Portugal and peripheral environments, as well as in national and international cooperation networks. It operates contextually by producing, transferring, reverting and communicating the scientific and professional knowledge of design, media and culture into environments where it may generate benefit.

ID+ is currently organised in eight working groups, covering specific outlooks while maintaining the capacity for reconfiguration and cooperation according to the various projects and challenges at stake:
- CAOS: interfaces with local industries
- DESIS Lab: networks for social Innovation and sustainability
- LUME: lab for unexpected media
- MADE.PT: critical design for growth and prosperity
- OIKOS: Design for Ecosystemic Spaces
- PRAXIS & POIESIS: art practice and theory
- SD Lab: strategy and design management
- THEME: theory and memory

Besides the above groups, PERIPHERIES is under creation at the University of Madeira, focusing on Nature, Culture, Tourism and Ocean-related content. The regional scale of ID+ is ensured through a consortium structure based on a formal cooperation agreement between the University of Aveiro, the University of Porto and the Polytechnic Institute of Cávado and Ave. The convergence of the respective institutional competences ensures a degree of hybridity and critical mass that furthers an expanded research territory.
As of 2018 the team comprises 168 members, of which 69 are integrated PhDs. Besides the aforementioned host Universities and Polytechnic, member provenance includes ten further higher education and research institutions. ID+ gathers a significant number of young researchers from Design and other creative and cultural areas. ID+ has therefore, in this context, pioneered an operative model for a proper research culture in Design amongst a first, structured national generation of PhD students. The consolidation of a research culture demands a temporal scope and this is why we decided to include in the celebration of the ten years of existence of ID+, the development of the editorial venture hereby, pertaining to the validation of research according to scientific canons, as well as with the translation and the impact of this research on broader and more diverse publics.

The publication of this first **DRX: Design Research Records** collection aims to systematize the dynamics of each group through a selection of the most relevant scientific articles it has produced together with others written by, currently or formerly collaborating, internationally recognized experts. To all of them – Alastair Fuad-Luke, Bruce Brown, Clive Dilnot, Sophie Van der Linden and Victor Margolin – our sincere thanks for their valuable contributions to this effort, and especially to the family of the late Anna Calvera (1954-2018) for having authorized the publication of one of her texts.

Through this new publishing venture, ID+ ultimately aims to increase the visibility of its research work. We hope this will lead to new challenges, the strengthening of current partnerships and fostering new collaborations, thus qualifying new outlooks for the production of meaning, knowledge and values that will impact our collective future.

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RESEARCH GROUP OIKOS: DESIGN FOR ECOSYSTEMIC SPACES

The research group OIKOS – Design for Ecosystemic Spaces focuses its scientific activity on a multidisciplinary network mainly crossing Design, Product Engineering and Ecotechnology in a close collaboration with the enterprise sector to create opportunities of a sustainable innovation in which design is added value, favouring connections between people/materials/processes. The main area of research is the design of spaces in a broad sense, namely, the meaning of space as oikos, involving home, working and leisure and its artefacts, devices, goods, materials and atmospheres.

The key words that summarize the OIKOS research are:

- Design and Ecotechnology
- Knowledge Valorisation
- Circular Economy, Upcycling and Life Cycle Design
- Genius Loci/Reflexive Society
- Interaction Design and Experience Design
- Phenomenology of Design/Inhabitation of Designed Spaces
- Design Research and Contemporary Challenges

The theoretical framework in which OIKOS roots its research is the declaration of the 17 Sustainable Development Goals from the United Nations that supports the Agenda 2030 as a global vision and concern with a better future for all[1]. A sustainable development is the flagship to take action in 'name of all people and the planet'. To the research group OIKOS, Life Cycle Design is a paramount approach for integrating sustainable issues into design. Designing new products and services that reduce the environmental impact is a learning process that requires reflection, awareness and thinking about how products are made and consumed. Adopting a conscious life cycle strategy means taking responsible decisions during the design process concerning material selection, manufacturing processes, packaging and transportation, long useful life, reuse and maintenance, recycling possibilities and disposal at end of life. Consumers also need to be more responsible about their choices. When people understand the environmental impact of the product, they become more aware and may take action or make responsible choices. Communicate life cycle issues associated with the product and integrating sustainable values in communication plans is a valuable strategy to change attitudes and behaviours[2].

In effect, once the research group OIKOS intends to contribute to the reinforcement of the mobilization to optimizing the fulfilment of the 17 universal objectives it is also aligned with the purposes of the contemporary challenges for growth of a society that respects the ecological transition as outlined by the European Green Deal[3]. To meet this target, research has to contribute to the development of a critical, ethical and engaged attitude in the reduction of the ecosystems' destruction in a global sense which will have a positive impact to our planet.

This research group aims to produce and disseminate knowledge that contributes to boost the values of a responsible design in a bilateral collaboration between academia and the industry towards a more reflexive and ecologic society. The design of future societies within such goals intends to generate a more conscientious behaviour towards consumerism, supporting more authenticity and less waste in the daily life decisions regarding the design and the inhabitation of spaces from the domestic environment till the collective and public spaces. To reduce the damage to ecosystems, it requires improvement in economic performance and technologic methods and processes aiming for a holistic perception about the designed complex world and the interface with it.

MAIN OBJECTIVES

The research developed by this group intends to respond mainly to:

- the application of new and emerging materials into habitable spaces in order to improve users' experience while conciliating digital revolution aspirations and potentialities with social, economic and ecological sustainability demands;
- the relationships between the spaces and (i) the people who inhabit them (ii) the (sustainable) materials that shape them and (iii) related technologies;
- users' role while designing products and spaces that combine digital transformation benefits and sustainable development challenges, through a human centred approach;
- the significance of images for the design project as cognitive and perceptive experience of places and artefacts;
- how to take advantage of new and emerging technologies and manufacturing processes within the industry 4.0 scenario in order to design and produce better smart products through smart and connected industrial systems and at the same time contributing to reduce pressure on ecosystems.

[1] https://www.un.org/sustainabledevelopment/sustainable-development-goals
[2] https://cincoma.org/mesa-life-cycle-design/
[3] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

NETWORK

OIKOS research members belong to distinct research networks and collaborate with national and international researchers in favour of addressing through multidisciplinary approaches the pertinent issues of our time. In that line, OIKOS expects to strengthen the national and international network of partners with the already established channels as ID+ groups, protocols, conferences, peer-reviewed journals, call for projects, organizations, events, workshops and other platforms at disposal and by enlarging it through theory and practice based research.

At this date two research projects which involve OIKOS members are running, namely the European project CRAFT – Building links between education, research and innovation on the foundation of our shared cultural heritage (2018-2021) and the National project COVID-PORTA ABERTA: Sistema de apoio à abertura de portas [COVID – OPEN DOOR: support system of Hands Free Door Openers (2020-2021)].

CRAFT took its point of departure in the celebration of the European Year of Cultural Heritage (2018), whose slogan was 'Our Heritage: where the Past meets the Future.' CRAFT builds upon the objectives related with cultural heritage and further contributes to them by working on the theme connecting sustainability and education in a joint multidisciplinary approach on research based education and innovative creative practices. In particular, CRAFT has been connecting high education with civil society stakeholders, manufacturers, companies, and cultural actors and thereby follows the recommendations of the European Council (Council of the European Union, 2009: 4). Therefore, this new joint multidisciplinary curriculum is expected to have a high impact on the students at higher educational institutions across Europe, who will gain new, necessary skills within innovative practice, creativity and entrepreneurial thinking built on shared cultural heritage and sustainability concerns. CRAFT promotes cultural diversity and intercultural dialogue in Europe, in the belief that culture is a driving force for innovation and creative endeavour, bearing in mind the Lisbon Strategy for jobs and growth. Also, by placing shared cultural heritage and sustainability as a main element and focus area in the dissemination of the new curricula and training schemes, and the implementation and results of CRAFT in practice, the project has been fostering understanding of the European Union's external relations to other parts of the world.

In effect, the results obtained during CRAFT contribute to social and educational value of European cultural heritage and sustainability working with innovation within the topics:

- developing, implementing and testing the effectiveness of CRAFT's joint multidisciplinary approaches to promote creativity, entrepreneurial thinking and skills;
- supporting and ensuring the transfer of latest research outputs back into education;
- promotion of cultural diversity and intercultural dialogue in Europe through the newly developed joint multidisciplinary curriculum and training scheme and the dissemination of these based on shared cultural heritage;
- new joint multidisciplinary tools for learning, teaching and training at higher education, based on the interlinking of innovation, research and education - the three sides of the 'knowledge triangle';
- new joint multidisciplinary methodologies for innovation developed in collaboration between educational and cultural institutions, manufacturers and other relevant cultural actors from the European Union;
- contributing to higher education with impact on future jobs and growth and its international attractiveness.

This project brings together six partners: Aalborg University from Denmark (leading the project), Aveiro University from Portugal, Oviedo University from Spain, Ljubljana University from Slovenia with partners Hans Thyge & Co from Denmark and AMAT-Associazione Marchigiana Attivita' Teatrali from Italy.

COVID-PORTA ABERTA: Sistema de apoio à abertura de portas
The current situation determined by COVID-19 showed, in a short time, several vulnerabilities in the fulfillment of the simplest daily actions, forcing the adoption of new hygienic behaviours that have a direct impact on our way of life. An easily spreading virus contaminates surfaces and objects handled by people, and the subsequent contact between hands and eyes, nose or mouth, presents itself as one of the main factors of contagion. Considering that this new context will become part of our future, it is necessary to develop and implement solutions that will mitigate or eliminate the different routes of contamination. Thus, there is an urgent need to rethink the way of interacting with the most-touched surfaces, where door handles in public places are themselves possible spreading agents of viruses and bacteria.

The main objective of the project is the development of a stainless steel device with universal characteristics that allows hands-free door opening and closing, adaptable to the "pull/push" rotation axis door, which is most often found in high-traffic buildings. It is also intended to incorporate a dynamic component to improve user interaction.

Activities to develop and expected results
The development of the device involves the interaction between the various partners in completing a set of design steps, which includes respect for safety standards in its use, design and mechanical strength that ensures a harmonious framework with the environment in which it will be inserted, and the ease of production. Once developed, the product will be submitted to functionality and usability tests to validate its use in high-density environments such as health centers, hospitals, commercial areas and schools.

This project promotes a consortium made up of 2 companies and 2 non-business entities from the national R&D system, namely SHAPETEK—Tecnologias de Maquinação, Lda; SANDREDY—Comércio de Artigos de Decoração, Lda; CENTIMFE-Centro Tecnológico da Indústria de Moldes, Ferramentas Especiais e Plásticos and Instituto Politécnico de Coimbra (ISEC e ESEC).

More information about these and other projects and research activity is displayed in https://idmais.org/pt-pt/research-group/design-for-ecosystemic-spaces/

ABOUT ARTICLES' SELECTION

This publication displays a selection of articles that illustrate some research themes carried out by their authors and explored within OIKOS, pointing out to a range of a broad expertise and research interests.

The first article written by Fátima Pombo entitled ***Designing Atmospheres and Landscapes of Dwelling*** addresses the concept of space in the current millennium starting from the discussions of authors' statements so different as Bauman, Heidegger, Zumthor, Pallasmaa, Böhme, Branzi or Sloterdijk. For the quality of the project of spaces and atmospheres is presented a reflection about phenomenology of design as discipline that contributes both with knowledge for and about design through a description of things and to the occurrence of experiences with those things through dimensions created by the designer. Sceneries to dwell are approached as spaces to the body, mind and spirit and therefore as an opportunity to integrate parameters of functional, emotional, aesthetic, economic, ecological and technical nature that constitute a complex challenge to the designer.

In the article ***Three Drawings for Three Stories about Portuguese Cultural Heritage*** by Fátima Pombo and Sónia Teles e Silva is discussed the specificity of three projects to elaborate about the partnership between traditional economic sectors and design as added value regarding cultural heritage as framework for sustainable solutions. The scenery of intervention is the refurbishment of a single-family home that motivated the creation of three types of products: an entrance door, an armed chair with a footstool and eight carpets. The

three projects started from hand drawings of one of the architects. In the article is considered the concept of home and surrounding objects from an organic, human centred perspective, recalling, among others, essays as *Bauen Wohnen Denken* from Martin Heidegger and *Rationalism and Man* from Alvar Aalto as key references that give the note of this text's approach. The analysis goes further by addressing the product's development process through the immersive collaboration of the architects with the client, technicians, factories' workers, namely metalwork, carpentry/carving and hand knotting, underlying that these projects are a significant example to illustrate the partnership that can be experienced between arts & crafts production and design proposals.

For Graça Magalhães the core in the article ***Drawing: the Active Desire of Design. A Case of Designing Architecture*** is the reflection about the contribution of drawing in the understanding of the design project, and particularly in relation to architecture. The analysis seeks to contribute to a critical and multidisciplinary discussion between drawing and design in order to stimulate the interdisciplinary understanding in generating ideas and solutions for architecture. A case study is presented, namely the project drawings of the architect Bernardo Rodrigues who voices the paramount importance of returning back to nature, supporting the idea of sustainability according to the essence of architecture as centered in the human being. Thus, drawing is more than the heuristic representation of the project of architecture. The subject of representation goes beyond the functional consideration of the design through a poetic expressed on the drawing that is a different way for questioning the world and its representation.

From a different perspective but within the same mindset Graça Magalhães in the article ***Drawing the Place's Soul. Designing the Representation Experience in the Schist Villages*** points to the concept of genius loci by discussing the question of landscape's representation through the crossing of the languages of art and of design through the practice of drawing while interpreting the project *Drawing the Place's Soul*. The experiment was carried out in three territorially and circumstantially differentiated villages whose territory is deeply deserted and which, in summer 2017, was hit by violent forest fires. Methodologically it was sought that the experience, free of constraints, would be able to provide information for the internal evaluation of the territories and for the way they are disclosed. Drawing is the medium explored as an iconographic bond politically participative in the ethical valorization of people and territories promoting craft as an action deeply associated with the landscape.

In the article ***The Chairs of Venice. Applying Storytelling as Teaching Method to Understand Material Cultural Heritage*** authored by Tenna Doktor Olsen Tvedebrink and Nini Camilla Bagger the environment is Venice inspiring an interdisciplinary Summer School at the Art Biennale 2019 within the Erasmus+ European project CRAFT already above mentioned in this text. Ruskin's Venetian wanderings, writings and drawings are recalled to stress the importance he acknowledged to material cultural heritage as a way to understand the present and prepare for the future. The article goes further by explaining the Summer School planned as a five-day workshop focusing on the cross-examinations of material cultural heritage. Within the workshop it was used the specific example of a Monobloc chair to function as a medium to investigate and make more tangible different thinking and discourses in cultural heritage. The chair was placed into six particular themes and six careful chosen historic contexts of Venice: (1) 'Full/Empty' at Rialto Bridge 2) 'Mystery' at Borges Labyrinth on Island of San Giorgio Maggiore 3) 'Time' at Arsenale 4) 'Scale' in the City of Venice 5) 'Place' at Piazza San Marco, and 6) 'Body' at Santa Lucia Railway Station. This is also where the methodology of *storytelling* became relevant. The process, outcomes and conclusions display the vivid experience of all participants regarding the issues approached in this text.

Based upon the connection between design and sustainable responsibility the following article named ***Preserving Heritage through New Narratives:***

Designing a Guesthouse within a Cross-disciplinary Team by Pedro Bandeira Maia and Raul Pinto describes the interior design project that accommodates a guesthouse in a historical building located in the city of Coimbra in Portugal. It focuses on the importance of generating new narratives to maintain the original nineteenth century building's essence, when changing the architectural program, from an existing pharmacy on the ground floor and residences in the upper floors into a single guesthouse. This is a project rich in historical, decorative, and emotional attributes in which metaphors work as storytellers and generate a conversation between spaces and people, resulting in strong emotional experiences. The article also emphasizes the importance of the designer's elastic mindset as a binding tool between actors and contexts, valuating different enriching personal contributions and using them as the elements of an integrative whole. By presenting the design-led methodology while working in a cross-disciplinary team it focuses on the role of the designer as a key decision maker regarding an ethical approach to the project.

In a different angle the article ***Additive Manufacturing Artefacts: an Evaluation Matrix Proposal*** by Silvina Félix, Nuno Dias and Violeta Clemente explores the Additive Manufacturing (AM) as a changing process in the way products are designed and manufactured. Evolving from a rapid prototyping tool to an end-use product manufacturing process, AM releases designers from the constraints of the traditional manufacturing processes, offering to product design new opportunities and strategies for innovation. AM improvements have led to a growing awareness about the potential of additive processes challenging design to exploit an open space of infinite possibilities, and moving it towards an emergent aesthetic and functional language.

In ***Digital Sketching to improve Sketching Practice in Design Higher Education*** Silvina Félix draws the attention to sketching as one of the most effective visual thinking tools used by designers during the creative process in order to reveal thoughts, to voice concepts and communicate ideas. Sketching has also been highlighted as a fundamental subject of design higher education curriculum, where problem solving skills, spatial abilities, and creativity thinking are expected and can be improved by sketching practice. However, sketch inhibition and the reluctance of design students to engage in sketching during ideation and concept development phase is growing and affecting design quality outcomes. The author discusses the issue of sketching losing for CAD and the way it affects current generations of digital native design students' creative process and exercises' outcomes. As the reluctance to use paper-based sketching techniques are growing, Félix argues for the need to include digital sketching in design higher education, proposing a research starting point based on the premise that students' sketching inhibition during the design process can be minimized and sketching practice encouraged by using digital sketching interfaces.

With the article ***Mapping the Territories around Design Research: a Four-Layer Analysis*** the authors Violeta Clemente, Katja Tschimmel and Fátima Pombo, following previous work, aim to contribute to Design Research consolidation proposing a Map where four categories of Design Research are positioned in relation to territories of Design Research, Education and Practice. In effect, despite great progress in the last five decades, Design Research still reveals fragilities in comparison with other academic disciplines. The Map also supports the examination of those four Design Research categories based on a four-layer analysis resulting from four key topics: Processes, Philosophy, People and Products. The Map intends to help design researchers, especially inexperienced ones, like PhD students, to visualise where their own research is located within the Design universe and by that understand the ontological, epistemological and methodological implications.

This book concludes purposefully with a thematic regarding Knowledge Valorisation discussed in the article written by Soraia Ala ***Does the European Paradox still hold for Portugal?***. In this text the author debates the European Paradox and the need for policies to

reinforce the downstream activities in the knowledge valorisation chain, if European Union Member States want to enforce the policy strategy stated in the Lisbon agenda. Having Portugal joined in, for the first time, the 2020 Innovation Union Scoreboard (IUS) – the group of countries classified as Strong Innovator – after 10 years of being classified as Moderate Innovator, the present stage of this research addresses the question if the European Paradox still holds for Portugal and most European countries. Hence, successful innovation process depends on much more than simply new knowledge production. It requires knowledge dissemination. In this line of thought, being knowledge an important base for innovation, cooperation efforts between research centres and industry should be intensified to spark innovation, the creation of new businesses and the transfer and dissemination of knowledge. The key term in this translation process is knowledge valorisation, meaning the formal transfer of knowledge resulting from basic or applied research in R&D organizations (universities, research institutes or companies) to other parties in order to create social and economic value from this knowledge.

OIKOS TEAM

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– Fátima Pombo (coordinator)
– Graça Magalhães
– Pedro Bandeira Maia
– Silvina Félix
– Soraia Ala
– Violeta Clemente

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1 DESIGNING ATMOSPHERES AND LANDSCAPES OF DWELLING

Inspired by the *Lezione Americane. Sei Proposte per il Prossimo Millennio* (1985) by Italo Calvino which, due to the author's unfortunate death, could not be given by the author himself at the inviting Harvard University, Juhani Pallasmaa also proposes *Six Themes for the Next Millenium* (Pallasmaa, 2005). If Calvino titled the six proposals that describe the literary work as *leggerezza* (lightness), *rapità* (speed), *esattezza* (accuracy), *visibilità* (visibility), *molteplicità* (multiplicity) and coerenza (coherence) – this proposal was never written as Calvino intended to write the text in the United States), Pallasmaa puts forward as a defence of architectural quality and, therefore, for the quality of existential occupation of spaces, the following topics: slowness, plasticity, sensuality, authenticity, idealization and silence. (Pallasmaa, 2005: 300–305). Other authors such as Bauman, Sloterdijk and Branzi, from different disciplinary areas, also inspire criticism of the world as we know it. The Polish sociologist, devoting great attention to the topic of contradictions of postmodernity and postmodern ethnics, provides a detailed surgery of modern times in the *Liquid Times* trilogy. *Living in an Age of Uncertainty*, (2007); *Liquid Love: On the Frailty of Human Bonds* (2003) *and Liquid Modernity*, (2000). Peter Sloterdijk, a prolix and controversial German philosopher, whose thoughts are designated as posthumanism, or, in his own words, as a thought that seeks "ontological constitution" which integrates all beings (humans, animals, plants and machines) in spaces of coexistence. Sloterdijk's work is complex, namely his opus magnum, the *Sphären*-trilogy (1998, 1999, 2004). The trilogy exposes the reader to very heterogeneous materials from different and varied sources of knowledge, instigating a reflection on the condition of being in today's world as it presents itself. A supporting text (if I may call it that) to Sphären's hermeneutics is the lesson in which Sloterdijk asks himself questions, on behalf of a hypothetical interviewer, that he answers at the same time. This is a lecture given at Harvard University Graduate School of Design on 17 February 2007, which he called *Spheres Theory*. Talking to myself about the Poetics of Space (http://www.harvarddesignmagazine.org/issues/30/talking-to-myself-about-the-poetics-

of-space). In the text of this conference, the first (self) question posed was: "Mr. Sloterdijk, as part of your trilogy on spheres you set out to create a theory that construes space as a key anthropological category. Why this emphasis?". For Sloterdijk, the concept of space as a key anthropological category is expanded as "spaces of coexistence" which together with the topic of "ontological constitution" are part of an integrative and even hybrid perspective rather than dualistic (body and soul; subject and object; culture and nature; biology and technology; human and animal; life and thought, etc.) that calls into question the meaning of construction, manufacture, manipulation and existence in the society of the present millennium: "We have to speak of space because humans are themselves an effect of the space they create. Human evolution can only be understood if we also bear in mind the mystery of insulation/island-making [Insulierungs-geheimnis] that so defines the emergence of humans: Humans are pets that have domesticated themselves in the incubators of early cultures. All the generations before us were aware that you never camp outside in nature. The camps of man's ancestors, dating back over a million years, already indicated that they were distancing themselves from their surroundings." (http://www.harvarddesign magazine.org/issues/30/talking-to-myself-about-the-poetics-of-space). A text that helps clarify the bridge between Peter Sloterdijk's philosophical ideas and design, is Bruno Latour's lesson entitled: *A Cautious Prometheus? A Few Steps toward a Philosophy of Design* (with Special Attention to Peter Sloterdijk) presented at the Networks of Design History Society Falmouth meeting in Cornwall, England, on September 3, 2008 (http://www.bruno-latour.fr/sites/default/files/112-DESIGN-CORN-WALL-GB).
In this text, Latour discusses five connotations of the word design and its application from everyday objects to cities and ecosystems. Linking these arguments to Sloterdijk's philosophy, he concludes that the philosopher's ideas are of crucial importance for the philosophy of design and, finally, for the intervention of design in explaining the issues of our time (which Latour considers Sloterdijk clarified), namely the crucial question "How can it be better redesigned?" (Latour, 2008: 10). A word also about Andrea Brazi's contribution to redefining the role of design today. A. Branzi, recognizing multiple definitions of design and their variation according to time and context, proposes a definition of his own design regarding the interpretation of some of the great masters of Italian design (Gio Ponti, Franco Albini, Marco Zanuso, Gae Aulenti, Vico Magestretti, Castiglioni, Achille, Enzo Mari and many others): "*Un'attività che cerca di interpretare l'estetica per le sue possibilità tecnologiche, e la tecnologia per le sue possibilità estetiche*." (Branzi, 2010: 15-16)[1]. And this activity must be done with a higher objective, which is to make the world better, more liveable: "*saper progettare per rendere di nuovo abitabile il mondo, cioè più ospitale, più funzionale e anche più bello*." (2010: 16)[2]. And he further argues that anyone who is unable to pursue this purpose would be better off changing profession because the world is already full of inhospitable and aggressive things. The aim of design is "ambitious and difficult" because it must participate in the humanization of the world, of its symbolic meaning, to be an instrument of work but also a "part of the mysteries of the universe". Branzi, by defending a design for a post-environmentalism time, starts from an assumption that always integrates the human condition. The Italian master argues that environmental and sustainability issues, which are fundamental to safeguard the ecological balance, must be addressed within a "creative culture" that includes the anthropological relationships that are forged between human beings and their environment in the broad sense, thus including environmental issues, but also symbolic and aesthetic ones.

The intelligent, fine and lucid reflection of these authors presents a scenario that places the condition of human existence and experience as a part of the world at the centre of truly important issues, whether it be mediation elaborated by literature, sociology, philosophy or by design. The phenomenology of design, in particular, contributes with knowledge to design and about design, through the description of things and to the experience with these things, through the dimensions that the designer creates for that experience

to take place. The phenomenology of design is, in a very brief explanation, the study and interpretation of human experience with things, contexts, environments and spaces and the meaning they portray in the existence of human beings, individually and communally. However, this brief explanation becomes more complex when one thinks in more detail about each of these parts. The phenomenology of design aims to develop a reflection that: (1) clarifies the role and meaning of things regarding what constitutes daily routine; (2) interprets the importance of the "extraordinary" in the "ordinary" experience of everyday life. I refer to things in the double quality of singular objects and of elements that create environments and atmospheres, namely as participants in the design of spaces to be inhabited by the subject, which implies taking into consideration the role of the various materials and technologies in the way they shape different aspects of everyday life. The experience of things can thus be considered from different contexts. The phenomenological context of designed things calls for hermeneutic reflection with an empirical approach to everyday things, converging the world of the subject's experience with the world of life through the world of things.

DESIGNING ATMOSPHERES

Currently, the concept of atmosphere and inhabited space is debated by phenomenological philosophy, by philosophers such as Gernot Böhme and by designers and architects with personal experience in project practice who wrote on the topic. For Michael Hays, professor at Harvard Graduate School of Design: "the architecture of atmosphere (...) seeks to be a direct stimulation of the sense organs, shunting around critical consciousness altogether which makes writing about it all the more imperative. But writing the new architecture means writing with the body as much as the mind, apprehending the atmospheric and the ecological as feeling and affect as well as thought (...)." (Hays & Sykes, 2010: 472). Steven Holl, who has developed an enlightening reflection in the scope of the relationship between phenomenology and the creation of spaces, writes that: "When we sit at a desk in a room by a window, the distant view, light from the window, floor material, wood of the desk, and eraser in hand begin to merge perceptually. This overlap of foreground, middle ground, and distant view is a critical issue in the creation of architectural space. We must consider space, light, color, geometry, detail, and material as an experiential continuum. Though we can disassemble these elements and study them individually during the design process, they merge in the final condition, and ultimately, we cannot readily break perception into a simple collection of geometries, activities and sensation." (Holl et al. 2008: 45). Phenomenological awareness is sensitive to the global character of space and then to its details. Juhani Pallasmaa refers to the conclusions of the Architecture and Neuroscience seminar organized in Helsinki in June 2013, stating that: "our perception and understanding does not process from details towards entity but the other way around: from entity to details. This is an essential aspect of atmosphere: it is an immediate experience of the whole, the entity, and only later can one distinguish the details that are part of it." (Havik and Tielens, 2013: 37). The philosopher Gernot Böhme in *Synästhesien* (Synesthesia) develops a phenomenological-aesthetic discourse on nature, particularly the landscape, in which the concept of atmosphere is described as the total environment of a space that first impresses the senses: "Only with this background, i.e., in this atmosphere is it possible to distinguish details. Things will be recognised, colors distinguished, scents identified. Important is that each detail will be in a way tinted by the atmosphere." (Böhme, 1997: 95). Steven Holl, investigating the experiences of perception in connection with architectural decisions within the scope of "phenomenology of architecture" (Holl, Pallasmaa, Pérez-Gómez, 2008) takes from Merleau-Ponty the concept of "entre-deux" reality: "ground on which it is universally possible to bring things together" (Holl, Pallasmaa, Pérez-Gómez, 2008: 45).Holl considers that the perceptual experience is one in which the architectural elements (space, light, detail, material, volume, shape, proportion...) merge with the understanding of space as a whole in a global way. Thus, the

discussion on the concept makes perfect sense in relation to the perception of interior space. Atmosphere refers to the sensory qualities that the space expands, and each space is an invitation to its perception and eventually to it enjoyment. In the chapter *Atmosphere as the subject matter of Architecture*, Böhme makes a distinction between the "physicality of the things and their existence in the space" (2005: 402) because the spatiality of the things can only be experienced by individuals being in the space "through physical presence" (2005: 402). There is no representation of space (photographs, films, literature) that can replace the individual experience. Böhme reinforces the irreplaceable experience of space through physical presence: "We sense what kind of space surrounds us. We sense its atmosphere. That affects the perception of architecture. If it is true that architecture shapes space, then one must move about in these spaces in order to evaluate them. We must be physically present. (...) the decisive experience takes place only when we take part through our presence in the space formed or created by architecture." (Böhme, 2005: 402). But how to project atmospheres? And a specific atmosphere? According to Böhme, the designer is aware of the importance of the atmospheric quality of the spaces. In "*Die Produktion von Atmosphären in der Architektur*" (The Production of Atmospheres in Architecture) the philosopher advocates that architect through "the sensitive parameters that he chooses, colors, surfaces, line framing and the arrangements and constellations that he creates are at the same time the physiognomy from where arises an atmosphere." (Böhme, 1997: 97). This relationship between detail and unity of space that characterizes the design process in which each element works together to create the space in whose materiality and form invites the individual to relate to it through the senses and give it meaning, applies to the design of atmosphere of many differentiated interior spaces. I recall Zumthor's question before the student café at Hans Baumgartner student housing in Clausiusstrasse, Zurich, built in the 1930's: "May I project something with that atmosphere, with that density, with that tone? (...) How? (Zumthor 2006: 5). The architect summarizes nine principles in his book *Thinking Architecture*, emphasizing that the design process depends on the link between the objective and rational criteria with intentions and feelings about the specific space that the designer wants to design. The compatibility of materials (how the materials react with each other), the sound of space, the temperature of space (in dialogue with the temperature of the body and exterior space), the degrees of intimacy that are defined based on proximity and on distance, on size, on the proportion of the building with the objects and the individual, the light, the shadow and the consequent effect on surfaces and materials, the objects surrounding the individual ... all these parameters must be considered by the designer and the decisions that are made regarding them, make space work as a great instrument, says Zumthor. Each of these parameters deserves detailed attention on its own and, as an example, I suggest the parameter of light and shadow and its effects on the creation of atmospheres and I do so through the thought of Louis Kahn for whom this parameter had a unique expressive importance. In the book *Beginnings: Louis I. Kahn's Philosophy of Architecture*, his daughter Alexandra Tyng writes that: "His reaction against the International Style's dry, analytical approach to architecture prompted him to say that feeling was a more important process than thinking in the design of buildings. (...) By feeling, Kahn meant the instinctual, intangible side of his mental processes. (...) Although Kahn considered feeling the source of all ideas, he had also learned the value of thinking rationally, of putting his ideas into cohesive order. Thinking was to Kahn an academic process useful for the disciplining of his creative drive. What Kahn called thinking is the ability to stand back from an idea and evaluate it objectively." (Tyng, 1984: 27). For Kahn, both feeling and thinking were equally important to the creative process of design and had equal weight in the exploration of the possibilities of transforming ideas into forms. In his own words: "But some people always separate feeling from thinking and build their solution around thinking only. That is why the creative mind cannot accept the separation categorically of the nature of space-order-design, and rightfully so because feeling embodies all at once intuitively". (Kahn

in Tyng, 1984: 64). The inseparable bond that Louis Kahn saw between feeling and thinking in the creative process shelters his thoughts about light as the fundamental element to materialize space. He states that: "A space can never reach its place in architecture without natural light. (...) The structure is a design in light. The vault, the dome, the arch, the column are structures related to the character of light. Natural light gives mood to space by the nuances of light in the time of the day and the seasons of the year as it enters and modifies the space". (Kahn in Tyng, 1984: 162). For the architect, the nuances of natural light design the atmosphere of space while interplaying with the architectonic structural elements. I would also add that, in this interaction, the parameters defined by Zumthor enhance creative plasticity and adequacy of purpose. Kahn integrates his theory on light and architecture in a poetic discourse describing the metaphorical approach of light and music, as the atmosphere of a space is like a musical composition formed by "notes of light" (Tyng, 1984: 130) and silence, a concept that the architect articulates with spirituality, inspiration and ontological need. I recall Juhani Pallasmaa and his idea that architecture should create silence, one of the most lost sensations in the loud and cacophonous world of today. "Great architecture also evokes silence. Experiencing a building is not only a matter of looking at its spaces, forms and surfaces – it is also a matter of listening to its characteristics, unique silence. (...) The task of architecture is to create, maintain and protect silence." (Pallasmaa, 2005: 305). Returning to Kahn. On February 12, 1969, the architect-philosopher gave the famous *Silence and Light* lecture at the Swiss Federal Institute of Technology in Zurich, revealing his spiritual understanding of architecture and of the perceptual experience of spaces. Louis Kahn praises the power of light as an architect and philosopher, but also the power of shadow as a natural part of the light to which darkness and silence belong. His projects, such as the Salk Institute (1959), Exeter Library (1965), Indian Institute of Management (1962-1974), evoke the harmony between natural light and natural shadow, and architectural elements such as the design of openings, voids, surfaces, textures. From another source, *Lob des Schattens* (2006) (*In Praise of Shadows)*, Japanese Jun'ichirō Tanizaki explores another form of shaping space through shadows. In the traditional Japanese aesthetics, the subtlety of shadows is an ally of beauty, and a key element to unveil the meaning of the opacity of the materials, the walls' natural color, the reflection of the objects, the silence and the dimness of interior spaces. Atmosphere is the result that evokes various visions of perceptual experience. Atmosphere is a construction based on the combination and synesthesia of the aesthetic (sensory) qualities of things that "appear" in the subject-object relationship. Christian Schittich, in a very lively and clear text on interior design, argues that: "is where people dwell – for living and working, for prayer, shopping or leisure activities. Interiors can be hermetically closed off from outside, relinquishing all connections to the outside; they can even be subterranean. But they can open towards the outside and transition smoothly into the exterior space." (Schittich, 2002: 9).In the chapter *Space, Light and Material: Concepts for Interior Design*, the author presents a wide range of concepts for interior whether they are domestic, sacred, commercial, gastronomic, office, cultural, transport spaces... revealing that each design solution ensures a specific and singular atmosphere that is offered to the experience of its user. Having focused his study on three basic concepts - space, light and materiality - Schittich examines the role of the designer as a creator of distinct environments (specific moods as he calls them on page 12 of the aforementioned work) that are characterized from more conventional and predictable choices to the most sophisticated, experimental or extravagant. Indeed, the vast world of interior design offers itself as an opportunity for design to explore solutions for everyday life and to propose choices capable of bringing extraordinary into daily living. The development of ideas for interior design requires the integration of functional, emotional, aesthetic, economic, ecological, technical parameters that constitute a complex challenge for the designer. The interior space is also the space for the awareness of body, mind and spirit. What proposals does design intend to offer in terms of interior design in the plethora of the great

questions of today? Interior design expresses a time and epoch, differing from the past. Conversely, visionary design includes an interior design, also visionary, that adheres not only to already tested principles, but that continues to experiment beyond the limits. Authentic spaces communicate credibility, project emotions in space, stimulate motives and interest, without getting lost in pretentious and confusing exercises of style. A particularly delicate realm for designing is the perceptive space of the home as an inhabited and domestic space. The home is far more than the extensive and differentiated domain of products that appeal to industrial and graphic design: furniture, ceramics, glass, textiles, packaging, electrical appliances, multimedia, home automation... The home is the place of the individual who is existence in time.

INVENTING HOME

The history of the home cannot be dissociated from the history of humanity and the hermeneutics of the domestic space is a source of knowledge about history, society, culture, behaviour, uses, customs, habits, expectations, the confluence of the old and the new and other dimensions of the human condition. The home is a shelter, providing physical and mental protection, representational of ideas, identity, conformation, rituals, conflicts, contradictions, power... as it is an individual space of solitude, but also of family and socializing. However, socializing at home is different from socializing in public places, as it is associated with the feeling of a private and intimate place. The home is, ideally, the place where you recover from tiredness, offering rest, comfort, peace and freedom. It is a place with a strong symbolic component, sentimental and emotional, which collects autobiographical experiences manifested in the way the things are 'arranged' and other practical facilities are a mere expression. The home is much more than a functional physical place. Ideally, the home is a 'complete work of art' for the existence of the individual who lives there, and domesticity is a versatile scenery of projections and experiences that aggregate the past, present and future. The matrix of this criterion in the epistemological of design, being necessarily historical, theoretical and critical, allows a hermeneutical study of objects in both a diachronic and synchronic perspective. Regarding the daily experience of living, Maurizio Vitta claims that it is a partner experience of the individual's existential situation, through which, one becomes aware of a vitality which is space, time and identity. From his interest in carrying out a systematic enquiry into the aesthetic of everyday living, Vitta in *Dell'Abitare* (2008) reflects on the experience of dwelling through four catalyzing themes – bodies, spaces, objects, images – characterized as the protagonists in the nature of dwelling. Bodies relate to the main protagonist in the circumstance of 'dwelling' – the dweller – and the modalities created between the dweller and the spaces he inhabits. Spaces address the environments, territories, atmospheres which are constructed, developed, organized and transformed in the temporal dialectic of dwelling. Objects interpret meanings, shapes and functions which things take on within inhabited spaces. Images discuss the iconography of dwelling and the diverse perceptions that the inhabited spaces acquire, as representatives of individual uniqueness. Vitta clarifies that dwelling is the appropriation of an impersonal space which the 'dweller' personalizes, through daily impressions and traces. According to Vitta: "*Lo spazio architettonico è, come si sa, uno spazio doppio. Nella sua perimetrazione recinge, circoscrive, trattiene; nella sua estensione accoglie, ospita, contiene. In questa duplicità esso si presenta però come spazio neutro, nel quale l'abitare, anche quando costituisce il tema progettuale primario, è pensato come pura possibilità: la sua vuota cavità definisce semplicemente un interno, in cui si può solo intuire la potenziale interiorità che fonda l'esperienza dell'abitare. Perché lo spazio architettonico divenga spazio abitativo, occorre superare la sua semplice configurazione fisica, svillupare l'intuizione in una precisa volontà, assumere il "trattenere" e il "contenere" come punto di partenza per un programma operativo destinato a comporli in abitazione.*"(Vitta, 2008: 203)[3]. With time, the 'dweller' makes the space more intensely inhabited. Dwelling is a daily phenomenon, cumulative and unique, of which objects

are a constituent part. In the article *Homes from Home: Memories and Projections* (Cieraad, 2010), the author shows how personalising a home is a phenomenon which accompanies individuals at the different stages of their lives. One's parents' house (childhood home), the house where one begins to live alone and then eventually with someone, the house after the divorce, or some other situation in which it is necessary to redo the place where one has lived...are a concentration of things and related practices, which are at the same time a melting pot of emotions and feelings. "Reinventing home is an ongoing process of linking the present to the past and the future. It entails not only remembering past homes but also projecting future homes. Away from home, whether travelling, migrating or living in lodgings, one becomes more aware of the meaning of the home one has left behind, temporarily or for good" (Cieraad, 2010: 99). The classic reference to the home as a place of memories of personal experiences is discussed by Gaston Bachelard with his work *La Poétique de l'Espace* (1958). The home is the primary refuge for the most intimate memories and particularly the childhood home holds the most primitive images, memories and dreams. Without a home, the individual is an incomplete being, made up of fragments and contingencies. To inhabit a place, to feel at home, is to be held in a symbolic context in which our relationship with the objects has a fundamental priority because the objects evoke images, sensations, emotions and feelings which give continuity to our individual biography and allow us to say "me". Mario Praz understands the importance of home to life and gives precisely the title of *La Casa della Vita* (1958) to the work in which he leads the reader along a guided tour in his apartment in Rome, in which each object has history related to the collector, and history of its own. In this book, the interpretation of home, is simultaneously, the interpretation of each object, of the place it came from, of the time it evokes and the author's interpretation to himself and to the reader. Iñaki Ábalos suggests a philosophical reading of archetypal houses as a representation of relationships between 'ways of living' (...) types of houses, ways of projecting them and of dwelling there" (Ábalos, 2009: 9). Each chapter is a reflection on the ideal house, not so much from the technical point of view, but from the point of view of domestic culture and ways of appropriating a space. The chapters are set out in the following way: 1. Zaratustra's house; 2. Heidegger in his refuge: the existentialist house; 3. Jacques Tati's machine for living in: the positivist house; 4. Picasso on vacation: the phenomenological house; 5. Warhol at The Factory: from Freudo-Marxist communes to the New York loft; 6. Huts, parasites and nomads: the deconstruction of the house; 7. A Bigger Splash: the house of pragmatism. This book, says the author, "aims to stimulate the pleasure of planning and living intensely: to foster the appearance of that house which doesn't yet exist." (Ábalos, 2009: 13). The construction of the dwelling involves design in subtle emotional and existential landscapes, which exceed the aspect of usefulness or the mere aesthetic formalism of things. To dwell is a phenomenon of living. In the essay *From Doorstep to Living Room* written by Alvar Aalto in 1926, the architect addresses the relationship of the individual with the home in a profoundly existential manner: "Your home should purposely show up some weakness of yours. This may seem to be a field in which the architect's authority ceases, but no architectural creation is complete without some such trait; it will not be alive. This trait can be compared to the need for a particularly subtle kind of humor to expose one's own weaknesses" (quoted by Pallasmaa in Jetsonen J. and Jetsonen S., 2011: 14). Aalto integrates his tolerance for human weakness as a condition of life which is not perfect, but a process of transformation: "Nothing that lives is, or can be rigidly perfect: part of it is decaying, part nascent... And in all things that live there are certain inequalities and deficiencies, which are not only signs of life but sources of beauty." (quoted by Pallasmaa, 2011: 14). This Finnish architect's stance points to the fundamental theme of the experience of dwelling as a subjective phenomenon, the opposite of a project which is too controlling or definitive. However, how can the objects integrated in the home be part of the plan for an individual's freedom or be part of an ideological commitment? In the article *Impossible Totality and Domesticity: Designed Interiors as Monsters*, written in co-authorship with Peter Aschenbach (2013), we

argue that the design should escape from any intention, mirage, or desire for totality: "Ancient cosmologies order place from the familiar (home) to the beyond (divine). To approach the divine exceeds human capacity and is thus monstrous. Literary morality tales warn us of the hybris of our quest for perfection; contemporary design offers similar examples: uninhabitable minimalism; pastoral landscape simulacra; the unheimlich Modern; anxious and oppressive transparency. The article presents three cases of unbecoming monsters: Nathaniel Hawthorne, John Pawson, and the claim for perfection; Narcissus, Marie Antoinette, and the reflexive gaze; Mary Shelley, Mies van der Rohe, and the Belgian Blue. Each exemplifies an overreach in design that abandons the domestic and whose resulting *unheimlichkeit* provokes an uncanny reaction." (Pombo & Aschenbach, 2013: 20). Returning to the world of Alvar Aalto, it is possible to read in 1935, in a lecture entitled *Rationalism and Man*, the architect's disapproval of the functionalist ideal, which is summarized in statements, such as "objects that can rightly be called rational often suffer from flagrant inhumanity" and "formalism is inhuman to the highest degree" (quoted by Pallasmaa in Jetsonen J. and Jetsonen S., 2011: 15–16). This declaration by Aalto shows a distancing from white textures, cold steel surfaces and glass, from geometric shapes, the hygienic purity of minimalism and, mainly, the techno-rational and historical rejection of spaces and objects. Aalto defended the combination of realism and imagination, reasoning and intuition, the proximity to nature, the integration of the vernacular, the aesthetic pleasure of the senses, but above all the capability of 'not losing the soul.' In the chapter *Identity, Intimacy, and Domicile. Notes on the Phenomenology of Home,* Juhani Pallasmaa discusses the serious repercussions on society if they abandon the issue of the home. "Many of us in the consumer world today are suffering from Homo Faber's [reference to the book Homo Faber by Max Frisch] alienation. We have become homeless in our culture of abundance. This new homelessness derives from our inability to fuse the self with the world. Homelessness becomes synonymous with detached solitude and a perpetual present tense." (Pallasmaa, 2005: 112). In line with what the author calls "the phenomenological approach to dwelling" (2005: 125), he defends the statement that the house and the home are essential to "strengthen our sense of human reality" (2005: 126). The construction of dwelling and domestic space is a daily process in which design takes part in and influences directly and indirectly. Home is, above all, the place of the individual which has an ephemeral existence in time. *Mensch und Raum* (*Human Being and Space*) by Otto Bollnow, published in 1963, is a paradigmatic text about the human experience of space, in which the author brings together the knowledge of philosophy, anthropology, architecture, psychology and human behavior in general. For the study of home, the text *Mensch und Raum* by the philosopher, Otto Bollnow, with influence from phenomenology, is essential. Particularly in Chapter III – *Die Geborgenheit des Hauses (The House and the Feeling of Security)* – the ontological and existential meaning of home is presented in detail. The philosopher reflects on the experience of the home as an expression of the dwelling culture and of the idiosyncratic construction of everyday life, describing the domestic space as closely related to the behavior and primary needs of the human being, contributing to an anthropology of the home which is worth being rediscovered contemporarily. In this chapter, the philosopher argues, quoting several authors, the meaning of home and of dwelling, enhancing the concrete phenomenon of this experience of "being at home", of inhabiting a space and not only of using it. Hence, postulating the anthropological nature of dwelling, Bollnow argues by using the following topics: "the meaning of home"; "the sacred place", "comfort", "door and window", "the bed", "waking up and falling asleep". Following his thought implies finding the complexity of the human-home relationship transposed to the experience polarized in two complementary phenomena – waking up and lying down – as a basic relationship, which, however, should be daily rebuilt and filled. It is this phenomenon of the apparently obvious which challenges all the process of transforming the utilitarian relationship of space into an anthropological relationship with meaning and value. Csikszentmihalyi and Rochberg-Halton in *The Meaning*

of Things: Domestic Symbols and the Self (1981) carry out a research of sociological implication which integrates an empirical study based on interviews conducted to 315 respondents of 82 families living in Chicago and Evenston (Illinois). The interviewees were asked to mention what special objects they had at home and to explain why. After analyzing the answers about the meaning of these objects, the author concluded that in every home there is a "symbolic ecology" which gives meaning to the life of those who inhabit these spaces. The individual gives meaning to things from the moment he or she starts an active symbolic relationship with them, when things have a certain resonance in their lives and generally, this resonance is in the scope of emotions and feelings. In a synthesis of the experience between the individual and the home[4], paradigmatic examples are to be mentioned: the room, which allows protection, privacy and freedom (Virginia Woolf); the home as the domestic interior that welcomes the flow of life (Mario Praz); the home as the primordial guardian of childhood memories and imagery (Gaston Bachelard) and the home as the intimate space to think and experience the essence of dwelling (Martin Heidegger).

Virginia Woolf in *A Room of One's Own* (1929) shows that "a woman must have money and a room of her own if she is to write fiction". (Woolf, 1991: 2). A Room. The first notion associated with a room is one's privacy. Privacy is also related to protection. The occupation of an individual room gives, according to Woolf, the sensation of being inside, of being protected from potential dangers, and thus, of feeling free. The writer analyzes the conditions and limitations of women who wrote in the past and in the time in which she lives: "In the first place, to have a room of her own, let alone a quiet room or a sound-proof room, was out of the question, unless her parents were exceptionally rich or very noble." (Woolf, 1991: 56). In addition to the feminist tone of Woolf's essay, the argument for the demand of a space which can be called "mine" is evident. Mario Praz in *The House of Life* (*La Casa della Vita*, 1958) leads the reader along a guided tour in his apartment in Rome, room by room, which is a tour through his autobiography, memories, feelings, love for his art collections and his sensitivity to domestic details. Domestic space is portrayed through sceneries in which each piece of furniture, decorative object, carpet, mirror or work of art has a meaning to the author: "From the ceiling of my telephone passage hangs a bronze chandelier in the form of three sirens joined together by their tails, each siren supporting two lights. The design of the chandelier is extremely fine, but alas, its quality is inferior, and if I tolerate an object in the house which is far later than the Empire period, even though it copies one of the models of that period, it is because it reminds me of a most noble chandelier of which this is but a degenerative derivative. This very fine chandelier hung in the shop of the London bookseller Batsford in North Audley Street (...) and when I saw it I fell so deeply in love with it that, if it had been for sale, I would have done anything in the world to acquire it." (Praz, 2010: 62-63). In *La Poétique de l'Espace* Gaston Bachelard explores the biographical inspiration of the domestic space and his lived experience of architecture, specifically the experience of the childhood home, and its different spaces: the attic, the basement, the rooms and the different types of furniture. For Bachelard, cherishing the primordial imagery of the protective home brings back sensitivity, intimacy, identity: "We must therefore experience the primitiveness of refuge and, beyond situations that have been experienced, discover situations that have been dreamed; beyond positive recollections that are the material for a positive psychology, return to the field of the primitive images that had perhaps been centers of fixation for recollections left in our memories". (Bachelard, 1994: 29-30). For the philosopher, the home is the most intimate of all spaces, where each space shelters a particular memory or experience. Understanding the home is, thus, understanding the human being and its ability to imagine and dream. Bachelard enhances the relevance of dreams, memories, thoughts to define identity and happiness, calling them experiences of rêverie. The childhood home is the primordial place and first subjective universe, the scenery of innocent consciousness, and therefore remains in the archives of memory. In addition to the memories, the house where one is

born, is a physicality embedded in each of us. It is a group of organic habits. After twenty years, despite all the other anonymous stairs already climbed, we would be capable of recapturing the reflexes of "the first staircase", we would not stumble that especially high step (Bachelard, 1994: 14-15). However, we also know that it is not always possible to physically preserve the childhood home for many different reasons. The fourth example I referred to is the home as the place to reflect. It is the case of a simple, modest, small-sized house belonging to Heidegger (also designated hut), inhabited frequently by him throughout almost five decades, since it was built, in 1922. Adam Sharr describes this house in the book *Heidegger's Hut* (Scharr, 2006) giving account of Heidegger's bond with the hut and the surrounding environment. Themes as dwelling, sense of place, landscape, thinking, body and feelings are philosophically thought in books written by Heidegger during his stays in this house. The hut was built in the Black Forest in the south of Germany, near the village of Todtnauberg, near Freiburg: "The building surveys the landscape, sheltered and framed by trees. (...) The hut measures approximately six meters by seven. It is made largely of timber, framed and clad with timber shingels. (...) The hut's external walls are painted gray. Windows, doors, and shutters are painted in bright colors. (...) Window transoms, mullions, and casements are a brilliant white. Their frames are canary yellow and architraves a deep blue. Hinged shutters are painted leaf green. The door is also green with a blue frame." (Sharr, 2006: 22). The hut was built to be an occasional refuge from the busy daily life in the city and in the academy. However, it became the intimate space for Heidegger, where he stayed for long periods to think and to write, many times alone. In *Building Dwelling Thinking* (Bauen Wohnen Denken, 1951) Heidegger addresses dwelling and building not "as an art or as a technique of construction; rather [tracing] building back into that domain to which everything that is belongs. We ask: 1. What is it to dwell? 2. How does building belong to dwelling?" (Heidegger, 1971: 143). For the philosopher, the quality of dwelling questions the quality of building. Building should allow and sustain the needs of human beings (Da-sein) to dwell with quality, since dwelling is essential for the human being. Dwelling is bringing together earth, sky, people and spirituality (the divine). In *Bauen Wohnen Denken,* Heidegger delivers a speech around the etymological roots of the history of the word "build" (bauen) reflecting on its connection and impact in dwelling (wohnen): "Only if we are capable of dwelling, only then can we build. (...) "Dwelling, however, is the basic character of Being in keeping with which mortals exist. (...) Building and thinking are, each in its own way, inescapable for dwelling. The two however, are also, insufficient for dwelling so long as each busies itself with its own affairs in separation instead of listening to one another." (Heidegger, 1971: 158). The Heideggerian texts such as *Building Dwelling Thinking* (*Bauen Wohnen Denken*) as well as *Poetically Man Dwells* (*Dichterisch wohnt der Mensch*, 1951) introduce us to the condition of dwelling and in the implicit and explicit connection with the domestic space and its design. Dwelling is, no doubt, an experience of versatility associated with the condition of living. In this line of thought, I quote a chapter of the classical and eloquent text of the work *The Place of Houses* (Moore, Allen and Lyndon, 1974) called *The Three Orders.* In this work, the authors advocate, in illustrated reflections with concrete examples of architecture, with the analysis of parameters of architectural construction and arguments about the domestic spaces and the phenomena of dwelling as the quality project that should give rise to the expression of individuality and be committed to the reference to the meaning of space (genius loci). These three orders are "the order of rooms", "the order of machines", "the order of dreams", which contribute to the phenomenon of dwelling, but which depend on the main character - its inhabitant. The order of rooms is described as "unspecific space" (1974: 82) in the sense that it only acquires meaning through the human action played out in them, providing, however, "generalized opportunities for things to happen, and they allow us to do and to be what we will" (1974: 82). The order of machines has a proper autonomy, but its existence and specificities are not neutral for the individual who inhabits the house, although the authors distinguish two groups in the order of machines: "those which are self-operating

and those which require people to operate or use them. In the first group are furnaces, air-conditioners, and water heaters, machines which once adjusted perform their services nearly by themselves and they need attention from us only for occasional maintenance, or when they break down. In the second group are machines which we confront directly. They assist us in a multitude of ways, helping us perform specific and often regular domestic activities". (1974: 108). The order in which all the former orders culminate is the most radically personal and human: dreams. The authors find a very clarifying expression of what a home allows, naming it as "embodied aspirations" (1974: 124), considering that "dreams which accompany all human actions should be nurtured by the places in which people live" (1974: 124), because the house serves the dream, 1974: 139). And yet another quote referring to the differentiating ability of the inhabitant to invent his or her place: "to extend your imaginative life into the everyday, the place that you live in should allow for the everyday to become exceptional. It should lead your mind to multiple associations." (1974: 140).

A NEW RENAISSANCE

Nowadays and in the future, the aforementioned Branzi's matrix, assigns the design the possibility of harmonizing these three orders without this terminology being explicitly mentioned by the Italian author. To Andrea Branzi, design has the facility to penetrate into what he calls "interstices of the domestic universe" through "micro-projects" and "sub-systems" which, given its dynamic, transferable, adaptable nature, allow giving quality to the everyday life, at home and in the city, personalizing the space of the built world (Branzi, 2010: 19). The designer recalls the concept of "mental maps" (*The Image of the City*, 1960) of the American urbanist Kevin Lynch to justify that in the urban landscapes, the individual who travels them and uses them actually remembers subsystems such as bus stops, traffic lights, publicity displayed on a wall, on an "outdoor", windows and facades...i.e. references which seem to be secondary in the city architecture. Design projects and manages this "molecular universe" (Branzi, 2010: 209) and, thus, it takes part in the quality (or not) of this reality in a greater scale beyond that of the domestic space in which the individual partakes, uses, goes to and lives in. Already in 2006 with the work *Modernità Debole e Diffusa. Il Mondo del Progettoall'inizio del XXI Secolo*, Branzi discusses the architecture, the city, the interior spaces, and the objects for a time which he claims as weak, fragile reality, recalling the concept of weak thought formulated by Gianni Vattimo in the eighties. This reality is different from the great syntheses and systems of the past, but for Branzi the concept of weakness is not related to the "*valore negativo di inefficienza o di incapacità*" (...) [but instead] it indicates "*un processo particolare di modificazione e conoscenza che segue logiche naturali, non geometriche, processi diffusi e non concentrati, strategie reversibili e auto-equilibranti*" (Branzi, 2006: 14)[4]. Design as a culture of project and critical interpretation is, still for Branzi, a means to change the designer's way of thinking ("the logic") contributing to a different design and perhaps to a better world. It is not unusual that Branzi advocates the need for a new Renaissance. Branzi contributes with a clear and visionary hermeneutical reflection to the culture of project as a manifestation of a projecting thought to a post-environmentalist reality, more inhabitable and more beautiful, but also more exploratory and desirably closer to the "ontological constitution" mentioned by Peter Sloterdijk. The last time I heard Andrea Branzi speaking in public was at the Nomadic Interiors congress, which took place in Politecnico di Milano on May 21 and 22, 2015. In a brave and free speech, Branzi advocated the need for a new Renaissance, in which the design must actively be present. The present world must look into the great anthropological topics, which are life (Eros) and death (Thanatos) and once again place the human being in the center of its decisions. The project in design should address these major issues, which Branzi enumerated at the congress of Milan as being four: *dell'amore, della morte, della psiche, della storia*[5]. Design must look into its history and integrate it into the "greater narratives" it belongs to. Therefore,

for example, an object is not a mere utensil, adds Branzi. An object belongs to a tradition, a history, it goes into "other narratives". And these narratives are nature, life, and dimensions as dream, despair, anguish, beauty. To place the person in the core of the design topics is a great challenge for our times, as Branzi concluded in the line of thought he has developed in the last decades of his career as a designer, theorist and design professor. (Branzi: 2013, Branzi: 2010; Branzi: 2006). Looking into the world questioning the possibility of a second Renaissance is, indeed, a great challenge which concerns not only design. However, should design be left out of this question?

NOTES

[1] An activity that seeks to interpret aesthetics through its technological possibilities and technology through its aesthetic possibilities. (Branzi, 2010: 15–16).

[2] being able to design in order to let the world be liveable again, more hospitable, more functional and even more beautiful. (2010: 16).

[3] The architectural space is, as we know it, a dual space. In its perimeter it encloses, restricts, holds; in its extension it welcomes, hosts, contains. In this duplicity, however, it appears as a neutral space, in which living, even when it is the main design element, is thought as a pure possibility: its hollow cavity simply defines an interior, in which one can only guess the interior potential that underpins the living experience. In order for the architectural space to become a living space, it is necessary to overcome its simple physical configuration, develop intuition into a precise will, assume "restrictions" and "containments" as a starting point for an operational program intended at developing it within the home. (Vitta, 2008: 203).

[4] Negative value of inefficiency or inability (...) but instead it indicates a particular process of modification and knowledge which follows a natural logic, widespread but not concentrated processes, and reversible and self-balancing strategies (Branzi, 2006: 14).

[5] of love, of death, of the psyche, of history.

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2 THREE DRAWINGS FOR THREE STORIES ABOUT PORTUGUESE CULTURAL HERITAGE

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ABSTRACT

This article aims to discuss the specificity of three author's projects to elaborate about the partnership between traditional economic sectors and design as added value regarding cultural heritage as framework for sustainable solutions. The scenery of intervention is the refurbishment of a single-family home that motivated the creation of three types of products: an entrance door, an armed chair with a footstool and eight carpets. The three projects started from hand drawings of one of the architects of the architecture office in charge of the assignment. In this text it is considered the concept of home and surrounding objects from an organic, human centred perspective, recalling, among others, essays as *Bauen Wohnen Denken* from Martin Heidegger and *Rationalism and Man* from Alvar Aalto as key texts that give the note of this text's approach. The analysis goes further by addressing the product's development process through the immersive collaboration of the architects with the client, technicians, workers of the chosen factories, namely metalwork, carpentry/carving and hand knotting. Finally, in this article it is to remark that these projects are a significant example to illustrate the partnership that can be experienced between arts & crafts production and design proposals. In effect, the craft industry that remains in the market with competitive parameters is the one that adapts techniques and skills of the tradition and innovates in concepts.

Keywords: home, product design, drawing, arts &crafts

1. INTRODUCTION

The three stories that this article addresses start from the need to give a solution to three demands related with the refurbishment of a single-family house in multiple scales till the level of potentially becoming a home through the client's inhabitation. In this text the analysis falls on the design of an entrance door, eight carpets and an armchair with a footstool. The responses put in motion an architecture office[1] and three types of crafts: metalwork, carpentry/carving and hand knotting. It was also paramount that the three pieces were original and reflect the skills of Portuguese arts & crafts. Therefore, the three projects mirror the approach of design to the traditional knowledge of those activities, whether more technical or more handmade, acquiring an identity that allies tradition and contemporaneity. Home was perceived by the architecture office as a human-centric design scale offering interiors with comfort, coziness, warmth and quality. At the same time, the home should be in harmony with the surrounding landscape and to point out to nature as inspiration to life. Finally, design decisions intended that the products display a feeling for sustainable awareness from the concept till the final outcome. The house even if tuned with the language of the functionalism, rationalism and efficiency, unveiled an interior's ambience that resonates creativity to shape spaces for enjoying home. Therefore, instead of furnishing it with ready-made sets of furniture, the choice was rather to design furniture and carpets to unfold a warm, familiar and comfortable atmosphere. And if the chair is probably the most designed piece of all times and in a way is the symbol of the ability to design a product to be used and enjoyed by the individual, this time the challenge was to design an armchair paired with a footstool. The carpets were designed according to room's functions and ambiences and were spread at home, giving immediately a strong expression of quietness and well-being. The door is a very demanding piece of design, providing a delineation between what belongs to the outside space and to the inside space. Moreover, this door should open to a large entrance hall that is the first open space to welcome guests. The following stories showcase the successful intertwining of a set of actions that ended up in three types of exclusive products that expose cultural heritage as a paramount parameter to design along. The factories were chosen in order to respond to the demand. The collaboration between the factories' responsible, workers, client and architects was very fruitful. Very often the architects were immersed in the factories pouring an exchange of knowledge and skills. Other possibilities of combination of design as added value within the scope of patrimonial validation were foreseen for future projects.

This article adopts a structure based upon two chapters namely the chapter *Home and Surrounding Objects* and the chapter *Three Projects for a Single-family Home*. In *Home and Surrounding Objects* the concept of home is analysed by recalling the ideas of three known authors as Witold Rybcznski, Martin Heidegger and Alvar Aalto who, from different background, contribute to elaborate about home in the sense that the architecture office mentioned responded to the assignment in discussion. In *Three Projects for a Single-family Home* three designed products are interpreted starting from the hand drawing in which every product is originated and then, placing them in the productive process within the Portuguese traditional crafts and techniques framework. This article addresses cultural heritage as an approach to reinforce sustainable design solutions.

2. HOME AND SURROUNDING OBJECTS

Home is ideally the space associated with the most private and intimate space. It is a place with a strong symbolic, affective and emotional essence and therefore it is much more than a functional scenery. Witold Rybczynski writes an appealing book about the idea of home arguing that 'it is an attempt to discover (...) the meaning of comfort.'[2] And he confessed that 'it was only when my wife and I built our own home that I discovered at first hand the fundamental poverty of modern architectural ideas. I found myself turning again and again to memories of older houses, and

older rooms, and trying to understand what had made them feel so right, so comfortable.'[3] This statement recalls the essay *Building Dwelling Thinking* from Martin Heidegger[4] in which he debates the action of dwelling and building not 'as an art or as a technique of construction; rather [tracing] building back into that domain to which everything that *is* belongs. [So] We ask: 1.What is it to dwell? 2. How does building belong to dwelling?'[5] For Heidegger, the quality of dwelling questions the quality of building. To build should respond to the needs of the human being (*Da-sein*) to dwell with quality, once dwelling is essential to live. Dwelling is, then to Heidegger, to join earth, heaven, mankind and spirituality (the divine). In *Bauen Wohnen Denken*, the philosopher develops a discourse around the etymological roots of the word 'build' (*bauen*) reflecting on its connection and impact in the act of dwelling (*wohnen*). 'Only if we are capable of dwelling, only then can we build. (...) 'Dwelling, however, is *the basic character* of Being in keeping with which mortals exist. (...) Building and thinking are, each in its own way, inescapable for dwelling. The two however, are also, insufficient for dwelling so long as each busies itself with its own affairs in separation instead of listening to one another.'[6] Heidegger since 1922 inhabited frequently a modest, simple house during five decades as an occasional shelter from the busy life of the city where he lived and from the demanding academic life in Freiburg. He called it the hut. There, he stayed many times alone to think and to write. It was built in the Black Forest (Schwarzwald) close to the Todtnauberg village in the vicinity of Freiburg. 'The building surveys the landscape, sheltered and framed by trees. (...) The hut measures approximately six meters by seven. It is made largely of timber, framed and clad with timber shingels. (...) The hut's external walls are painted gray. Windows, doors, and shutters are painted in bright colors. (...) Window transoms, mullions, and casements are a brilliant white. Their frames are canary yellow and architraves a deep blue. Hinged shutters are painted leaf green. The door is also green with a blue frame.'[7] The dwelling of the hut enhances the bond of Heidegger with the landscape and there he philosophically thought and wrote about concepts as inhabiting, the sense of place, the sense of *Being and Time* (*Sein und Zeit*).

The condition of dwelling emphasizes the importance to think about the domestic space, its design and the surrounding objects which challenges the process of transforming the space utilitarian relationship into an existential relationship with meaning and value. Aligned with this thought, it is worth to recall the lecture of Alvar Aalto *Rationalism and Man* written in 1935 in which he distanced himself from the functionalist ideology, stating that 'objects that can rightly be called rational often suffer from flagrant inhumanity' and that 'formalism is inhuman to the highest degree.'[8] Aalto as his wife, the architect and designer Aino Marsio-Aalto, were critical of the white textures, the cold surfaces of steel and glass, of the geometry of the forms, of the hygienic purity of the minimalism and, above all, of the techno-rational and ahistorical refusal of spaces and objects. They argued and practiced the combination of realism and imagination, rational and intuition, the proximity of nature, the integration of the vernacular, the aesthetical pleasure of the senses, and not to lose the soul. Peter Zumthor, in other terms, defends the same as Alvar and Marsio Aalto regarding architecture: 'The magic of the real: that to me is the 'alchemy' of transforming real substances into human sensations, of creating that special moment when matter, the substance and form of architectural space, can truly be emotionally appropriated or assimilated.'[9] And he adds: 'I try to make sure that the materials are attuned to each other, that they radiate; I take a certain amount of oak and a different amount of *pietra serena* and add something to them: three grams of silver or a handle that turns or maybe surfaces of gleaming glass, so that every combination of materials yields a unique composition, becomes an original. (...) I give thought to careful and conscious staging of tension between inside and outside, public and intimate, and to thresholds, transitions, and borders.'[10] This interest and attention regarding perceptive features and atmospheric qualities of the spaces are framed by the phenomenology of architecture and

design practice.[11] There are, then, designed objects that besides accomplishing their useful function, express features that promote an authentic relationship of longevity between the individuals and objects, integrated in contexts and experiences that are day-to-day meaningful. The following projects aim to represent such purpose.

3. THREE PROJECTS FOR A SINGLE-FAMILY HOME

3.1 From Camellias to a Carved Armchair

Porto is known for the strong attachment to *camellias*. Brought from the Orient by Jesuit missionaries, it is in the first half of the 19th century that *camellias* conquer Porto's gardens. José Marques Loureiro (1830-1898), the Gardner of Virtudes,[12] by cultivating a splendorous garden, at the time called Horto das Virtudes in the historical town's core, contributed to transform Porto in the *camellias* town. Still nowadays Porto hosts an extensive exhibition of *camellias* and activities around the flower during a few days each March. As if the exhibition celebrates in advance the coming of springtime. Among the numerous species of this flower there is one that blossoming in March received the name of 'Cidade do Porto'. From here *camellias* reached all the north of Portugal and Galiza in Spain. The sun in Porto does not damage these flowers, because the humidity from the Atlantic acts like a filter. It is not such a surprise that the park close to the house to which the armchair and the footstool were designed for has promenades and corners full of *camellias*.[13] Sónia[14] has been captivated for a long time by these flowers and has drawn dozens of it with all sizes and colours. It was from some of those drawings that the pattern for the carved armchair was inspired (Fig. 1).

It was decided, then, to design and build a wooden armchair and a footstool integrating the very Portuguese wood carving art. In effect, carpentry, cabinet making, wood carving and upholstery were called to work in a close dialogue with client and architects. The *camellias* drawing was directly hand drawn by Sónia in the wood piece in the exact scale to be carved (Fig. 2).

Figure 1. Camellias in china ink. © Sónia Teles e Silva

Figure 2. Graphite drawing in brown wood in full-scale © Sónia Teles e Silva

Figure 3. António Carneiro, woodcarver. Rigorous drawing of the *camellias* by SJGS Arquitectos. © SJGS Arquitectos

Figure 3 shows the woodcarver artist[15] working on the back of the armchair and the rigorous drawing that was also made by the architects. The direct contact of the architects with the woodcarver was paramount to bring the *camellias* drawing into the final version. During the meticulous process of building it the architects got also acquaintance with terms, tools, utensils, techniques that were used in this craft.

Portugal has a remarkably rich and long tradition in the work of wood furniture and related wood artefacts, notable both in concept and form and in techniques and production processes. This tradition is in risk of disappearing due to several reasons, namely the response to ephemeral market tendencies based upon the reproduction of trends that follow passing and phlegmatic demands. The production of this armchair and footstool showed the opportunity to integrate design with the use of traditional crafts and techniques. The armchair's drawing was adjusted in order to accommodate the necessary technology, namely adapting the oblong form to the CNC cutting machine and the element hand carved by a carver artist. Some studies were tested once the carved wood in the back raised

Figure 4. Armchair and footstool © Nuno Pereira

some technical challenges to cabinet making and to upholstery. The solution for the product's final form is to be seen in Figure 4 that displays the front and back in natural leather upholstery with a curved element in brown wood firstly cut by the CNC machine and then hand carved.

The armchair named by the client *Cadeirão Tempo* and the footstool were displayed in *The Best Furniture in the World* exhibition in Torre dos Clérigos do Porto.[16]

3.2 From Algae to Carpets

The long coastal zone of the country and the closeness of the sea in the city of Porto enhance the water as inspiration for many maritime activities, as it is catching *algae* to create an *Algae Book*.

Sónia is composing an *Algae Book* for some years, a skill and interest she inherited from her grandfather who gathered an exquisite collection of *algae* that he donated to the Maritime Museum of Ilhavo[17] as well as wrote a book about preparing and conserving *algae*.[18] In effect, it was from *Guia Prático de Preparação de Algas Marinhas* and from the *Algae Book* that emerged the *algae* patterns transposed to the carpets. It was necessary to provide eight carpets that should have the same leitmotiv but expressing diversity according to the place they were meant for. Eight *algae* were chosen by the client together with the architects (Fig. 5) for eight different carpets for eight different rooms to be made in a traditional Portuguese familiar factory specialized in carpets known as 'tapete de Beiriz'.

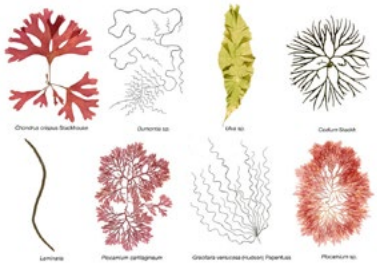

Figure 5. Eight algae for eight carpets © Leonor Secca

Tapete de Beiriz is a handcraft carpet in wool originating from Beiriz, a locality that belongs to Póvoa de Varzim in the district of Porto, in Portugal. The first Beiriz carpet's factory was founded in 1919 by Hilda Brandão, a Portuguese aristocrat living in Beiriz. She started with six artisans and two looms. In 1934 the factory had 350 artisans and sixty looms which reveals the success of these carpets. In effect, they conquered national and international taste by quality, beauty and originality, consolidating their position in the market till the factory closed its doors in the 1970s. However, in 1988, a German businesswoman bought several of the old looms, recruited some of the former workers and reopened a factory in Beiriz using the same techniques to hand knot carpets with the prestige of the old times. The particular characteristic of the carpets is defined by a kind of knot called 'ponto de Beiriz'. Each piece, made of 100% wool, is hand knotted on a loom by several women in line with synchronic movements, involving an extremely thorough work that asks for great expertise. Figure 6 shows the artisans working on one of the carpets.

Figure 6. Artisans hand knotting the blue carpet in a loom. © SJGS Arquitectos

This technique allows the possibility to work with detailed drawings and to make very resistant and durable carpets. Almost 100 years after carpets were woven in Beiriz, these '*algae* carpets' were hand knotted in the same traditional way.[19] The drawing from the *algae* was adapted to the carpets dimensions, each one with a different colour to be involved in the room's atmosphere. Figure 7 presents the carpet in the dining room.

Graphic simulations of the space with the carpets were experimented and rigorous drawings from the carpets were done till the desired composition was achieved. Later, in the factory the drawings were adjusted to the matched technique with the choice of the knots' density and the selection of the wool colours' palette. The result was eight carpets, all different and exclusive to integrate a 'total work of art' planned to resonate the atmosphere to dwell in.

3.3 From the Ginkgo biloba leaf to an entrance door

Ginkgo biloba trees can also be found in various areas in Porto. The most beautiful bicentennial female specimen with 35m high can be found in the Garden of Virtues that was already referred in this article.[20] There are many *Ginkgo biloba* trees in the park close to the house that has an entrance door with multiple leaves of *Ginkgo biloba* made in steel plate. Besides the good quality and lightness of its wood, this tree is known for ornamental reasons and, above all arguments, for its medicinal properties. This fame is originated in ancestral times, since in China it was used to increase the organism resistance to several diseases. And that glory remains nowadays as it is considered a healthy element that benefits the balance of the body and the mind. Sónia has been drawing many *Ginkgo biloba* leaves from the trees of that park. The drawing of one of that leaves, was chosen to be the pattern of the entrance door (Fig. 8).

Figure 7. The carpet for the dining room. © SJGS Arquitectos

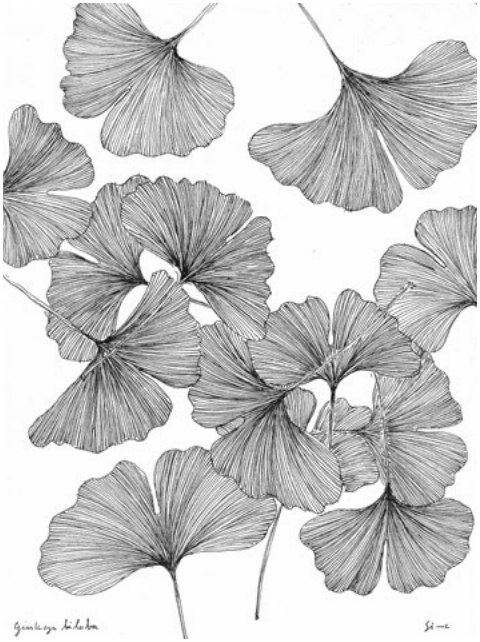

Figure 8. *Ginkgo biloba* in china ink. © Sónia Teles e Silva

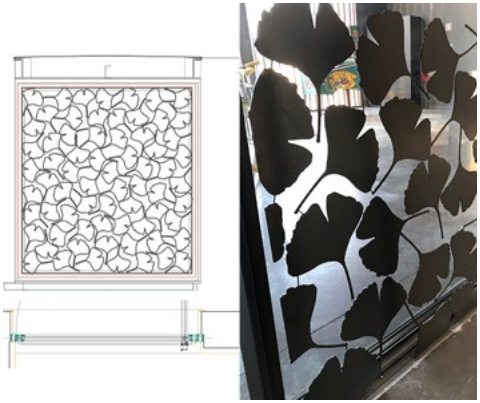

Figure 9. Entrance door's rigorous drawing by SJGS Arquitectos and experiment in steel plate © SJGS Arquitectos

Figure 10. Entrance door *Ginkgo biloba*. © SJGS Arquitectos

The door is a space as an edge that is used daily. It delimits the inside and the outside. Symbolically the leaves of this tree establish the connection with the landscape, namely referring to the many *Ginkgo biloba* trees from the park. The factory that produced the door has the motto 'iron work artistry'[21] and develops a conceptual work in urban window frames, going beyond technical skills by investing in research and innovation. From the drawing of the *Ginkgo biloba* leaves other technically rigorous drawings from the door as well as models of the cut steel plate were experimented till the final integrative solution. Figure 9 provides a moment of those experiments.

The direct contact in the factory with all team involved, namely architects, workers, technicians and client was decisive to adapt the product's concept with technical performance and materials. The factory was able to develop from a strong creative and demanding stage a single product, through the blending of a technological standard performance with a more craft oriented solution. The main door from the house is large, light and very safe. The translucent double glass with the overlapped ginkgo leaves repeated pattern in steel, filter the light and ensure privacy as Figure 10 demonstrates.

FINAL REMARKS

A general refurbishment of a single-family house in different design scales included the design of products in order to create the wished atmosphere to dwell. The above mentioned projects are a valuable example to illustrate the successful partnership that can be experienced between the arts &crafts production and design proposals with the proximity of all stakeholders cooperating. The craft industry that remains in the market with competitive parameters is the one that was able to adapt techniques and skill of the tradition and innovate in concepts. In parallel some craft industries introduced the modernization of equipments as a way of adapting to the market with a more competitive and versatile manufacturing. The production of low technology may reinforce the genesis of a product genuinely Portuguese as well as reinforce the goals of sustainability. The three examples abovementioned show a very clear interpretation of the nature of the form, the physical and mechanical characteristics of the raw material and the knowledge of traditional techniques, tools and skills. The close interaction of the architects with the craft workers stimulated the argument of the rapprochement of the crafts through the design mediation. Design, cultural heritage, economic

production should work together towards a more resilient future. Contemporary societies urge for an ethical attitude towards the planet with and environmental consciousness and responsibility in the consumerism that points out to the need of educating more critical and demanding consumers matching more sustainable ways of living. Culture and Heritage are a driver for social cohesion and sustainable economic growth. These three examples also show that their fabrication was contextualized in the manufacturing history of these factories, purposefully adopting the productive process in exercise. The incorporation of original drawings promoted innovation and still allowing the exhibition of the craft component in the final product.

NOTES

[1] SJGS Arquitectos, Lda based in Porto is an architecture office founded in 2001 by a group of 4 partners (SóniaTeles e Silva, João Paulo Fernandes, Gustavo Rebolho, Sérgio Secca) who work in projects of co-authorship since the end of 1980s

[2] Rybczynski W. (1987) *A Short Story of an Idea: Home*. Penguin Books, p. vii

[3] Idem, p.viii

[4] Heidegger, M. (1971) 'Building Dwelling Thinking' [*Bauen Wohnen Denken*, 1951) in *Poetry, Language, Thought*, translated by Albert Hofstadter, New York: Harper Colophon Books.

[5] Idem , p. 143

[6] Ibidem, p.158

[7] Sharr, A. (2006) Heidegger's Hut. Cambridge (Mass): MIT Press, p. 22

[8] Pallasmaa J. (2011) 'Alvar Aalto's Concept of Dwelling' in Jetsonen J. and Jetsonen S. Alvar Aalto Houses. New York: Princeton Architectural Press, pp 15-16

[9] Zumthor, P. (1999) Thinking Architecture. Basel: Birkhäuser, p. 85

[10] Idem, p. 87

[11] In the article *Phenomenology for Introductory Architectural analysis Courses. The Pentagon Methodological Approach*, Pombo et al. relying upon the arguments of recognised architects regarding the importance of the phenomenological approach in the field of architecture, discuss extensively the legacy of architectural phenomenology in the design practice and propose a five-steps method (pentagon) to add to architectural analytical exercises. See Pombo, F., Bervoets, W., De Smet, H. (2015). 'Phenomenology for Introductory Architectural analysis Courses. The Pentagon Methodological Approach.' *Design and Technology Education: an International Journal*, 20 (2), 58-69.

[12] https://www.dn.pt/opiniao/opiniao-dn/rui-frias/o-cavalheiro-das-camelias-10627222.html retrieved on 26th May 2020

[13] There are in Portuguese literature several references to *camellias* namely by authors as Eça de Queiróz (novel A Relíquia), António Nobre (poetry), Pedro Homem de Mello (poetry), Sophia de Mello Breyner (children book O Rapaz de Bronze).

[14] Sónia Teles e Silva is one of the architects of the architecture office SJGS Arquitectos, Lda in charge of the projects discussed in this article. See note 1.

[15] António Carneiro is a very skilled woodcarver with a long and successful experience in this traditional activity.

[16] This exhibition was open from 15 December 2017 to 28 February 2018. It was an initiative of the Municipality of Paços de Ferreira, Câmara Municipal de Paços de Ferreira (Paços de Ferreira Town Hall) Associação Empresarial de Paços de Ferreira (Entrepreneur Association of Paços de Ferreira) and Moveltex. a This zone concentrates the largest number of furniture factories from the country in a way that Paços de Ferreira is known as the furniture capital.

[17] AméricoTeles (1893-1989) was the founder of Museu Marítimo de Ilhavo (Maritime Museum of Ilhavo) which is a regional museum that mirrors people's activities related to the sea, namely the cod fishing, and to the lagoon. https://museumaritimo.cm-ilhavo.pt/pages/137. The museum displays a valuable representation of cultural heritage through permanent and temporary collections.

[18] Américo Teles (2012, posthumousedition) Guia Prático de Preparação de Algas Marinhas. Uma Colecção do Museu Marítimo de Ilhavo. Edição do Museu Marítimo de Ilhavoe da Câmara Municipal de Ilhavowiththesuppportof Associação dos Amigos do Museu de Ílhavo.

[19] The factory is Fábrica Artesanal de Tapetes Beiriz in Beiriz, Póvoa de Varzim.

[20] The most famous literary work about this tree is the poem *Ginkgo biloba* written by Johann Wolfgang von Goethe, published in *West-Östlicher Diwan* (*West–Eastern Diwan)* in 1819 (first edition). He read the first poem's version to Marianne von Willemer on 15th September 1815. He saw her again on 23rd September and visited together the inspiring tree in the garden of Heidelberg Castle. After writing the poem's last version Goethe sent it to Marianne on 27th September 1815 including two *Ginkgo* leaves taken from that garden. The manuscript with the two leaves pasted onto the poem by Goethe himself is displayed in the Goethe Museum in Düsseldorf. The *Ginkgo biloba* leaf with its heart-shape is in many works of art symbol of love and friendship.

[21] BBG-Aluminium Systems and work metal based in Zona Industrial de Esposende.

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3 DRAWING THE PLACE'S SOUL: DESIGNING THE REPRESENTATION EXPERIENCE IN THE SCHIST VILLAGES

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ABSTRACT

In this paper we will discuss the question of landscape representation as a crossing between art and design as from the project *Drawing the Place's Soul*. Underlying the project is the idea – that serves as an argument for landscape representation – of drawing as a visual language and as project's matter (medium). In the field of Visual Studies, images and, in this case, drawing are an unavoidable presence of the 21st century, as an iconographic bond, politically participative in the ethical valorization of people and territories. The choice of the medium (drawing) promotes craft as a bodily action, also deeply associated with the landscape. Methodologically, it was sought that the experience, free of constraints, would be able to provide information for the internal evaluation of the territories and for the way they are disclosed. The initial experiment was carried out in three territorially and circumstantially differentiated villages (whose territory is deeply deserted and which, in summer 2017, was hit by violent forest fires) and will be presented and analyzed here from a perspective that sees landscape as a purpose for the interception of art and design through the practice of drawing.

Keywords: drawing, image, landscape, design, project

1. INTRODUCTION

Firstly, we will use the polysemy of the concept of *landscape* that derives from the fact that the term refers to the representation made from the perception of space and, simultaneously, to the territory itself, through its present and past artifacts. Such polysemy also refers to the action of representing (drawing) from two different perspectives: the contemplative and individual nature of the designer's perception makes representation an artistic tool as an alternative to a coded representation which describes morphological and environmental features. These two ways of seeing the territory are naturally differentiated and, consequently, they imply different communication systems, showing, over time, formally and politically, the divergent and conflicting character of the representation.

The question posed here reflects on the practice of drawing, originally associated with the artistic and on how it is bended in the design project. This question is approached as from the project *Drawing the Place's Soul*, considering the idea of landscape representation as a crossing between art and design. The experiment took place during the summer of 2018 in three villages of a vast territory in the interior of Central Portugal and was carried out mainly as fieldwork in Schist Villages (Aldeias do Xisto), a project, in turn, proposed as part of the design work developed and funded by the Agency for the Touristic Development of Schist Villages [ADXTUR] for the promotion and dissemination of the villages.

Drawing was the chosen medium within the field of Visual Studies and, therefore, inscribing image as an unavoidable presence of the 21st century, assuming an iconographic bond, politically participative in the ethical valorization of people and territories.

The experience was initially implemented in 3 villages: Janeiro de Cima (Zêzere); Ferraria de São João (Serra da Lousã) e Aldeia das Dez (Serra do Açor) and counted with the presence of six designers, two people who took care of the documentation (photography and video), a coordinator and a supervisor in articulation with ADXTUR.

2. FROM THE NAME TO THE LANDSCAPE HISTORY

According to Carlo Tosco (2007), the name *landscape* (*paisagem*), connected to visual representation in general and to art in particular, has no common meaning, even among the languages of the same origin (Latin). The late medieval term *paese*, which extends to the Latin languages and from which the word landscape derives, used to denote a large expanse of land regardless of its territorial or legal limits. Therefore, landscape painting or drawing is not from the outset associated with the representation of territory but, above all, imposed as a means of perception of space. The term that identified the representation with particular artistic qualities – *pittura di paesi* – originates in the Renaissance, referenced in 1481 in Tuscany, concerning Paolo Uccello's painting[1]. However, the term as an artistic technical word is only clearly identified in France as a neologism of the word *paysage* and most likely comes from Fontainebleau school[2]. What has been disseminated and accepted between the Romance languages has no direct correspondence in German or in English language once in those languages the designation endures in the use of compound words associated with the root *land*: *landschaft* or *landscape*.

Historically, the *subjective* representation of landscape was most of the times linked to the visual and literary arts, while the *objective* representation of landscape was related to legal and political planning and was determined by the scientific objectivity of the nineteenth century. If about the former we can say that it mimics and symbolizes reality, about the latter we say that it seeks the meaning (fig. 1).

As presented by Jorge Gaspar (2001), referring to Giuseppe Dematteis, from the point of view of geography, this dichotomy in the nineteenth and twentieth centuries, saw landscape from two fundamental trends:

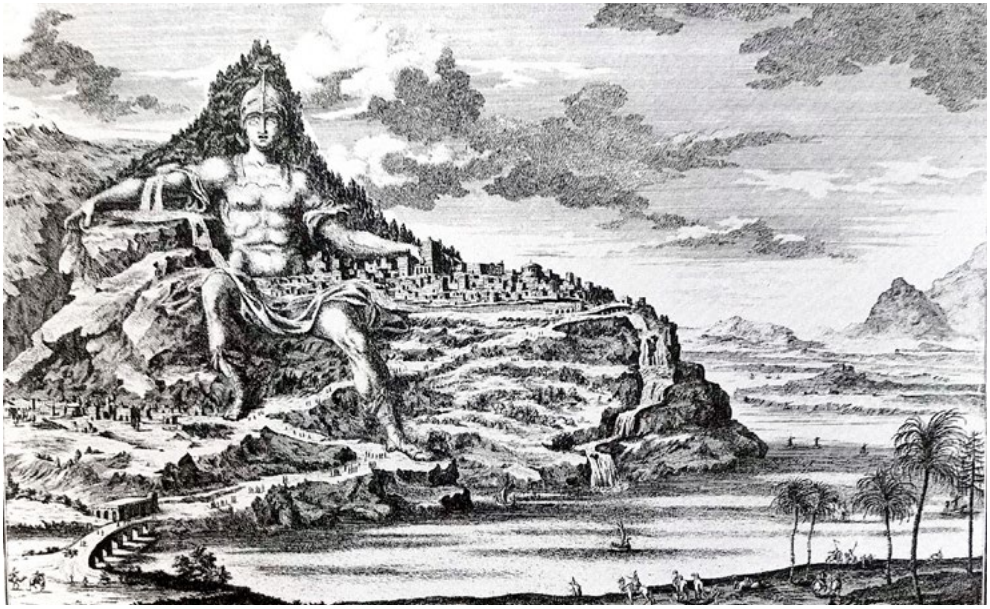

Figure 1. J. B. Fischer von Erlach, The *Mount Athos monument of Dinocrates to Alexander the Great (A Plan of Civil and Historical Architecture)*, 1721, engraving.

1. the landscape as a symbol, i.e., as a set of signs to be interpreted;
2. the landscape as a model, i.e., as a rational construction that explains the external reality.

In the first case, the visual representation is driven from the symbol to the subject of the representation. In the second case, it is constructed from the representation model that seeks the object. As Martin Warnke points out:

> The politicization of landscape moods obviously began when painting had discovered landscape as landscape per se. As the technique of the 'atmospheric landscape' was developed in Venice, it was here that landscape was first endowed with qualities that made it possible not only to construe, but to experience the meaning of a Picture. (Warnke, 1994:16)

Starting from the Modern Age, the landscape associated with the figurative arts is usually related to the aesthetic of the sublime. In the Romantic period, the landscape will approach the idea of *spirit of the people* through its geographical – territorial and environmental – condition. Also the *spirit of the place* (*Geist des Ortes*) had its great moment in late 18th century Germany, where the first romantics announced their encounter with nature through the combination of art and science. *Landschaft* is the core theme of *Naturphilosophie*. The transition from the artistic (aesthetic) concept of landscape to the scientific domain occurs with the pioneer of geography – Alexander Humboldt.

> Humboldt presented a new way of perceiving the natural world to the European bourgeoisie. (...) The German geographer thus founded the new approach to the "objective" dimension of the landscape: the contemplation of nature was

> no longer a poetic pastime, but the first step towards a scientific understanding of the cosmos. (Tosco, 2007: 42).

Thus the pioneer of the historical understanding of the concept of landscape as a field of historiographical investigation is Jacob Burckhardt. As a Renaissance scholar, Burckhardt returns to the joint dimension of man and nature.

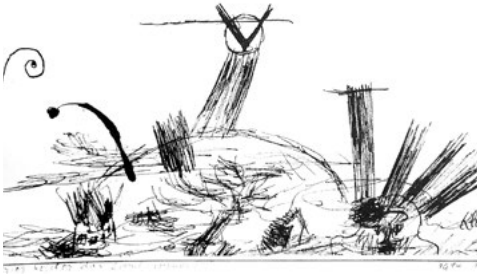

Figure 2. Paul Klee, *The war that devastates the land,* 1914, ink on paper

3. SURVIVAL OF THE FORM

For Tosco (2007), Joachim Ritter (Cassirer's student) had the merit of bringing the concept of landscape back to its aesthetic dimension by giving particular attention to the symbolic aspects of culture and narrowing the relationship between man and nature. In Tosco's interpretation – based on Ritter – from the point of view of art, nature becomes *landscape* (image) when contemplation is transformed into aesthetic enjoyment, offering the world a *fairer* approach to nature and individualizing an aesthetic relationship with it. The role of art in the development of the idea of landscape is modernist in that it defines figurative arts and, in particular, painting, as the true space of creation, conducting our perception for the aesthetic contemplation of nature. We intend to consider the concept involved with different areas — from geography to biology, from history to ethnography, from art to anthropology. In particular, we seek the idea of landscape image as a privileged tool for the valorization of the territory, which implies representation as a strategic factor for communication. Thus, landscape is both design and History (fig. 2).

More important than *looking* at the territory and the community is *being* in the territory with the community, so that the representation becomes *'present-image'*, making the invisible visible, revealing rather than showing.

Nowadays we speak about the programmatic *status of places* for establishing invariables structures and the rules of transformation of a territory, respecting and appreciating the local identity. The sensibility is taking on a new scientific dignity. The environment is not only a question of economic and legal forces trying to balance an ecosystem, but it is also a source of stimuli for the populations that are of great value in defining the quality of the place.

The importance given to the representation of the territory of the Schist Villages, through the project *Drawing the Place's Soul* was promoted by ADXTUR not only as an intentional way of perceiving the territory, but also as a means to give back to the territory and their communities images in which they recognize each other. The general assumptions of the project were the following:

1. the idea of an *environmental image* implicit in the territory's representation that would be determinant for the self-esteem of people and places, whose perception is no longer individual, but a collective phenomenon, subordinated to the appreciation of the group, where the collective image fits into the collective behavioral framework;
2. the importance attributed to the symbolic aspects of the places as they contribute to the analytical process of self-representation, where individuals recognize themselves as spectators and actors, feeling themselves integrated within the images of representation;

3. to fill the place's meaning through the representation of their artifacts that are a representative identity value for the populations.

In this case, the designer is an agent in the territory. It's all about a plural thinking of the landscape as a cultural phenomenon. We argue for a representation of an *inductive* geography that starts with participation rather than previous rational argumentation. Concerning the models available, they are the phenomena themselves experienced *in loco*. In the experience carried out in Schist Villages, the idea of landscape encompasses the experience of perceiving and acting, deduced from the territory and transformed into drawing.

4. RHETORIC OF IMAGES

The rhetoric of images has always been connected to the idea of territory and has been gathering *connected knowledge*. In the Renaissance, with the improvement of instruments and technical knowledge, the representation of the territory began to include illuminating artists and painters. The visual images of the territory were refined in connection with the identification and recognition of the territory but also with the strategies of power that sometimes manipulate those same images (fig. 3).[3]

Figure 3. Lopo Homem, Pedro Reinel, Jorge Reinal (cartographer), António de Holanda(painter illuminator), *Atlas Miller World Map*, 1519, Paris National Library

Nowadays visual images from the territory have a double provenance: technical-scientific, as data that, according to operative codes and conventions, answers to the geographical description with a certain degree of abstraction, and images that result from the proximity to the subject of representation. The first type of images uses rational understanding as a graphic tool, the second uses accidental perception to reach a sensitive understanding.

According to Joan Torelló (2015), this contradiction is combined in the interpretation of the term *chorography*: the description of a particular territory, linked to art. Chorography would have its origins in the 16th and 17th centuries (as well as the landscape image) in regional narratives based on historical places and its witness value relied on the chorographer *in situ*. According to the author, chorography, through its urban views (drawn or engraved), would bring to the geography more intuitive conditions to decipher the territory.

These images were of great importance for the iconography and symbology of sovereign power. Your power was asserted both through commission (commissioner) and also by the status of the maker (the artists replace the artisans or the cartographer painters). If the difference between technical and artistic image may seem consensual today, it was made at the expense of the abstraction degree that the deciphering of knowledge requires.

According to Denis Cosgrove (1989) the development of representation goes hand in hand with the concept of landscape of the 16th and 17th centuries, sharing the visual attention given to the territory as opposed to the scientific aspect of the map.

5. *DRAWING THE PLACE'S SOUL*

Drawing the Place's Soul is a project that uses drawing as an image (result) and instrument and seeks, primarily, to contribute to the cultural enhancement and, consequently, to the communication and dissemination

of Schist Villages. Drawing is proposed as the subject matter for landscape representation: the territory and the communities. The chosen method was freehand drawing seen as the prosaic action of the gesture in the conduction of manual instruments, an action deeply associated with nature and landscape.

It was sought that the images would function not only as simulacrum, but as *'present-images'* committed to an ancient time that characterizes both nature and drawing. To this end, experience was considered implicit the balanced between perception and meaning, knowledge and curiosity, interest and confrontation, reflection and closeness, conjugation and distance, and many other attributes that are, by nature, the matter of drawing. Thus, the result was to be born from the proximity with the territory and the people and, therefore, would involve the subjects and the models of the representation.

Figure 4. Eliane Beytrison, *Aldeia das Dez*, Drawing the Place's Soul Project, 2108, 410x3000mm, ink on paper

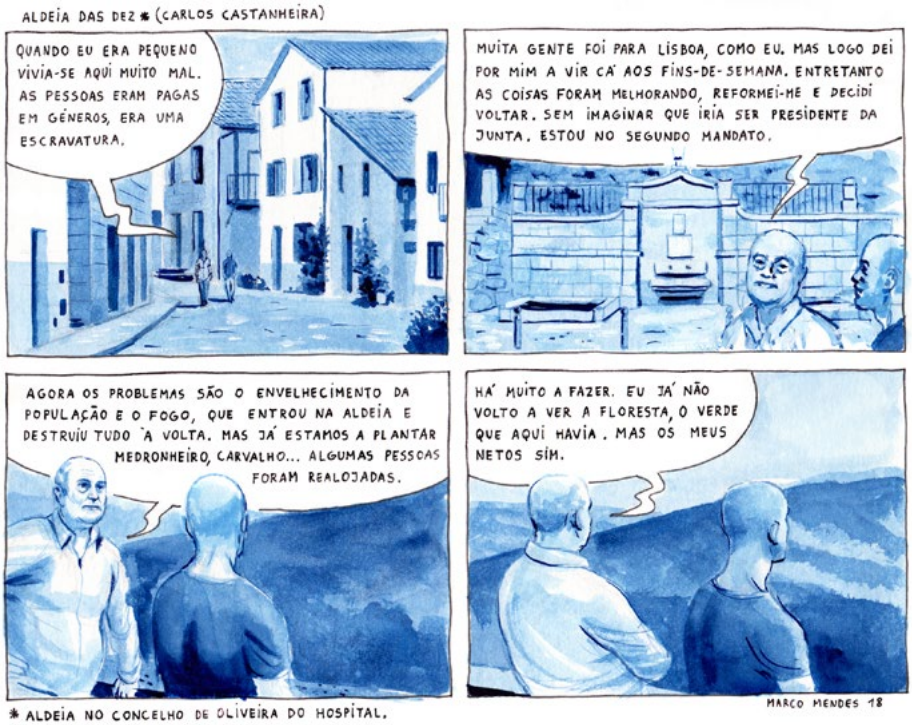

Figure 5. Marco Mendes, *Aldeia das Dez* (Carlos Castanheira)*, Drawing the Place's Soul Project, 2018, 297x210mm, pen and ink on paper

The choice of drawing as medium has as its principle the valorization of the body. Drawing embodies the condition of becoming an agent of feeling and acting. Drawing is therefore an action (*to be drawing)* but images are beyond the degree of *being*. According to Francisco de Holanda's definition[4], "drawing imagines what it isn't so that it be and it will be". In our proposal, the transition from *to be* to *being* represents the importance given to the place implied in *being*, in a continuous renewal of the time of *to be*. For Francisco de Holanda, images *are* when they exist materially or in the mind. Through the experience of drawing, images *happen* and interact with what is external to them; they are engaged with the material place, continually renewing their origin that emanates from the landscape (fig. 4, 5).

The project has been accepted by the Agency for the Touristic Development of Schist Villages [ADXTUR] as a propaedeutic experiment to get indicators to build a project for all of the 37 Schist Villages. This experiment is part of a design project (under construction) that aims to promote villages through the itinerancy in the territory, disseminating the experience with manual skills.

The main condition for the experience was the ADXTUR's disposal to bring designers to the villages, offering a stimulus for the representation. Images are a result of the empathy, comprehension and generosity of the people. In return it was expected that those images would contribute to the acknowledgment and esteem of the people and of the territory.

Beyond this, it was expected that the images would 'migrate' to other media and advertising supports of ADXTUR.

The aim was a constraint-free experience and methodologically able to give information for the internal evaluation of the territories and to understand how they might be communicated and disseminated. The experience carried out mainly served to evaluate its continuity within an extended design project that aims to promote the territory of the Schist Villages through the recognition of its inhabitants as a main condition for the 'survival' of the places. Therefore, in this experience, drawing did not serve to document the villages but to reveal the people's self-esteem and to promote their desire of sharing self experience.

The choice of villages was based on the particular circumstance to which they were submitted during the forest fires in 2017: *Ferraria de São João*, where fire circumscribed the village; *Aldeia das Dez*, which burned in its entirety and *Janeiro de Cima*, which wasn't hit by fire. In addition, the choice also refers to the landscape and social diversity of each of the villages.

Six designers (two per village) have in residence with a coordinator who provided logistical control of fieldwork and two persons who took care of the project documentation. The documentation was made by video and photo. This material was later edited and used as documentation and archive for discussing (critical domain) and dissemination of Schist Villages.

Each designer was required to submit 6 print-ready images. The work was individual (however, open to a joint and 'dialogical' development). Designers were able to continue to draw after the village's residence as the final work was not confined to the fieldwork.

The chosen designers all present differentiated expressions because, despite being a common narrative, it was thought that different expressions would be an added value for the appreciation of artifacts, people and territory. It was also crucial for the designers to be close to and *contaminated by* the places and their inhabitants (embodying the relationship between symbolic value and communication). Thus, guidelines were minimized, especially during fieldwork. However, information about the motivation of the experience was provided to the designers as well as information about the different places regard the forest fires. (fig. 6, 7).

Figure 6. Miguel Jacques, *Janeiro de Cima*, Drawing the Place's Soul Project, 2018, 210x297mm, black ink on paper

Figure 7. Rodrigo Queirós, *Vista Rio1_ Janeiro de Cima*, Drawing the Place's Soul Project, 2018, 500x620mm, crayon pencil on paper

As study subject, the territory was considered through the following aspects:

- perception as operative program for representation;
- meeting point for phenomena (natural and human) and artifacts;
- closeness to multiple technical fields and aesthetics;
- sources of information (artifacts and people) for past and present knowledge;
- Observation and study of different geographies and environments (particular, natural and anthropic phenomena that contribute to distinctive features of places);
- privilege of the *local*, the *local-global* admitting a part-whole and whole-part relationship;
- adjusting the *visibility* of the artifacts with the *invisibility* of hidden stories (present and absent manifestations and traces).

Briefly, we tried to characterized he experience in the field of representation from the following aspects:

- involvement / identification – involvement of the designers with the territory, seeking the iconographic identity of each of the villages;
- curiosity / perpetuation – recognizing the signs of each village, perpetuating the essence of the humanized nature of the places;
- experience / time – the experimental dimension was the main feature of this stage of the project as a model of representation based on the time of perception and the meaning of the place.

Drawing was to be seen as a perceptive and cognitive subject, an action materialized in images and Whose methodology was related to the *fieldwork*[5], however, not restricted to it.

Landscape drawing as a visual medium was identified as follows:

- favorite space for the representation of stories that reconcile past and present and bring together what would be interrupted or discontinued;

Figure 8. Daniel Costa, *Ferraria S. João*, Drawing the Place's Soul Project, 2018, 210x297mm, color pen on paper

– confrontation ground where new proposals for representation appear;

6. FINAL CONSIDERATIONS: NOTES FOR A SUBJECTIVIZATION OF THE PROJECT

The experience of representation is founded in the production of village's images while trying to make people feel represented in them. For each of the designers the encounter with the territory of the Schist Villages was a first experience, the strangeness was accepted as a voluntary act. Strangeness provided a sense of referential loss that found balance in representation. The sense of loss summons images that emerge from the confrontation with the territory. To draw an unknown place is also to admit a fictional action. The strangeness in the eye of the designer was revealed in the body of the representation. The perception of distance is simultaneous to the sense of what is adjacent. In this case, the representation mediates between the radical distance and the familiar proximity, uniting projected image and past life, bringing the narration of history

Figure 9. Sofia Neto, *Ferraria S. João*, Drawing the Place's Soul Project, digital drawing

closer to that of the ghosts of the past and the dreams of the future (fig. 8, 9).

Thus, representation is capable of evoking loss, placing itself on the edge of the paradoxical by the desire to represent the absent in images – figures in the silence of representation. In this case, the reality of the image will never be reducible to the story that was told. On the contrary, the image shows what is being lost in the subject of representation. It's about the magnificent encounter between what lasts in memory and what can be found in representation, making drawing a *'present-image'*, figuring the absent as the essence of representation.

Drawing the Place's Soul was thus an experience that conjugates the verb *to draw*, as considered by Buci-Glucksmann as an action that refers to an ancestral ritualization practice that constitutes the passage from nature to culture through the testifying images. Ritualization inherent to the act of creation, as opposed to dogma, whose poetics disclose content through shape.

NOTES

[1] Paolo Uccello as refered by Cristoforo Landino, in 1481: "buono compositore et vario, gran maestro d'animali et di paesi"

[2] The term appears in 1549 in Robert Estienne's dictionary.

[3] The World Map of Miller Atlas shows the oceans surrounded by continents and spread the idea of an impossible maritime connection between Occident and Orient as the first circumnavigation made by Fernão de Magalhães. Thus this map gives an example of graphic expression as a tool for geopolitics manipulation.

[4] Painter, illuminator, architect, designer, essayist, historian, 1517-1585.

[5] The designers had the possibility to continue their drawings, outside the *fieldwork*, in the studio).

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4 DRAWING: THE ACTIVE DESIRE OF DESIGN. A CASE OF DESIGNING ARCHITECTURE

ABSTRACT

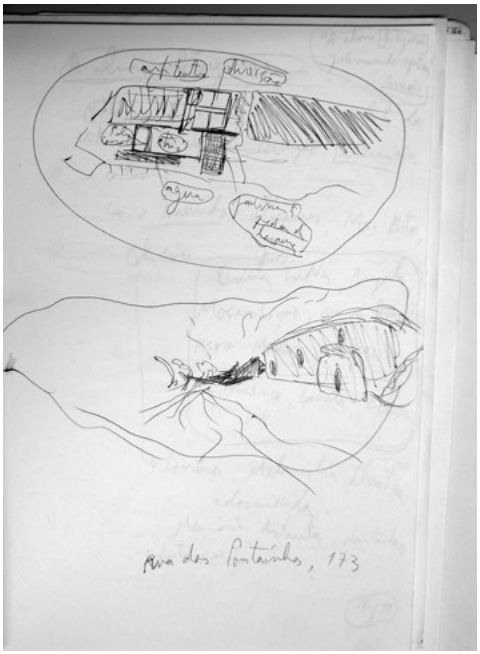
We aim to discuss that which generally refers to the contribution of drawing in the understanding of the design project, and particularly in relation to architecture. From a heuristic perspective, it is accepted that drawing recreates 'ways of seeing' which promote the project. Throughout the project, drawing contributes in supporting and stimulating the idea's development in accordance with the stratified process of design. We present a case study of the project drawings of the architect Bernardo Rodrigues (Ponta Delgada, Azores, Portugal, 1972)[1]. He got a degree in Architecture from FAUP, Oporto University, 1996. His architectural projects are spread across USA, China, Japan, Dubai, and of course Portugal. His work, focused on sensory perception and matter, has been the subject of national and internationally thoughts. According to BR architecture must returns closely back to nature, therefore, supports the idea of sustainability through ethics projected in architectural shape through the material building and its environment. "The twenty-first century should be the return to the classic and timeless categories of social planning and then urban", the architect said. The experimental nature of the projects leads to its fair recognition that is according to the original essence of architecture while thought about the human being. BR's architecture stands out through sustainability using materials that replying the energy yield but also to poetic dwelling the world. Thus, drawing is more than the heuristic representation of the project of architecture. The character of representation is contaminated by all that is marginal to design and ethically and materially disseminated through it, joining opposites and differences through a poetic desire expressed on the drawing. The images of BR design come from a methodological contemporary process freed from traditional instrumental constraints they become the essence for questioning the world and its representation. Thus, the subject of representation goes beyond the functional consideration of the design, because the different instrumental drawings influence the perception of the subject and the author. The analysis seeks to contribute to a critical and multi-

disciplinary discussion between drawing and design in order to stimulate the interdisciplinary understanding in generating ideas and solutions for architecture.

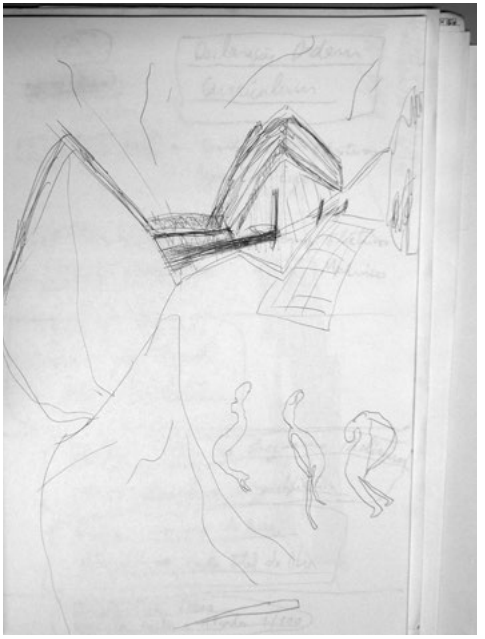
Keywords: drawing, project, architecture, designing

1. INTRODUCTION

The present case study aims to contribute towards architectural theory, based on the analysis and interpretation of drawing in the project designing. The architecture uses neighboring and converging disciplinary fields that more or less remotely in fact contribute to establish a well-defined autonomous theoretical frame. It is intended to demonstrate the importance of drawing in its structuring condition behind the act of designing. Therefore, drawings, and images in general, are an important material for the development of the object of architecture. We think about project representation through the drawing skills as a critical issue of the design project. The progress of the projectual idea is leading by the level of clarification provided by drawing. The 'efficiency' of drawing images depends on the selection of meanings and on what the author is able to do with them.



Figures 1, 2. Bernardo Rodrigues, *The architect's notebook*



Figures 3, 4. Bernardo Rodrigues, *The architect's notebook*

The project drawing meanings allow to stem from signs, through which they are embodied, to be read through the interpretation of culturally disseminated codes (rules). This means that all project drawings appear within a context. In this particular case, concerning BR architecture.

Considering images a metaphorical representation of reality, the value of drawings lays on their interpretation. The sense of possibility overrides the sense of predictability. The discussion on the design provided by the drawing overrides the limited value of programmatic definition. On the BR work the metaphor suggests a structural understanding that seeks to interpret the new possibilities of design. "The syntax of metaphor is predicated on polyvalence of meaning to which it contributes with multiple determinations." (Boehm in Pinotti, 2009: 56).

To analyze the project's images of this author involves visual interceptions, fusions and reverberations that are unexpected and surprising meanings. Looking ahead to the debate from the design drawing it found the wide value for the author project's through the interpretation of the history of architecture in which it participate.

According to Didi-Huberman, such drawings, "are a challenge to reflect about the heuristic aspects of experience: that is, to question the "evidences of the method" when exceptions multiply, the "symptoms", the cases that should be illegitimate and yet reveal fertile." (Didi-Huberman, 2000: 23). The example of BR drawings discloses the 'symptoms' of each drawing reveals as translation of the author's experience.

2. CONCEPTUAL CONTEXT

The architectural design represents the commitment of the artificial with nature – the artefact as symbolic cultural representation as the skills of drawing as renewed desire it transforming the world. Therefore, drawing is the material of design idea as medium of

the representation, such as technical and interpretive expression of the author's imagination from an external program (brief).

We propose drawing as a path performed by author's desire that symbolically reveals the subject of design in a specific level. The architectural object as primordial income for the conceptual designing process comes out of the drawing tools as cultural representation of the authorship. The drawing becomes technical tool and critical instruction for the designing project as subject matter of architecture.

We hypothesized that cultural and symbolic features result according to the artifact's identity. We consider that the pattern of drawing results different according to the project features, and so we seek to justify the hypothesis analysing the matter of drawing in the architectural authorship.

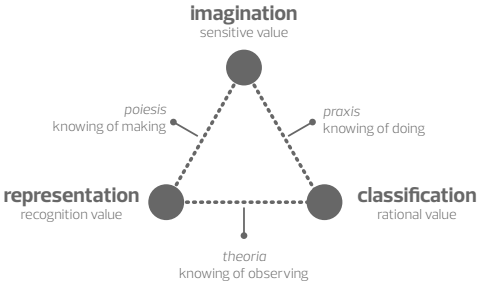
The creative and symbolic understanding of the design subject is reflected in the drawing as a design tool but mostly as poetic field. It means that we attach to drawing the capability to understand, imagine and communicate design artifacts. We recognize that designing is not making the object[2]; however, the assessment of the object will be conducted by the possibilities of the project representation. We consider that the performance of the design thinking through drawing is able to raise the understanding and imagination of the object.

The practice of drawing is founded in the draughtman's freedom necessarily 'deep-rooted' to the design activity, which is connected with the world. In this hypothesis drawing 'incorporate' the project idea through a procedural way of making.

3. INTERPRETATIVE CONTEXT

In our analysis drawing (pre) exists as multidisciplinary function through the triangular representation of *classification – representation – imagination3* (Partenope 1984-1990: 36). In this case, project drawing may be defined as recognition value according to representation, sensitive value according to imagination and the rational value according to classification.

Drawing the project implies a thinking scope attending to the understanding of the subject and an imagistic scope testing the imagination about it.



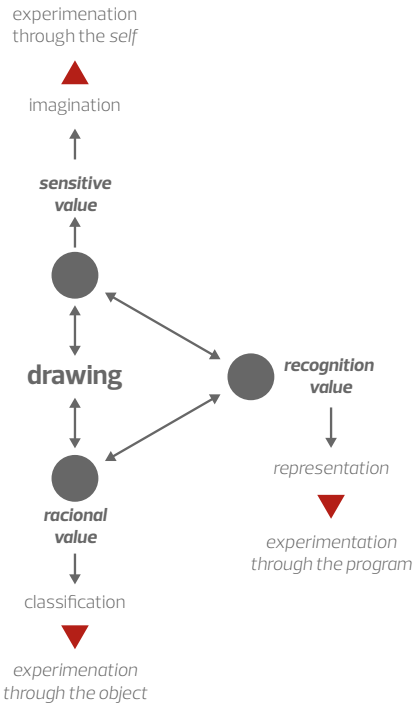
The images evaluation follows from the relationship of them in the author's vision. Images come together according to forthcoming and withdrawal in its perpetual motion. Each image search for the next to appease the desire of knowing and calls for freedom in discarding the previous.

However, the purpose of drawing is not the accordance between imagination and knowing through the expression of models. From the intentionality, there is a leading possibility of the drawing's irresolution to proceed with the design. The productivity will depend on the experimentation that drawing is able to provide about the design subject, on how it relates to other disciplines and how it allows its own uncertainties and irresolution's toward design process.

The project stems from a polysemic set of drawings evolving throughout the process onto a level that raises the appearance of the object. Drawings, however, are the author's expression and way of knowing.

From a formal point of view, the drawing's project results from the action of thoughts, guided by par-

ticular technical tools. Drawing is able to stir up the imagination and the understanding of the object. Both motivated by the idea involved in the problem.



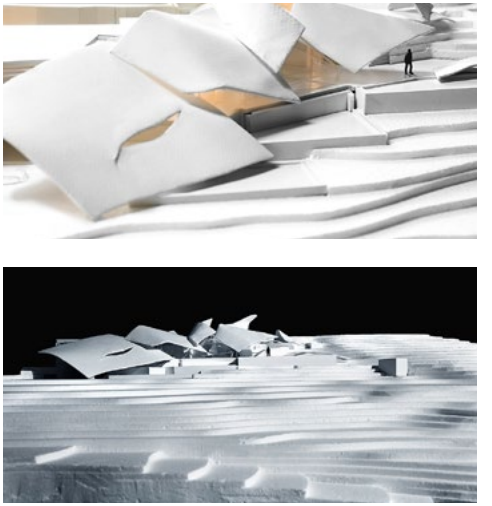
From a gnoseologic point of view, drawing enhances the author's experience to revert into the project. The experimental use of drawing is thus expressed constructively in the design project. These are the traces that reveal the usefulness of drawing corresponding to a particular mode *of execution* that pronounced the progress of the idea. As a consequence, the *productive capacity* depends on the different sorts and levels of drawing's experience regardless of the use of more or less canonical approaches.

From the communicate point of view, the importance of the design problem is revealed in the drawing, which assumes through form a rhetoric function underlying the operational system.

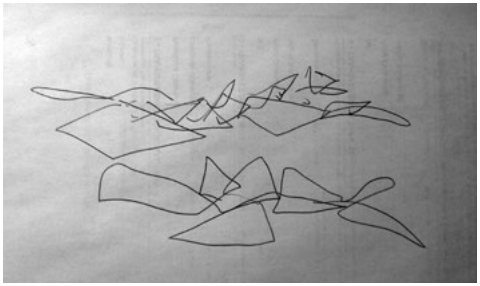
Therefore, project representation is to make visible the idea but also to makes it legible (meaning) which means to give them *figure-ability*. The visible as image (ikonos) plus the legible of the idea as means (logos) it presents as *figure* (iconology). By drawing there are many experimentations of the design object involved in a trial through gestures of the author. Drawings are therefore the author's expression and form of knowledge.

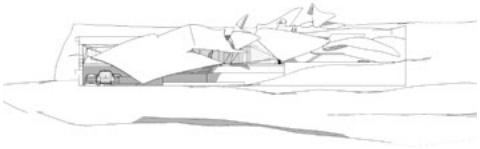
4. CASE STUDY: DRAWINGS BY THE ARCH. BERNARDO RODRIGUES (1972 –)

BR questions the drawing as a limited resolution of architecture's project. The author argues that is necessary to forget (unlearn) via an understanding that represents formal and conceptually the architecture. For him, drawing needs to find itself the major cleaning mechanisms of a creative mind, looking and seeing things "by other side", so drawing could be, primarily, a thought's vehicle. It means reasoning and rationalize it due the use of intuition.



Figures 5, 6. Bernardo Rodrigues, House on Theory of Winds, Leiria, Portugal, 2011





Figures 7, 8. Bernardo Rodrigues, House on Theory of Winds, Leiria, Portugal, 2011

Figure 9. Katsushika Hokusai, *Travellers Caught in a Sudden breeze at Ejiri*, 1832, woodcut

Figure 10. Jeff Wall, *A Sudden Gust of Wind (after Hokusai)*, 1993, photographic object, 2500 x 3970 x 340 mm

BR refers the "years of grudge against the drawing" when this one was for him, just an imposition or style, unlike the drawing as a possibility to establish experiences "admitting traces that can allow a come back". "To come back" on drawing means keeping faithful to a tracing, recuperate the thought's vitality, rein scribing the project. Through the drawing, establish the vitality of the events and the world. He explains: *"For example feeling, in the Samoa Islands, the pleasure of drawing". To draw trees, people, goat lings, drawing established that. So, what is needed is travel!"* The author refers the act of traveling as an extensive experience that leads to knowledge.

In the process, the distance between the drawing and project is minimal. Drawing emerges from the project in the most different forms, many times with residual feature. Drawing appears free. It is only connected to its own laconic existence. It happens because it springs from a need. Very often, it looks signed since its first appearing. Checked in a form observed "from within".

Such understanding can only be exposed as a purpose. Used with all the resources that are available to the author. BR refers to the possibility of drawing to be practiced with the new tools (computers, software), ceasing to be understood, unequivocally, as a required use, settled as instrumental utility. Today drawing is far beyond the instrumental utility. *"I believe that Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, if they lived in this time, they would be using the most realistic videos to show what was inside their brains and what could be done. The technique is the technique and never removes or decreases the creativity. Everyone should arm itself with all the possible weapons, with all training mechanisms, in order to succeed and to produce better what is inside his head. To give a better answer."*

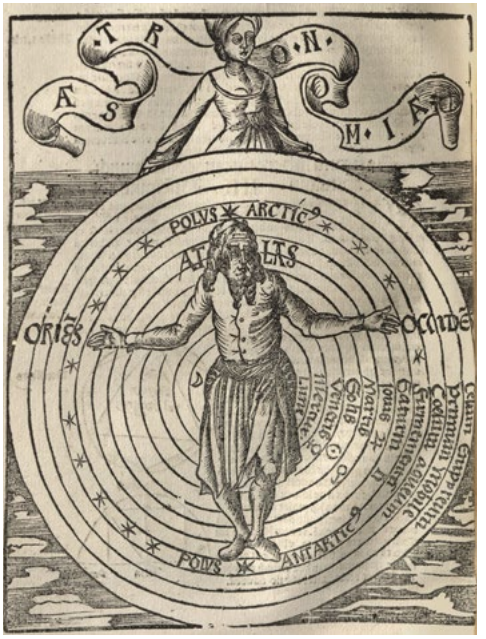


Figure 11. Gregor Reisch, *Margarita Philosophica*, 1508

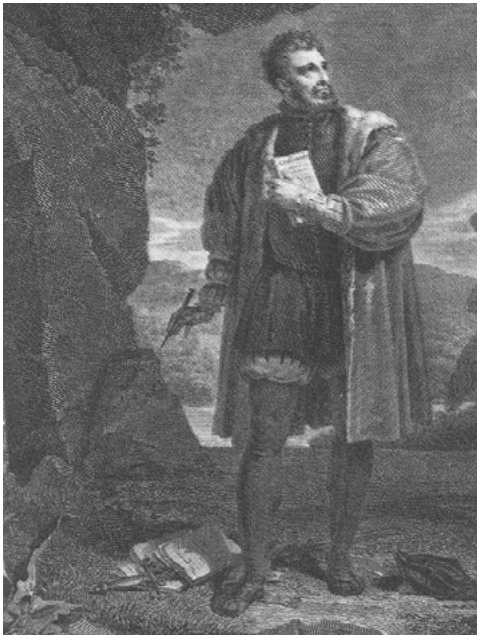
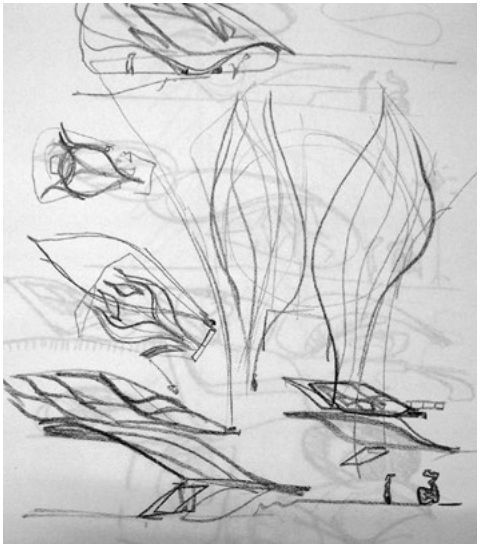


Figure 12. Desenne, *Camões na gruta de Macau*, 1817, etching



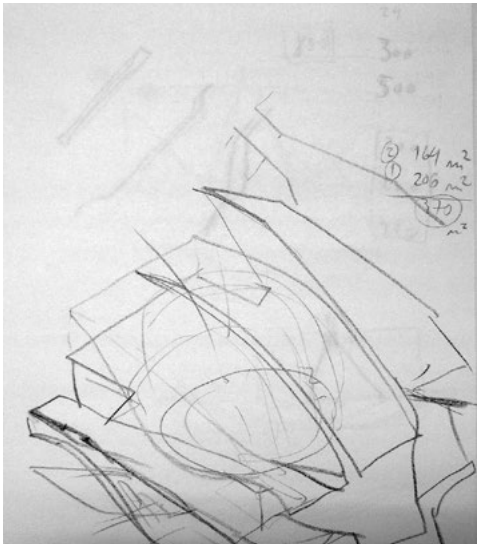


Figure 13, 14. Bernardo Rodrigues, *Machina Mundi House*, Azores, Constância, Portugal, 2005

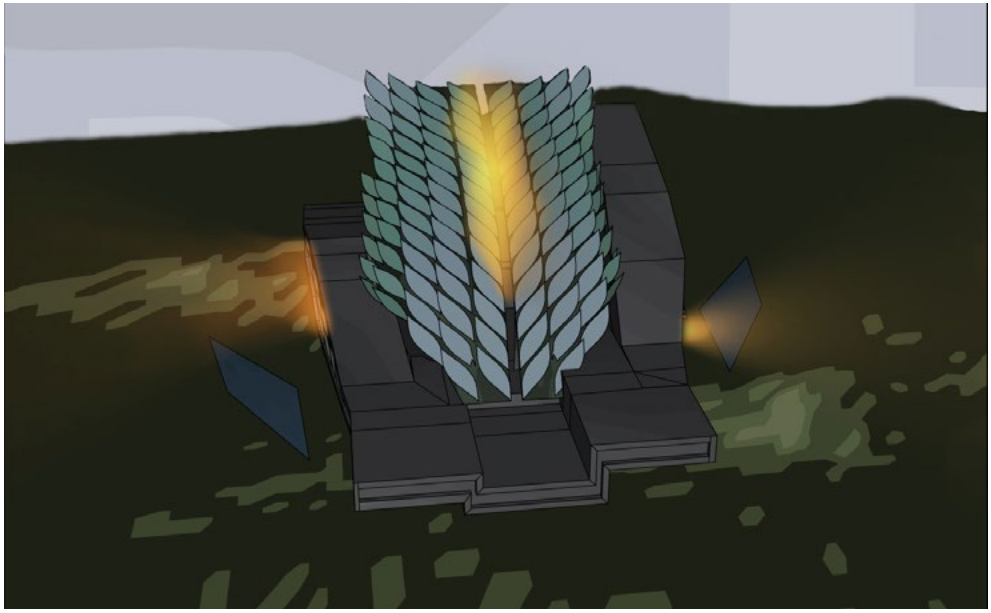


Figure 15. Bernardo Rodrigues, *Machina Mundi House*, Azores, Constância, Portugal, 2005

To the author to draw is the representation of the project's experience. In other words, a practical tool envisaged dream's experience. The draw pursues the "phatos" as the experience of something that remains, referred in the drawing as surface that fold by itself, and a "logos" that searches the place's knowledge.

The drawing is a global experience related to the knowledge of the everyday existence. The drawing's subject is the architecture but they always talk about the "thing" hidden by the architecture. In other words, what is being treated it's the condition by which the architect will give memory worldwide, the architectural work as historical element, the emergency of the meaning. That is why the BR's drawing develops empathically within the knowledge of the author' world.

To BR, representation is a minimal feature. Short notes; simple, stripped, direct spellings, in a way of searching the contact with the object of architecture, without outdoor mediations except the representation itself. He refers his own working process as follows: *"There is the draw, the draw itself." Sketching the idea. As a matter of fact, the 3D is a technical tool where the drawing process doesn't stay registered."*

In computer the drawing layers on the support, which is the "classic" form of project's drawings, didn't remain visible. Although, these records didn't stop existing, *"only they are not visible anymore, looking for them on the computer."* The perception features changes. The author's relationship with the project isn't anymore the individual's body gesture over the drawing board, but more about brain order.

"The architect's notebook is now my file". It contains all the instructions, to cut, to plan. Then, it's all done with conversations with the team members and the 3D images, which is nothing different from the method that considered the sketch in first place, and then the

technical drawings, and after the three-dimensional models...; it will only be faster and more intuitive. We see immediately the signs in 3D and we can implement the change in real-time. My "file" is the computer's sketching, with colorful lines that contrast plans, plant sections, elevations. Then, when needed to talk with the team members, I sit and I make a "briefing".

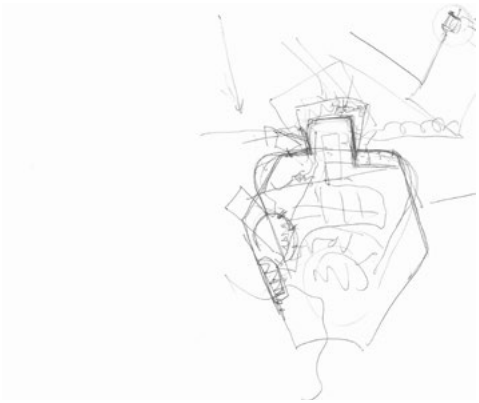
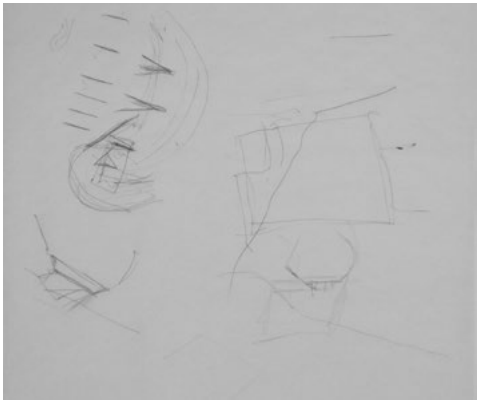
The work develops in team, in a hierarchical way. He says: "About my authorship, I talk to no one. There isn't any external intimacy. Whatever it arrives as an idea, an intuition. Then, the draw becomes another thing and I lose absolute control. After the creative and lonely work, I contact permanently with people that can help me with the material and technological resolution. Then, enter the engineers. Engineering is present by intuition. Therefore, the value of the structure is significant in the act of designing architecture. The structure is very important. Everything is structure. Designing is pure structure."

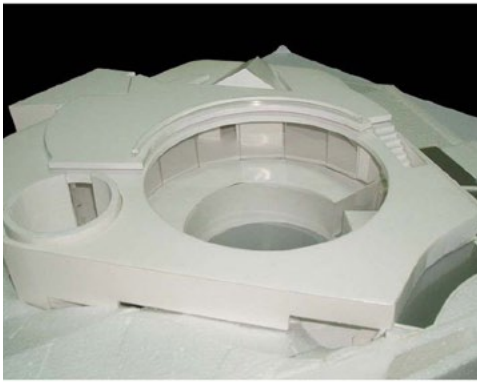
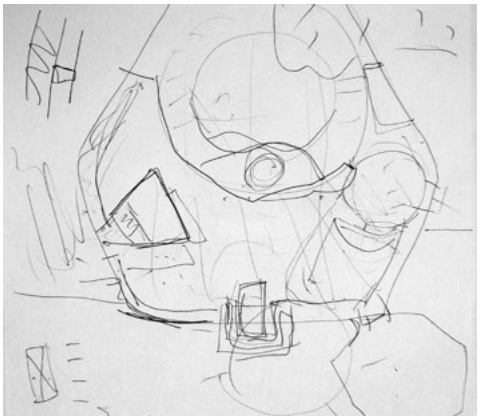
To BR the pleasure is the structure design solving. Design structures is vital, it reinforces successively. "I start by form's intuition to the structure's draw. The structural challenge is what makes me wake up in the morning and come to work. The structural resolution passes by geometry and drawing, it's all about drawing and idea. It's about an intuition that searches for a visual harmony. That's why symmetry and axes work as much as the loads' physical reality. I mean, drawing the harmony. To me, architecture's pleasure is involved in drawing the harmony and then build it." The design results from the structure thinking in pragmatic sense. And this one is represented by the drawn shapes. The draw is then used with aesthetic and tectonic sense.

5. CONCLUSION

The draw is vital in the problem resolution, materialized in the assumption of the architectural form, which is derived from reality acting as "creative memory". The architectural form's emergency results from the history as material reality, able to determine the creative practice. Drawing's intuition is liberating from the reality experience as survival model. The BR's work exists as formal memories, repeated gestures that transversely cross time. The author moves by desire in relation to the design subject "free from the cautious draw's danger, made with attention in relation to the aesthetic judgment." Evoking originality as inaugural form, the drawing surrender the imitation, keeping faithful to the singularity. Returning to the founding moment of the draw, starting to deal with elements that compose it from the ground zero of the drawing it means making visible the architectural form. As he says: "It's all about creating a space that can give answers to contemporary problems, searching for the aesthetic evolution and aware to not reply what was made or what I have been making." The drawing as helpful tool to the design project is contingent in relation to the author's professional course, that leave the technical-instrumental determination "recovers" the drawing as personal history's event, re-proposing it as a particular action. What results as primordial in Bernardo Rodrigues' draws it's the intentional character of the images. It is important its procedural intentionality in its methods, its matters and supports. The "return to the drawing" determines the intention of the author (and the team) for the formal structural representation that refers new proposals.

It's all about the maximum intentionality of drawing which uses the technique to achieve the object of architecture. The drawing presents itself close to its original roots, as structural support and guarantee of the architectural form mediated by the author's body. Therefore, the first draw, the one that marks the synthetic idea, often represents closely the final designing object that will be built. Complementarily, travel diaries, are a systematic practice of drawing related with the personal history and its corroboration as experience. What all of these drawings tell it's a personal fascination with the world's knowledge. The formal's repetition reveals the demand for world's visibility which is expressed in the "symptomatic" quality of the drawing. Drawing as encounter in the perpetual pleasure of discovery. In the drawing we see folding, twist,


Figures 16,17,18,19,20,21. Bernardo Rodrigues, Opus Lusa House, Biscoitos, Azores, Portugal, 2008

links. Often form "adjusts" itself as drapery; through author's memory they appear, disappear, reappear as the author see and "imagine", and so present in the author's own history. Forms autonomous, maybe remote ones, transformed by author's vision into real architectural appearance.

NOTES

[1] https://bernardo-rodrigues.weebly.com

[2] Although these two ways of doing are traditionally dissociated, its association is acknowledged in certain examples of contemporary design.

[3] *Representation* means to make visible the intention of the project. *Classification* means attribution of meaning in the world of objects. *Imagination* means to proceed with the intention.

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5 THE CHAIRS OF VENICE: APPLYING STORYTELLING AS TEACHING METHOD TO UNDERSTAND MATERIAL CULTURAL HERITAGE

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ABSTRACT

To understand the present and prepare for the future, we must remember our past. – And as indicated with the writings of 19th century English art critic and writer, John Ruskin; material cultural heritage holds an important lesson and plays an ethical role in establishing such a remembrance. With this paper, we discuss examples of implementing storytelling as a creative-explorative teaching method to critically reflect on- and develop the awareness and understanding of material cultural heritage among students from disciplines of Art History, Architecture, and Design. Our examples stem from a workshop held during the International Art Biennale in Venice 2019 by the Erasmus+ interdisciplinary research project CRAFT.

KEYWORDS

Material Cultural Heritage, Storytelling, Problem-Based Learning, Design-thinking, Interdisciplinarity.

INTRODUCTION

Once upon a time... such is the beginning of numberless stories told throughout historic time from old to young across cultures. The story possesses a strong emotional power. It has the ability to represent multiple time dimensions simultaneously, instantly bringing us from the present into the distant past, or an unknown future far away. As argued for by Staiff[1], telling stories draw on the ability of our imagination to make a passage in time; 'travel' in our minds and unfold 'fictive spaces' moving us beyond 'reality'. Triggered by the story we use our memories and imagination to 'transport' ourselves. We embark on an embodied 'journey' full of affective experiences, evoking a series of bodily-sensory impressions and emotional responses, as we absorb and associate ourselves with the characters, moods and landscapes unfolded. Yet, stories are more than this triggering of individual imagination and emotions. Stories are also important *representations* with a meaning-making telling. Often, they contain a kind of educational *morale* – a valuable lesson – to be

aware of, learn and remember. Sometimes the resulting morale concerns a grief processing of traumatic events, a reflective promotion of reconciliation, or even the underlying aim to change attitudes and alter human behaviors. In that sense, the story serves as a collective heritage; a cultural mind-set and identity passed on from generation to generation.

We are inspired by this 'passing on' of a collective educational morale and the ability to embark on a time travel through storytelling, when debating material cultural heritage. Furthermore, we are curious about the potentials of this storytelling lens for getting a closer understanding of how to *teach* material cultural heritage in the future.

However, before we go into details, we want to open this paper with the stories of the English art critic and writer; *John Ruskin*.

Between the years 1849-1851, Ruskin went on a series of journeys to the city of Venice. He did so equipped with a camera, pen, and sketching book to investigate the architectural qualities inherited in the material stories of (among others) the Doge Palace, San Marco Basilica, and Torcello Cathedral. Evidence of Ruskins' Venetian explorations can be found in his notebooks, diaries, and the two books; *The Seven Lamps of Architecture* (1849) and *The Stones of Venice* (1851-1853). Writings, which not only criticized contemporary Victorian society, the period of industrialization, and the mid-nineteenth century tourism increasingly governing the city of Venice, but also made a great inspiration on material cultural heritage and socio-cultural topics for a series of architectural thinkers like William Morris and Frank Lloyd Wright[2].

As argued for by Denis Cosgrove[3], Ruskin's Venetian wanderings had an almost phenomenological character, comparable to the visual mapping methods later deployed by urban architectural thinkers like Gordon Cullen[4] and Kevin Lynch[5]. Sailing with a gondola while doing drawings of Palazzos along the Grand Canal, Ruskin's fieldwork capture the atmospheres and detailed material cultural fragments of the city. In this way, Ruskin puts emphasis to the historic beauty of Venice, and use it as an example for how to preserve historic truth and design ethics in architecture[6,7] .We are interested in this exemplary story, because we are curious about his special emphasis on the *emotional expression*, *moral structure*, and *ethic role* of architecture – as a valuable contribution to the ongoing debate about material cultural heritage.

DOES THE PAST SPEAK?

Ruskin uses Venice as a symbolic landscape pointing to the value of producing, transforming, constructing and construing a 'landscape' of memory and imagination[8]. Hence, Ruskin makes a significant contribution to the discussion on material cultural heritage, weaving together social, architectural and art historic arguments. Consequently, putting forward the important point that certain buildings possess a high architectural value. Like the fictive story, the buildings with their material characteristics and expressions represent a significant moment in history. A building can thus 'speak' to us. This perspective first suggests an interrelationship and 'communication' between humans and material objects. Second, it suggests that buildings and material objects have a moral role to play. They contain a lesson for the present (and future); a value of historical and cultural significance recorded in the built environment worth remembering.

Critics would perhaps argue that Ruskin, with his writings, ignored the *material* history of Venice[9]. For instance, deliberately overlooking a series of buildings along the *Canal Grande*, while instead zooming in on the ones important to his story. Perhaps this is true. Yet, we are fascinated by the way Ruskin's writings suggest that a building holds a *character*, which can be captured and explored by use of storytelling tools like drawing and writing.

Simultaneously, we have to be aware – according to Staiff[10] – that the embodied responses and emo-

tional content perceived by a 'reader' *"...may have nothing to do with the setting and everything to do with individual memories and experiences."* Hence, the meaning-making of the story a building reveal is a *co-production* between built environment and spectator/partaker. The point is, that stories are not only told, but also *produced*. It is a reproduction by the person experiencing it. Consequently, the structure of the story – or the actual *storytelling* – is not only predetermined by the urban designer, architect, or engineer. The story and act of storytelling grows out of the material condition in collaboration with the spectator/partaker giving depth to the content. Thereby, also touching on the social interactive side of material cultural heritage.

PAST TRADITIONS OR MODERN FUTURE?

In everyday practice, a building/urban site is often objected to modification, transformation, adaptation, and extension. They undergo a continuous series of new functions, new economies, new regulations, and new user groups. Often there is not just *one crucial moment* worth remembering or telling stories about. It is an entangled network of many layers of history. The tricky part (and complex philosophical question) is to decide, which layer or moment to tell a story about. What design strategies should be used to help recall and protect the layers of history, as well as reveal the complexity? Furthermore, in cases of *difficult cultural heritage* (like actions of terror, war, displacement, violence, and world pandemics) the challenge is both to re-appropriate unpleasant memories, while simultaneously finding a descent way of retrospectively representing these stories in the future[11]. The point put forward by the architect David Chipperfield[12] is not to carefully restore or re-build replicas. Instead, allow for more re-interpretation, reformulation, and gentle transformation.

With previous research projects, we have addressed some of these issues of cultural heritage[13]. With this paper, we take point of departure in the interdisciplinary research project CRAFT and pursue a creative-reflective methodology, which can open up a new set of teaching perspectives on matters of material cultural heritage.

Our overall hypothesis is that new interdisciplinary collaborations - and the inclusion of storytelling as teaching method - can contribute to develop the understanding of material cultural heritage. This with the motivation, to foster a creative mindset focusing on how to *refine*, *reformulate*, and *retell* stories about material cultural heritage, as a topic embracing the temporary with integrity. Thereby *debating* the balance between conservation/protection of historic events and development/transformation of material culture. Lastly, also promoting a more critical-reflective and explorative-creative way of debating the *ethics* in telling stories about cultural heritage.

APPROACH & METHOD

CRAFT biennale workshop

The research project CRAFT is an Erasmus+ project, established as an interdisciplinary strategic partnership connecting partners from different disciplines in higher educational institutions and professional practice across Europe. The partnership was established to collaborate on different matters relating to the overall topic of cultural heritage, and one of the milestones was the development of an interdisciplinary summer school at the International Art Biennale 2019 in Venice. The summer school was planned as a five-day *workshop* testing an educational concept, focusing on the cross-examinations of material cultural heritage.

When entering this debate about material cultural heritage we position ourselves in the middle of a long line of experienced scholars discussing topics of conservation, restoration, historic preservation and architectural transformation. We do so with great respect, especially as we have no formal training in the domain of cultural heritage, but stem from an educational background focusing more on integrated design thinking and the

relationship between built environment and human experiences. Our interest in cultural heritage is based on the pedagogical desire to stimulate creativity and innovative thinking when working with form-making. Thus, what we hope to bring to the debate about material cultural heritage is merely thoughts on how to experiment with teaching style, teaching material and learning environment to foster a more critical reflection and curiosity towards the topic of material cultural heritage in the future.

Consequently, our paper takes point of departure in this CRAFT workshop and presents our personal reflections captured with our role as teachers and workshop responsible.

WORKSHOP FRAMEWORK

Storytelling and the chair as an example of material cultural heritage

In order to unfold the understanding of material cultural heritage, we used design thinking and the specific example of a Monobloc chair. During the workshop, the chair functioned as a medium to investigate and discuss different thinking and discourses in cultural heritage. Thereby making cultural heritage more tangible. - This is also were the methodology of *storytelling* became relevant.

Storytelling is originally a form of human expression and is define by the National Storytelling Network as: "*...the interactive art of using words and actions to reveal the elements and images of a story while encouraging the listener's imagination.*"[14]. Storytelling presents a story and is interactive, as both the storyteller and the audience contribute with imagination and emotions to the story from different perspectives. In the work of developing the workshop, we included storytelling as a narrative tool to help train students to spark stories, unfold their imagination and be more alert to different sensuous atmospheres. This is a perspective previously unfolded in other interdisciplinary educational settings[15] [16].

The Monobloc is a mass-produced plastic object known worldwide. It appears in numerous settings and the expression is uniform[17]. In that sense, the Monobloc is often considered anonymous. Yet, it can evoke both positive or negative emotions and memories. Thus, the point in using this chair in the workshop was to trigger students' imagination and creativity, by deliberately using a thought-provoking and often chastened object in the workshop exercises. More specifically, this was done by situating the chair into six particular themes and six careful chosen historic contexts within the city of Venice: (1) 'Full/Empty' at Rialto Bridge 2) 'Mystery' at Borges Labyrinth 3) 'Time' at Arsenale 4) 'Scale' in the City of Venice 5) 'Place' at *Piazza San Marco*, and 6) 'Body' at Santa Lucia railway Station. Initially, each group and a CRAFT project partner had to visit their given site and use this as a point of departure for investigating the comparative historical, cultural, and metaphorical differences, the site and chair embodied. Thereby also testing what happens with the perception of material cultural heritage, when the boundaries of the traditional disciplines deliberately dissolve, mix and blend.

Pedagogical and didactic approach

For the workshop, 30 students from various European universities – across master educations of art history, design, and architecture – were invited to participate. The students were divided into a series of 'project groups', working 4-5 persons together across disciplines. The groups were then given a series of different analytical and creative analogue/digital assignments divided into 6 overall phases: 1) *ESSAY: exploration of 'problem', 2) PLACE: observation of site, 3) HISTORY: analysis of cultural heritage, 4) UTOPIA: developing 'what if' scenarios, 5) PERFORMANCE: moving learning boundaries, 6) EXHIBITION: communicating explorations.* These assignments were tutored by the project partners; belonging to domains of art history, cultural heritage, theatre, interior architecture, and design thinking.

In phase 1, each student was told to submit two short, written essays elaborating on their perception of; 1) the Monobloc, and 2) the city of Venice. This writing

task intended to get the students to explore the two themes prior to our first meeting in Venice. Thereby also triggering the first thoughts on cultural heritage, and bring forth personal emotions and memories. Further, to help us – as teachers – get a deeper understanding of who the students were, before we had to get them in the mood for storytelling. A selected handful of the essays were presented by the respective author during the workshop.

Every day each group had to use digital tools to develop at least 20 posters, presenting their understanding and progress on the topic of material cultural heritage. With the digital tools an imaginary landscape can be created, allowing the students to manipulate built environment and re-arranging natural elements, as well as twisting the patterns of social relationships and activities, bringing forth a new set of meanings. Allowing to demonstrate a point in detail.

On the fifth day, in phase 6, 500 posters were displayed at an official open-access exhibition at the international Venice Art Biennale 2019. It was an overwhelming series of posters with great use of wordplay, metaphors, and analogies engaging in topics like *human relationships, personal space, loneliness, consumerism, climate, and capitalism.* They were emotionally effective and with a creative use of the Monobloc to raise critical, provocative or even satirical comments on material cultural heritage and todays' increasing tourism contributing to the growing problems of plastic littering all around us.

Figure 1. *Canaletto Rush Hour* 2019. Nikolaj Weberg Rahbek, Noelia Fernández García, Christina Theofanidi, Ramin Dorri, Katarina Richter.

Figure 2. *Chairs Have Souls* 2019. Nikolaj Weberg Rahbek, Noelia Fernández García, Christina Theofanidi, Ramin Dorri, Katarina Richter.

Figure 3. *Solved* 2019. Even Arsland Anderssen, Mercedes Menéndez Gonzáles, Devrat Chowdhary, Agnes Shulz-Bongert, Ardian Murati.

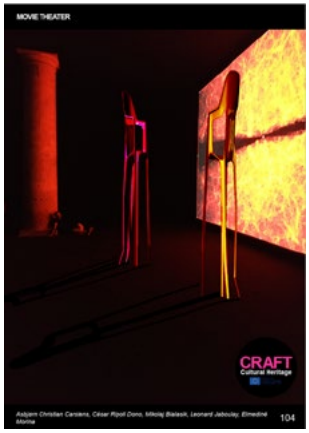

Figure 4. *Movie Theater* 2019. Asbjøm Christian Carstens, César Ripoll Dono, Mikolaj Bialasik, Leonard Jaboulay, Elmedinë Morina.

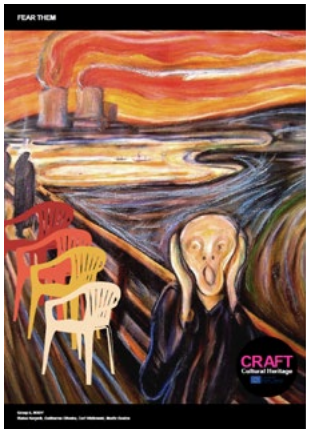

Figure 5. *Fear Them* 2019. Blaise Korpnik, Guilherme Oliveira, Cort Widlowski,Moritz Goetze.

In the following, we will comment on a few selected examples. Worth mentioning, is for instance the poster 'Canaletto rush hour' (Figure 1) by group no 1. They did a poster, which is graphically well done and use the Monobloc as a tool to experience 17th century Venetian everyday commercial life. In a similar manner, their poster 'Chairs have souls' (Figure 2) was emphasized in the workshop for reflecting on the relationship between humans and chairs, pointing to the spiritual meaning of sitting and daring to ask the underlying question if chairs make us human?

If we move to group no. 2, the poster 'Solved' (Figure 3) was mentioned for the great inspiration and critical reflection it provides on the process and lifespan of the Monobloc; playing with the perception- and cultural value of the chair. In continuation hereof, the poster 'Movie Theatre' (Figure 4), produced by group no. 3, unfolds an uncanny side of the Monobloc, as well as the Biennale Art Exhibition. The poster illustrates how the chair by twisting and diverting the place around it pushes the interrelationship between the exclusive art objects and the observing humans. The teachers agreed it was a provocative approach playing with the question of promotion of art – but also a reflective comment referring to death by the horrors of mindless mass-consumption. A series of similar posters developed across the different groups (not shown here) presented intense images expressing the inevitable condition of life – often framing the Monobloc as a possible cause to the 'death' of society. Hence, it warns about the grand pollution deriving not only from the city itself, but also from the unsustainable mass-productions of plastic (chairs).

With these kinds of critical statements, we suddenly find ourselves back at Ruskin and his critical perspectives on industrialization taking place during the Victorian Era. He raged against the rational thinking emerging with the new technologies and the growing machine made, standardized mass-production feeding 'fake' mass-consumer behaviors, as opposed to refined craftsmanship and ethics in artistic production. In particular the poster 'Fear them' (Figure 5), developed by group no. 6 contributes to this topic. This poster was emphasized for its thoughtful and daring approach, illustrating a nice reflection between classical, modern painting in front of modern concerns

Figure 6. *Venice Mascara* 2019. Anna Konstantopoulou, Lele Ramphele, Radoslaw Mazgaj, Daniela Gomes, Katarina Bogataj.

Figure 7. *Look Around* 2019. Anna Konstantopoulou, Lele Ramphele, Radoslaw Mazgaj, Daniela Gomes, Katarina Bogataj.

Figure 8. *Plague of the 21st Century* 2019. João Martins, Hana Ceferin, Sara Tacchella, Zhi Min Goh.

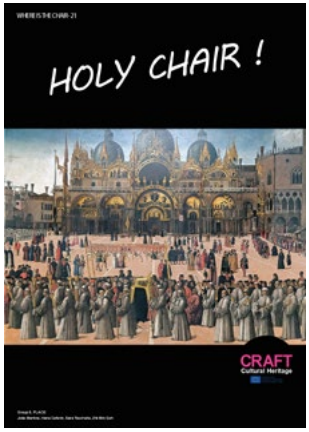

Figure 9. *Where Is The Chair* 2019. João Martins, Hana Ceferin, Sara Tacchella, Zhi Min Goh.

Figure 10. *Seat of No Power* 2019. João Martins, Hana Ceferin, Sara Tacchella, Zhi Min Goh.

and thought related to contemporary plastic littering debates and economic ecological considerations. The poster plays with the scream and the fear of the modern world changing too fast.

If we move to group no. 4, their posters 'Venice Mascara' (Image 6) and 'Look Around' (Image 7) was emphasized by the teachers for their strong graphic expressions, which position the Monobloc in different enriching situations from souvenirs like key-holders and masks, to ornaments on iconic building facades, or even grand monuments shining in the night sky. Seen together, these posters illustrate a clear and easily readable way of playing with scale, form and impact of the Monobloc in different 'iconic' Venetian sceneries. Perhaps also a critical comment on the seemingly limitless commercial design industry fostering an ever-growing hunt for tokens and tourist attractions as places serving the purpose of making money.

Finally, we want you to pay attention to the poster 'Plague of the 21st century' (Figure 8), developed by group no. 5. This poster illustrates a great attention to the historic Venetian context and a satirical play of words (again) referring to capitalism, mass-production, and the increasing monoculture. In a post-COVID-19 time, this poster expands our understanding of material cultural heritage even more, with the reference to pandemics and critical reference to the role of plastic chairs in the public domain.

A series of other posters developed during the workshop, further explored this topic. For instance, the posters 'Holy Chair' (Figure 9) and 'Seat of no power' (Figure 10) questions the political rules and human behavior in the San Marco square. Who has which rights? Who decides what you can do where? What is healthy human behavior? What ethical role does material objects play?

Common for these posters is the reflection on the political and socio-cultural positions in one of the early republics - and supposedly democratic places - in Europe. Furthermore, these posters also represent the contrast between mass-production and the loneliness of the power, the uniqueness of Venice and the cheapness of the millions of tourists passing by every year. Not to forget, the social interrelationships fostered with such material objects.

With the posters developed by group no. 5, we enter into a theme touching more on the emotions and meaning us as human beings assign to certain objects in specific situations - to trigger, contemporary public phenomena like fear of terror actions or world pandemics. Related to this, the teachers emphasized the groups' strong graphic skills, good humour, and elegant approach.

As can be seen from the above exemplary extract, some of the posters deliberately play around with the chronology of time; mixing up events and historic periods. Others question established socio-cultural rituals by playing around with the tangible and intangible evidences. Yet, another group of posters deliberately utilise the digital tools and analogies of the social media.

In retrospect, this development in the posters is probably triggered by the rapid increase in use of digital screens/social media in the urban domain. Smartphones and tablets – not to forget the numerous photographs and snapshots produced every minute with features like Snapchat, Facebook, Instagram, Twitter, and YouTube. These features capture each their historic moment. Together it is an ongoing endless stream of big data, on the one hand documenting digital interactions and digital conversations. On the other hand, continuously circulating personal stories; twisting and bending significant events and historic settings. Thereby rapidly adding even more complex layers to the history of material culture. With these devices and this kind of technology the relationship and experience of a place changes significantly, especially compared to the time of Ruskin.

Some would refer to this digitalization as a disassembly or even decline of the role of historic places and

material cultural heritage[18]. Nevertheless, perhaps it can also be seen as a new kind of co-production and co-joining of historic moments? A valuable extension to the possibilities in the storytelling of history and material cultural heritage. To embrace the digital technology as a valuable integral virtual part – not a parallel universe – but an important dynamic, ongoing, open-ended - *in the moment* - part of the process. The point is, the posters addressing this topic touch on the conceptual thinking about material cultural heritage. Fostering the idea of an online active process of co-production and co-joining as an element of creative engagement, where the mixing of personal-creativity, identity-making, memory-recording, emotional engagement, and social interaction are crucial for individual experience[19].

Ruskin was angry about tourism and the transformation of Venice. Today, Venice is still an object of an ever-increasing commercial environment. Some of these posters acknowledge that today Venice is a world of multi-national corporations and still increasing globalization and tourism. They use this tendency of digitalization in a positive to way to underline that present everyday life is a changing communal life. We face new types of social relationships and perhaps even new ways of defining psychological wellbeing. Hence, these posters dare to celebrate the multi-cultural, the power of tourism and question what the qualities of specific local histories and cultural identities are? More importantly, these posters challenge the 'romantic' idea that a place should be defined by regional traditions, local craftsmanship, and neighborly communities. Instead, the posters illustrate how such historic places are an intertwined web of meanings and fractured emotions.

Finally, in phase 5, the workshop counted an artistic performance developed by- and with the students in collaboration with the artistic performance group 7/8 CHILI. This artistic performance was meant to add yet another layer of interdisciplinary creative-explorative knowledge to the exhibition and assignments of the posters. This again, with the aim to train students not to be afraid to engage with and apply new (foreign or sometimes obscure) knowledge and skills in a very short time, as well to combine and transfer these competences to other topics in their future education/job. As with the abovementioned process of developing posters, the assignments of the artistic performance focused on pushing established world-views and common sense among students. This was done by a series of group-based dance exercises, role-play and theatre. In the first hours, these exercises strongly challenged the students and brought them out of their comfort zone and their traditional way of thinking. However, this provocative and challenging approach was – in line with the choice of the Monobloc – deliberately utilised to train creative exploration and critical reflection in the workshop.

DISCUSSING THE DIDACTIC FRAMEWORK

Interdisciplinary collaboration and creative exploration

As underlined above, the interdisciplinary perceptive was brought into the workshop by inviting students and project partners from different disciplines to collaborate on material cultural heritage and share knowledge. However, a creative process like the abovementioned poster workshop is often very chaotic. Students need time and space for individual development and growth, whereas the job of the teacher is in such situations often to facilitate, support, provoke and gently 'push' students thinking – meeting them at the specific challenges they face – instead of preparing long lectures and feeding them with textbook material. This was a new experience to both students and teachers/project partners. Whereas, at the workshop new networks were created across disciplines and a broader knowledge sharing slowly emerged during the different exercises and assignments produced. In total, that contributed to a series of collaborative experiences and a wider know-how among both student and teachers.

Expanding Problem Based Learning

The Problem Based Learning method (PBL) was an important underlying approach to include in this work-

shop to help secure learning and knowledge sharing across disciplines, as well as facilitate the inclusion of practical hands on experiences[20]. More importantly, the PBL approach challenges the traditional teaching environment often focusing on monologue-based lectures with slides, and blurs the boundaries between student and teachers by deliberately focusing on eye-level didactics and creating room for creative exploration and joint discussion[21]. Finally, it provided the students with new collaborative and communicative competencies, learning skills and real-life experiences beneficial for future scientific and practical work[22].

By introducing storytelling as a teaching approach during the workshop, the students were deliberately pushed into the speculative craft of confabulation; an oscillation between reality and fiction. This methodology encourages students to move beyond the romantic idea of an untouched historic landscape/monument, beyond nostalgia and enter into modes of dreaming and imagination, developing utopian ideas and ask 'what if questions'. The boundaries between fiction and reality, location and imagination, history and invention are then blurred beyond recognition. It may force them to think outside the box and push established ideas about material cultural heritage. But, it was also a deliberate pedagogical choice to encourage them to start learning across disciplines, sharing knowledge, contributing with new perspectives and inputs in an interdisciplinary collaboration. – At first, it did cause some frustration among students, but as the complexity and challenges rapidly increased, the students began collaborating and sharing experiences, and thereby slowly develop a new common language and common goal. Consequently, it made them produce new thinking patterns and adapt to new working methods, supporting their learning in becoming ambassadors of cultural heritage.

We find that during the 'crafting process' of the posters, the storytelling helped establish a greater sensibility towards communicating different atmospheres and emotions. It encouraged students to see the complexity rooted in the past and present of every single person/object, which makes solutions for the future more tangible. In that sense, we find, that storytelling is a unique approach to include in future educational training. Storytelling stands in contrast to the traditional deductive teaching methods and allow the students to analyse the relations between human beings and material objects.

In continuation of the storytelling methodology, we have to emphasise the importance of using an event-based teaching and learning environment. Having the workshop take place as part of the Biennale Art Exhibition, was a very important training element. First, it provided us with the opportunity to change teaching atmospheres; by using on the one hand different teaching methods, but on the other hand also by changing teaching facilities. For instance, mixing between exhibition spaces, group workplace settings, and the use of different locations around Venice. This mix provided different architectural perspectives, but also different perspectives on social issues and cultural heritage than traditional teaching environments[23]. Second, this mix created different dynamic relationships and collaborative interactions between students and teachers than traditional teaching environments often accomplish.

CONCLUSION

Throughout history, the chair has signified extraordinary socio-cultural relations, invited for many different bodily encounters, defined habits, and reflected various perspectives on individual personal space. With the workshop, the different groups unfolded this even further. They creatively played with the scale, form and function of the Monobloc. They endeavoured into a critical exploration of the chair and its' contemporary context, and used this lens to discuss and reflect on the historical Venetian context and current cultural discourses.

During the workshop, more than 500 posters were produced. Many of the posters quickly abandoned the original Venetian sites assigned for critical exploration.

Not necessarily due to an insensitiveness to the actual, existing material qualities of the Venetian locations, but with a deliberate choice to investigate their imaginary qualities. Hence, the students quickly managed to use the different elements of storytelling – the written language, visual images and bodily movements in theatre – to move beyond monuments representing a unique moment in history, instead touching on the wider meaning of material objects to cultural heritage and how places are part of people developing traditions and social rituals.

In the end, we are glad to see how, not only the entire workshop, but also, each poster represents a continuous oscillation between critical reflection and creative exploration by challenging the borders of the experienced, remembered, and imagined. - And thereby contribute to broaden our understanding of material cultural heritage. In order to live and understand many aspects of life, one most also understand the stories and life others lived; our shared cultural heritage. It is because of this that applying interdisciplinary collaboration and including storytelling as teaching method is of great importance. The stories of our past and our present also provides understanding of our shared cultural heritage when building, drawing, and designing for the future.

NOTES

[1] Staiff, Narratives, 96

[2] Cosgrove, Venice, 145–169

[3] Cosgrove, Imagination, 43–62

[4] Cullen, Townscape

[5] Lynch, City

[6] Kite, Wandering, 105–114

[7] Cosgrove, Venice, 145–169

[8] Cosgrove, Venice, 145–169

[9] Cosgrove, Venice, 159

[10] Staiff, Narratives, 98

[11] Tvedebrink & Fisker, Recalling

[12] Chipperfield, Berlin, 21–27

[13] Tvedebrink & Fisker, Recalling

[14] National Storytelling Network, What Is Storytelling?

[15] Tvedebrink, Fisker, Heilmann & Bagger, Karen Blixen´s Storytelling

[16] Tvedebrink & Jelic, Personas

[17] Fisker & Christensen, Cultural diversity

[18] Relph, Narratives, 31

[19] Staiff, Narratives, 121

[20] Aalborg University, Problem-based Learning

[21] Jacob, Black Box, 174–179

[22] Tvedebrink & Bagger, Booklet

[23] Jacob, Black Box, 174–179

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6 PRESERVING HERITAGE THROUGH NEW NARRATIVES: DESIGNING A GUESTHOUSE WITHIN A CROSS-DISCIPLINARY TEAM

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ABSTRACT

The following article describes the ongoing interior design project that accommodates a guesthouse in a historical building located in the city of Coimbra in Portugal. It focuses on the importance of generating new narratives to maintain the original nineteenth century building's essence, when changing the architectural program, from a pharmacy on the ground floor and residences in the upper floors into a single guesthouse. We present the design-led methodology focused on the importance of generating narratives as a foundation to achieve a common goal while working in a cross-disciplinary team. In this context, the designer not only has the role of the form-giver, but also becomes the mediator between matter and form, the team leader, and the forecaster of the user's emotional experiences. When adapting client's brief into a tangible outcome within a team that crosses various areas of expertise (in this case: architecture, design, engineering, archeology, conservation, and restoration), the importance of generating an open concept that can adapt to the evolving context, becomes key to meet client's expectations. This article intends to contribute to the discussion of the designer's elastic mindset as a binding tool between actors and contexts, towards an outcome that acknowledges the importance of the contribution of each one when looking for enriched results. Therefore, it questions what is gained and what is lost by setting aside the classic design fundamental principles and by focusing on design as a managing tool between data and the involved actors for an enriched outcome. As a main conclusion, it underlines the importance of generating a strong narrative with an open outcome to bind all stakeholders to a common goal through the designer as a project leader.

Keywords: interior design, interdisciplinary, narrative, experience, heritage

INTRODUCTION

The following article presents the design-led interior design project entitled the *Soporific Guesthouse*, for a small hotel that was commissioned to a design studio based in Aveiro[1], Portugal. The intention is not as much to present the project itself, but to describe the tools used to design and manage the process of converting an existing building into a specific functional and aesthetic program within an interdisciplinary team.

This text begins by portraying the context of the existing building and identifying the respective project team, continues by describing the architectural program that serves as the basis for the different design options. It follows with a theoretical reflection on the role of the designer as a project leader in an interdisciplinary team, and on the importance of having an elastic-mind to bind all team members in pursuing a common outcome.

After the introduction and theoretical considerations, the article illustrates the importance of building a joint narrative that offers coherence to the design team and presents open outcomes as an opportunity to give priority to common goals over personal expectations.

The article continues by describing the architectural program and how the initial base narrative was materialized into the project, concluding with a reflection on the importance of the presented design-tools in keeping the team focused on common results.

CONTEXT

The project takes place in a building that dates to the second half of nineteenth century, located on Ferreira Borges street, nº 135 to 139, in the city of Coimbra in Portugal. This edifice is one of several buildings that are part of the historic center of the city. Its original format was composed by commerce on the ground floor, and residences from the 1st to the 5th floor, having been the 4th and 5th floor added subsequently to the original construction, and of which there weren't any official records in the city hall. Due to several interventions undergone over time, often taking place with-

Figure 1. From left to the right: facade of the building; main entrance; interior furniture of the ground floor; main staircase. Arq. Cátia Fernandes, Coimbra, 2018.

out proper monitoring, the building was losing some of its original characteristics, especially regarding its main facade and exterior windows. At the initial point of intervention, it was at high risk of collapsing, as are many other buildings in the surroundings. It also presented serious structural problems and pathologies associated with abandonment, mainly caused by infiltrations resulting from the degradation of the roof and the external windows, revealing the need for an urgent intervention.

It is important to note that the building is integrated into an area of the city with archaeological importance and is considered a real-estate with relevant cultural and historical heritage. Moreover, it is linked to the application of the University of Coimbra to become a UNESCO World Heritage Site (fig. 1).

Team

The project was developed, from the beginning, by a team with different expertise that had never worked together. The disciplines of interior and product design were supervised by Estudioama, architecture and engineering by the architect Cátia Fernandes, graphic design by Estudioama and Aleksandra Kosztyła, archeology by Luís Fernandes, and in a final stage conservation and restoration by Raquel Misarela.

In this document, we will put emphasis essentially on the interior design process and on the tools implemented to manage the project from the concept to the final outcome. We will also intend to explain how design worked as a mediator between the requirements of each area of expertise and the common goal, by keeping a homogeneous design language, handling personal interests, and managing expectations.

1. USER EXPECTATION AS THE PROGRAM FOR THE DESIGN BRIEF

The project brief is the result of the intended user experiences discussed by the client, architect and the design team in the preparatory meetings.

As an overview, the architectural program proposed a spatial reorganization to provide the building with the requirements and characteristics necessary to function as a guesthouse. The ground floor, where previously was located a pharmacy, and the upper floors, where were several housing apartments, were to be transformed into a single guesthouse with a common language. The program intended to transform the ground floor into a reception area and the top 5 floors into 7 suites and 2 dormitories, respecting and valuing the existing structure and elements, as well as recovering a part of the original decorative elements.

Specifically, and within the scope of the interior design project, the reorganization and spatial qualification (interior compartmentalization) were programmed to maintain the existing high ceilings, furniture, staircases, and fresco paintings. The only deep structural intervention was imposed on the attic, which until now functioned only as a storehouse. This top floor was redefined by adding skylight to guarantee sufficient light to the future room, and by extracting part of the existing roof to make a terrace that aimed to be a chill out point with the view of the city of Coimbra.

The defined program had in its core the recovery of the main staircase that worked as the soul of the building, connecting the 1st to the 5th floor. The connection from the ground floor to the 1st floor was made by an old spiral cast-iron staircase, that did not fulfill the safety requirements in the legislation, and for that reason the intention was to recover it just as a decorative element that preserves its original language, integrating it in the interior design language.

After several meetings of the client and the design team, the final program defined the ground floor as a reception area with a small lounge and a bar open to the public, and a second space that would work as a distribution area with the access to the stairs and elevator. The latter includes a small support kitchen, and works also as a small private lounge for the guests.

The rooms situated on 1st to 5th floor and facing the main façade should be suites with a distinctive language, but without excessive luxury. The rooms facing the interior façade, that overlooks an interior courtyard, were to be transformed: the 1st and 2nd floors into dormitories, with at least 3 single beds; and on the remaining 3rd, 4th, and 5th floor into suites with an informal and relaxed language. Within the scope of the outdoor spaces it was planned to requalify the light vent into a patio, as well as to open the roof of the 6th floor into a terrace.

The general aesthetic approach was to introduce contemporaneity to the existing space, valuing the building's past and respecting its history, identity, and memory.

2. DESIGN AS A MEDIATOR

The "Design Dictionary: Perspectives on Design Terminology"[2] starts the definition of design by stating that it is "impossible to offer a single and authoritative definition". Thus, it is common sense that "design is intrinsic to human behavior" and that it is an "attitude to understand the everyday, to anticipate and react on it"[3]. Alice Rawsthorn explains that every change that humans impose on themselves or on their surroundings is an act of design, but that this is done instinctively[4], indicating that design pre-exists the word (as do most things), and, more importantly, the profession. Victor Papanek reinforces the idea that design is basic to all human activity, from "composing an epic poem" to "baking an apple pie" or "educating a child", adding that it is not only about "conscious [acts but also any] intuitive effort to impose meaningful order"[5]. If design is correlated to the process of how humans yield change, and if humans are evolving cultural beings, the way we perceive and instigate change, and consequently, how we design and understand design is an evolving cultural concept too.

This mindset brought forward the idea that all the stakeholders involved in imposing change onto the existing building should be considered as valid active voices in the design process. Client, contractor, architect, graphic and interior designers were integrated as active elements of the design team, and this generated the need to coordinate and manage both professional and non-professional "change enforcers" into the design process. In this case design can be perceived on different levels: as a professional form giving activity that mediates between matter and form, as a team leader by overseeing the project coordination, and as a facilitator between stakeholders. We consider this approach to be design-led, seeing that it keeps the consumers' expectations and behaviors as the focus guideline for the design team and uses design tools such as Customer Journey Map, Personas and Image Boards to generate a common language and goals.

When problems are very hard to formulate, generate open solutions and need a holistic approach to be tackled, they are normally referred to as "wicked problems"[6]. Cross-functional collaboration teams that grapple these problems by viewing them as something integrated in a complex system instead of something on its own, tend to be more successful and the outcomes generally lead to a more multidimensional approach. To understand the complexity of a "wicked problem", its interacting and intertwined processual events, a system should not be dissected but be given a valid solution, in the same way as a random phrase of a book should not be expected to grasp the whole narrative. The system must be seen as broadly as possible, and in most of the cases the solution resides in the shifting of the system from one state to another.

"Design thinking"[7] is commonly referred to as a creative form of complex problem solving within cross-functional teams where collaboration between many fields of expertise is considered as a key factor. In this context, designers' ability to facilitate and mediate is core to a successful outcome[8]. In this case design facilitates the communication in the ambient where you can find barriers that derive from specific terminologies and language styles and helps to respect personal goals

within a common goal, raised as the main concerns for the designers as project leaders.

Cross-functional collaboration can be approached in many forms, depending on the alternative ways of interaction between disciplines. Multidisciplinarity, transdisciplinarity, and interdisciplinarity are referred to as forms of *knowing*, *acting*, and *thinking*[9]. Multidisciplinarity denotes coming together of different disciplines, while transdisciplinarity refers to deep integration of the different disciplines into one, and interdisciplinarity is considered the term to represent the problem solving through close collaboration between more than one discipline[10].

2.1. The importance of interdisciplinarity?

Paulo Parra[11] mentions that the areas of Human Body Sciences, Natural Sciences, Material Sciences, but also Human Sciences produce knowledge that, crossed with design, allows to build the project culture at the service of humans and their quality of life, in harmony with the environment in which they live. This vision, centered on the sharing of concepts and knowledge, promotes different angles of observation and enhances the quality of the design project, as well as the development of new and different solutions that can promote a multi-experience that is physical/material/tangible but also sensorial/immaterial/intangible.

In the development of interior design it is presented as essential to promote close interactions within the different areas that contribute to the final project, but also, whenever possible, to cross areas that traditionally are not directly related, but that can add creativity and innovation, promoting the project's ability to "tell an unexpected story" and avoiding a common vision of spaces and objects. More specific fields of design compete for this purpose, such as interaction, experience, emotion, and behavior design, that result from different areas of the cognitive sciences, being subsequently reinterpreted under the lens of design and transported to the design ecosystem. In this sense, interdisciplinarity in design can generate new approaches to the existing or future challenges by enhancing divergent thinking. De Bono[12] refers to this strategy as "Lateral Thinking", arguing that creativity and innovation are excellent tools for progress, suggesting the need to look for alternative paths that enhance responses from the obvious methods of thinking. It is in this context that interdisciplinarity moves, giving identity to the project, since it comes from the characteristics, perspectives, territories of knowledge, and experiences of each of the contributory areas that, combined, end up producing a differentiated project vision contributing for "(...) connecting the unconnected in unusual ways (...)"[13].

In this project the intention was to promote this collaborative approach, intersecting personal contributions from each stakeholder into a single unified design proposal, and to see design as a mediator between disciplines as will be described further on in the document.

2.2. Design Tools

The customer journey map – defining and mapping the future customer's experiences – is a core to the success of a business that is dependent on how each customer communicates their personal experiences to others on accommodation-booking digital platforms. This tool proved its importance by building a common mindset for the design team – the guesthouse should offer different experiences for different clients, and the pre-existing pharmacy should be reflected visually and emotionally in each space differently. Furthermore, the rooms were not to be perceived as mere accommodations, but as personalized sleeping prescriptions[14].

Personas - were generated to consolidate the customer journey map (or maps). "Each map should represent a journey specific to a persona"[15], in this case 3 *Personas* were generated based on the cities' tourist's records: 1st - the small groups of young travelers that is city hopping, looking for cultural and social interactions towards intense experiences; 2nd - the romantic couples focused on each other, seizing intimate moments; and 3rd - the globetrotters, traveling alone or in pairs, exploring local cultural peculiarities. For each of these three personas, a Journey Map was planned,

from the moment of their arrival at the guesthouse, passing through their check-in process, and how each room would be attributed to them based on their sleeping habits and/or disorders. Like in a pharmacy, prescriptions are attributed based on one's personal symptoms. Some rooms have calming ambiences and an infusion known for its relaxing properties would be waiting for them, and its smell would invade the room, while others have soothing sounds and placebo sleeping tablets made of candy. Each persona helped to grasp a set of goals, expectations, tasks, and key interactive moments.

Image boards – multimedia mood boards using collages and drawings were created for the design team to define different ambiences for all personas' accommodations, without losing the overall general concepts and aesthetics. Image boards worked as an internal tool that allowed all stakeholders to gain a tangible grasp of the intended design. During the construction process it worked as a visual reminder, keeping focus even when unexpected events occurred. This tool worked also as an element of client engagement, allowing him to actively participate in the decision making beforehand, lowering the possibility of disappointments and last-minute changes[16].

"Open" Double Diamond – for the building that is located in a site considered by the city municipality as historical and cultural interest, the traditional way of approaching a design methodology, where one is guided through a set of steps from challenge to outcome, was not seen as a valid approach. The building itself was an organic element that was still to be fully understood and the project would be under the subjective analysis of the city planning department inspectors. Instead of the traditional one, an open strategy was put in place, where the process leads from challenge to a scenario for possible outcomes, instead of just one fixed. This strategy proved to be beneficial not only because it minimized frustrations (seeing that the project was not focused on a fix goal, but on an array of possibilities), but also gave the design team an opportunity to react to the building's idiosyncrasies. Image boards were useful to build the scenarios and kept changes in context. Keeping the four stages of the Double Diamond methodology – Discover, Define, Develop and Deliver – where Discover and Develop are divergent thinking moments and Define and Deliver are convergent acting moments. In this project, Deliver was also kept as open as possible. The main goal of not converging the Deliver stage to one closed outcome is based on the idea that user feedback will be seen as a tool to constantly update the experiences[17].

2.3. An elastic mindset as a binding tool between actors and contexts

Now, more than ever, the bulk of the material world's "form giving process" is the result of a multidisciplinary collaboration, where design has an important role and is seen as an independent discipline. It contributes to a better understanding of the relation between pre-conceived ideas and a final form.

Design is "mediation between different spheres", that occurs between areas of knowledge, "it is concerned with style and utility, material artifacts and human desires, the realms of the ideological, the political and the economic, [...] it serves the most idealistic and utopian goals and the most negative, destructive impulses of humankind", therefore it can be metaphorically described as "a discursive practice" that results in material and immaterial artifacts that are a metalanguage of human behavior[18]. Being "an expression of purpose[19], when design is "isolated from people and the everyday environment, [...] the designed object becomes a fetish"[20]. The designer, in this sense, is and will always be a coauthor of the material world's form giving process, may it be by dialoging with other areas of expertise, technological apparatus, organic spontaneity or the transcendental.

Keeping an elastic mindset, and by elastic we mean the ability to resume original shape after stretching or compressing, designers can stretch out into different areas of expertise, they can easily empathize with different "Personas" and situations, forecast the material and immaterial implications of a certain decision, and

still keep the ability to compress back into the original brief. In this project, design is positioned as a mediator between different languages of each specific area of expertise by looking for common grounds between them, and by extracting unique points of view into the pre-established aesthetic language. In this situation design acts as a facilitator between the existing building and the client's expectations, by constantly giving a visual dimension (through sketching and rendering) that allowed the client to understand the implications of the different solutions to a given problem. It also replaced a fixed-ended conceptual narrative with an open narrative that helped manage expectations without exceeding the initially set budget.

2.4. Designer as mediator between matter and form

Design, in its traditional role, embodies ideas through matter, "and designed objects are [constantly] redefined through new understandings of the relationship between the material and immaterial aspects of design"[21]. Being a material, "the matter from which a thing is or can be made; [the] physical substance in general, as distinct from mind and spirit"[22], means that the uncovering of new materials or new ways to conform and inform the existing ones, will result in new ways of making things. Design, as Klaus Krippendorff writes in *The Semantic Turn: a new foundation for design advertises*, is not just about making things but fundamentally about "making sense of things, [...] the products of design are to be understandable to their users"[23], thus design is not only required to apply new materials, but is essentially compelled to mediate materials into meaningful comprehensible artifacts.

Going into the origins of the word matter, we arrive at the Latin *mater* (mother)[24], suggesting that matter perceives and "generates" the materials and the forms to come, and that in some sense the (mother) matter itself influences the final form. This idea is an old one, the sculptor Michelangelo Buonarotti stated that "every block of stone has a statue inside it, and it is the task of the sculptor to discover it. I saw the angel in the marble and carved until I set him free"[25]. This sustains the idea that matter influences the outcome even before it exists, this might be through its physical characteristics or through the author's subjective interpretation of what that specific matter wants to be.

"Everything is made from something" and not only does "the material itself convey messages, metaphorical and otherwise, about the objects and their place in a culture" but also is a reflection of sociocultural and economical aspects that drive one material forward in detriment to others[26].

The intervened building was looked upon not as a decaying vessel to be hollowed out, but rather as a baseline for the construction of a narrative that focuses on its ethos by bringing to evidence its intangible qualities. The existing architectural and structural elements were seen as important as the details that remained from its previous functions. The multicompartment furniture with its array of glass jars, the fresco on the ceiling, the spiral cast iron staircase, and the inner courtyards, are examples of elements that are embedded in the story of what the building was and should keep being. Design became a mediator between matter and form. Color and light were the main instruments to translate the existing characteristics into the new program. Blending the new with the old was achieved by focusing or dimming light upon specific details, and also by using blocks of bright colors to overlap the existing pastel ambiance. Some constraints were imposed onto the design team by the city municipalities' planning department inspectors. The cast iron staircase did not fulfill the safety requirements imposed by today's regulations and had to be removed for the municipality to approve its fire escape plan. The staircase, having been identified as a core symbolic and aesthetic element, was not removed physically but rather functionally. With minor interventions, it became a structural element to the new staircase that was built to satisfy the needed requirements. The overlapping staircases are representative of how design combined old and new languages and materials into a new dialect that became the conducting wire that adapted the existing requirements to the new ones.

Humans have a perceptual experience of what matter is, and this perception is limited to a very specific scale and context. One can say that matter is revealed to us through the constant interactions that occur between the matter which defines our physicality and everything else, and that our comprehension of it is limited to our brain's ability to process the information that is sent to it by our senses (our physiological ability to provide data by stimulus)[27]. This also signifies that most matter can be mediated into being perceived in one way or another. In this practical case, we believe that by looking at the raw matter to be worked on empowered the design team to see beyond the building as one functional artifact. Instead it was approached as an amalgam of elements to be emphasized, trivialized, or repurposed as one. The term "amalgam" looks to suit the design approach, seeing that it did not only combine the existing with the new but in this case intertwined both into one single artifact that, somehow, lost their time-related barriers. As it is the case of some fresco paintings that dilute into the new inbuilt ceiling.

3. PROJECT — THE SOPORIFIC GUESTHOUSE

3.1. The Importance of building a narrative in interior design

Sikes and Gale[28]describe human beings as story-telling creatures, who perceive the world and things through the construction of narratives to explain and interpret events both for themselves and for others. In this sense, the narrative takes humans to extrapolate beyond reality, makes them dream or enchant through a universe of ideas, images, visions, offering an alternative path to the "raw" and immediate reality. This imaginative capacity is the quest to tell a story, which gives meaning to the inexplicable, to what does not exist yet, is nothing more than an attempt by man, as Sartre[29] claimed, to create a world that is not of this world.

We must, however, consider that, despite the ethereal character of metaphor and poetics, they decisively influence design of alternative universes, with an impact on human behavior, contributing to the intersection of the dimension of experience, emotion, and behavior with the design.

Regarding the application of the narrative in design, Erickson[30] argues that the stories provide a good first step in what is important, from the users' point of view, allowing the designer to understand their context and, therefore, providing the premises for further exploration. Erlhoff & Marshall[31] identify the open incorporation of the narrative as a characteristic of contemporary interior design, evident in several commercial thematic spaces where it is increasingly common, a fun and less linear approach to the narrative, giving as an example the project of two stores in Akita, Japan, AZB - x-Compiler and x-Assembler - that reference Japanese toys and robots. They also consider that the narratives can be extracted not only from cultural icons but also from the design typologies themselves, such as the Claska Hotel in Tokyo, where the project is based on the cutting of silhouettes of appliances on the walls of the hotel rooms.

In this way, the narrative applies to the design of spaces where language, as Tversky and Lee[32] claim, provides a systematic descriptive structure of the space, conveying its idea. Given that, a space is schematized similarly in language and cognition. In this sense, the power of language itself, as a tool to build the imagined space, should not be underestimated.

According to the aforementioned, it became imperative to design an elastic narrative, that would conceptually guide the project, provide an explanation, and spread a seductive discourse of the options taken, promoting, simultaneously, the involvement of the client. It is from that moment that meaning emerges.

The building is marked by the ground floor space that in recent decades has been a well-known pharmacy in the city, both for its iconic interior with wood furniture and wall covering, and for a richly fresco painted ceiling, that makes an immediate flashback connection to the

history of the space. The exploration of the building, when still vacant, revealed the existence of an array of visual and material references abandoned by the former owners, such as pharmaceutical labeled bottles, compendiums, or different instruments for medicine making. Realizing the potential of this material, the design team decided that it should be incorporated into the project's narrative (fig. 2).

Figure 2. Pharmaceutical labeled bottles. Aleksandra Kosztyla, Coimbra, 2020.

In this way the space, which exuded identity and memory, led to the exploration of the pharmaceutical imagery of ancient recipes, the meticulous manipulation of substances, their colors and shapes, or the use of the ancestral knowledge related to the natural substances. It was intended to preserve the history of the place in a dialogue with the language and the design requirements that, in essence, are linked to the pharmacological universe of substances of well-being, rest or relaxation.

3.2. Phase 1 – Project narrative

This phase of interaction with the client corresponded to the presentation of the proposed narrative for the development of the project that would fuse the client's imagination and bring together the ideas and premises of the future works, justifying the design options throughout the process. The basis for the construction of the narrative was the need to urgently give a homogeneous meaning to the interventions that would be necessary to carry out on all 6 floors, offering rhythm, dynamics, and diversity on each floor, but that simultaneously would found points of contact between all, to offer a coherent final result (fig. 3).

With the aim of emphasizing the pharmaceutical history of the building, and taking this as a starting point, we worked keeping in mind that those who arrive (clients) want to relax and have comfort to sleep. Flowers with soporific properties, such as poppy, bell, hops, valerian, and chamomile, were defined in each floor as an conceptual image reference that would "induce sleep". Meanwhile it was defined that the common areas of each floor would be neutral, the predominant colors of each soporific plant would provide the chromatic reference for the rooms, as well as offer numerous visual options for its decorative elements (furniture, textiles, coverings, graphic compositions). They also showed potential to contribute to the definition of the elements that would inhabit each room, since the project goal is to potentiate experiences of the clients, contributing to the development of the sensory aspects of each room (soaps, sweets, flowers, etc.) (fig. 4).

With regard to the design for the experience, authors like Bill Buxton[33] or Paola Antonelli[34] consider that nowadays more and more experiences are designed, and not mere products or spaces. Nathan Shedroff referred in 2001[35], and it remains true today, that the discipline of design of experiences is so new that its own definition is in flux and can encompass traditional and established disciplines as diverse as theater, storytelling, interior design, architecture, among others. Clarifying the concept, Shedroff[36] defines experience

Figure 3. Floor plans.

Figure 4. Diagram with soporific plants, colors and room name´s.

design as an approach oriented to the creation of successful experiences, and not about mediation of the environment, which includes analysis and design in the three spatial dimensions: time, five common senses and interactivity, to which the value for the client, the personal meaning and the emotional context are added.

In this project, the previously referred customer journey map offers triggers to help create new experiences, introduces costumer to the guesthouse narrative, and tries to build an individual experience, since we all feel, hear, and interpret differently.

In order to differentiate the rooms, names were given, inspired by the different types of medication (effervescent, elixir, capsule, s yrup, powder, extract, emulsion, lotion, and tincture), which should "work" in an abstract way (vapors, drops, bubbles, dust, etc.), being free of the evident visual and chromatic references, to leave space for the soporific substances to work.

3.3. Phase 2 – Project's book

From the beginning the objective of this project was to value the building and existing decorative elements and to preserve its original design, thus contributing to the appreciation of the. In that thought, the existing flooring in oak and handrails were recovered after the necessary treatments. The existing header, as well as the original footer, were also maintained, after the appropriate restoration.

The second phase corresponded to the materialization of the initial ideas proposed in the narrative and the consequent functional, technical, aesthetic, and decorative decision-making (fig. 5).

Ground Floor

We intentionally kept the interior of the first ground floor space (reception and lounge-bar) intact by adding only counters in the window areas facing the street, so you can contemplate the dynamics of the downtown while waiting or having a quick drink (fig. 6).

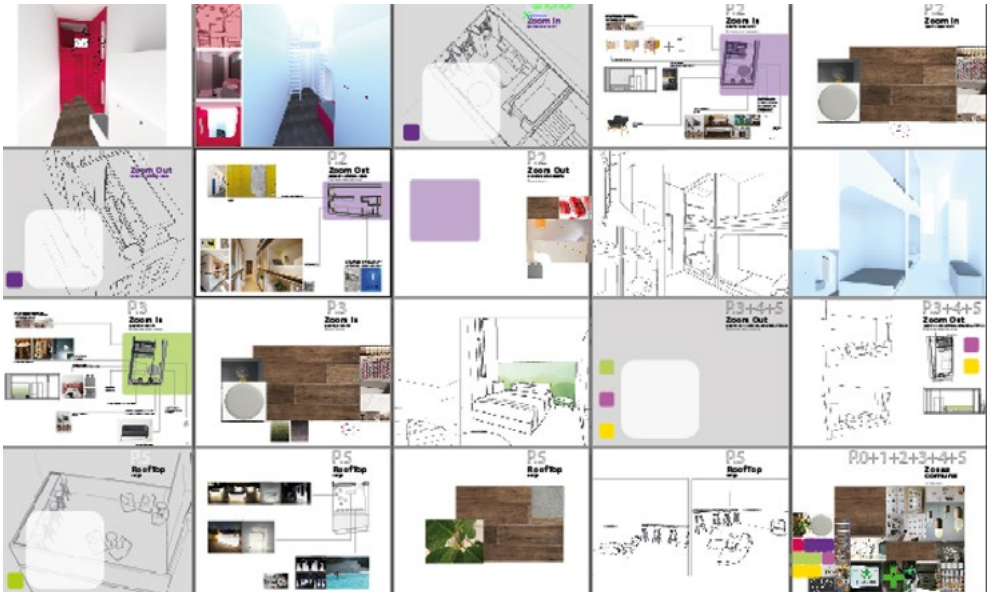

Figure 5. Part of project book.

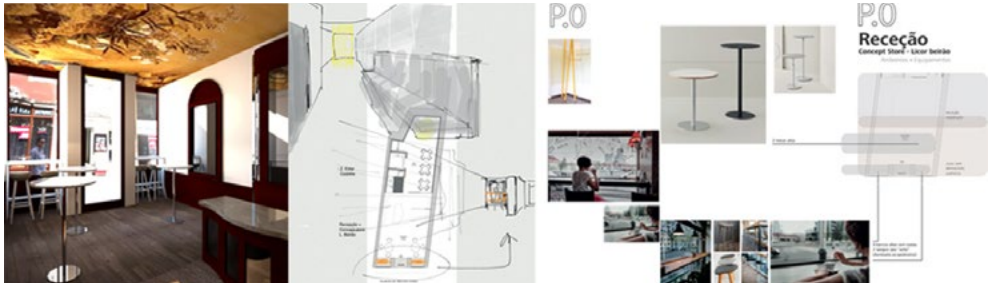

Figure 6. Studies for the Ground floor.

Figure 7. Studies for the Ground floor.

The second area provides access to the stairs and elevator and includes a small lounge with a kitchen hidden behind a wooden slat. It was decided to introduce vertical elements, lacquered in white, to enhance the wall that supports the new stairway to the 1st floor, also functioning as indirect lighting of the space, eliminating the need of any suspension lamp (fig. 7).

From the design perspective, the ground floor had 3 elements that were the soul of the space and that had to be maintained and enhanced: the fresco ceiling, the entrance furniture, and the iron spiral staircase.

The ceiling of the ground floor is covered with the fresco paintings that represent motifs alluding to the medicine, composed of 2 female figures (goddess Minerva), floral decorative elements, and other elements such as utensils used to produce drugs. Originally painted with oil paint, now it was restored with acrylic, and became the main and iconic element of the entrance space.

The furniture, of the same age as the building, was restored and electrified inside the glass doors and on the countertop to continue to function as an exhibition window and to provide ambient lighting (fig. 8).

Figure 8. Fresco paintings on the ceiling and restauration of the fresco paintings. Estudioama, Coimbra, 2020.

The design often had the function of questioning the most immediate solutions and challenging all the parts involved in the project in the search for less obvious and "instant" ones, which happened in the case of the spiral staircase that provides the access to the 1st floor. Contrary to what was originally planned, for technical reasons, this staircase was to be disassembled and placed as a decorative element in the interior patio. As a way to preserve the memory of the space and its aesthetic quality, the design team proposed to keep it in its original location and design a new staircase that, overlapping it, leaves both stair cases to cohabitate, promoting the idea of continuity between the old and the new and guaranteeing functionality (fig. 9).

Metaphor in the metaphor: ZOOM IN and ZOOM OUT
In addition to the proposed narrative, two differentiating moments were defined, aiming to find distinguishing points for two rooms on each floor (rooms facing the main street and rooms facing the interior courtyard) (fig. 10).

The rooms facing the main street were associated with the concept of Zoom In, which was intended to be more sensorial and detailed, offering an intimate and refined environment, with the premise of working with enlarged and detailed images, in the sense of the "maximal" language where light and transparencies play an essential role. In this situation colour was used in solid blocks reinforcing the idea that you zoomed in too much to see in detail.

The headboard in MDF with upholstery tends to suggest the idea of the molecular structure of the soporific pharmaceutical substances (fig. 11).

Zoom Out was the concept associated with the rooms facing the interior courtyard, which consisted in adopting simple and stylized language, trying to keep the intervention at an essential level, simplifying the shapes, working with shades, hues and tons of the color that could be dematerialized, creating more informal and relaxed atmosphere (fig. 12).

Figure 9. Spiral cast-iron staircase and new overlapping staircase. Estudioama, Coimbra, 2020.

Figure 10. Detail of the moodboards.

Figure 11. Zoom In room (1st floor).

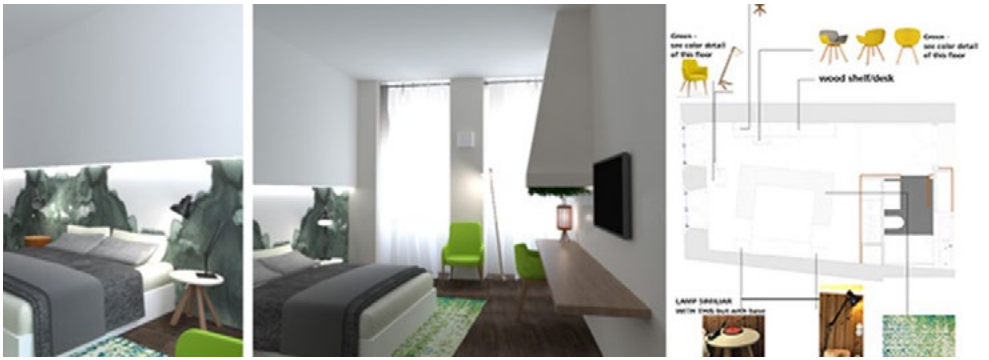

Figure 12. Zoom Out room (3st floor).

Figure 13. Studies to adapt pharmaceutical Bottle into bedside table lamp.

In the bedrooms, as a way to reinforce the created narrative, existing bottles from the old pharmacy were used to develop bedside table lamps (fig. 13).

Bunk bed

As a way to optimize two rooms (on the 1st and 2nd floor, facing the inner courtyard) that did not have enough space to be suites, the design team decided to make them into shared rooms with bunk beds, seeking to expand the notion of space through blocks of color associated with the soporific plants' palette (fig. 14).

The terrace

In this area the intervention was minimal, consisting in creating a suspended wooden balcony facing the river and the city (fig. 15).

Figure 14. Bunk bed studies (1st and 2st floor´s).

Figure 15. Roof top terrace. Estudioama, Coimbra, 2020.

Project Overview

The following images (Fig. 16) depict some effective achievements of the project so far.

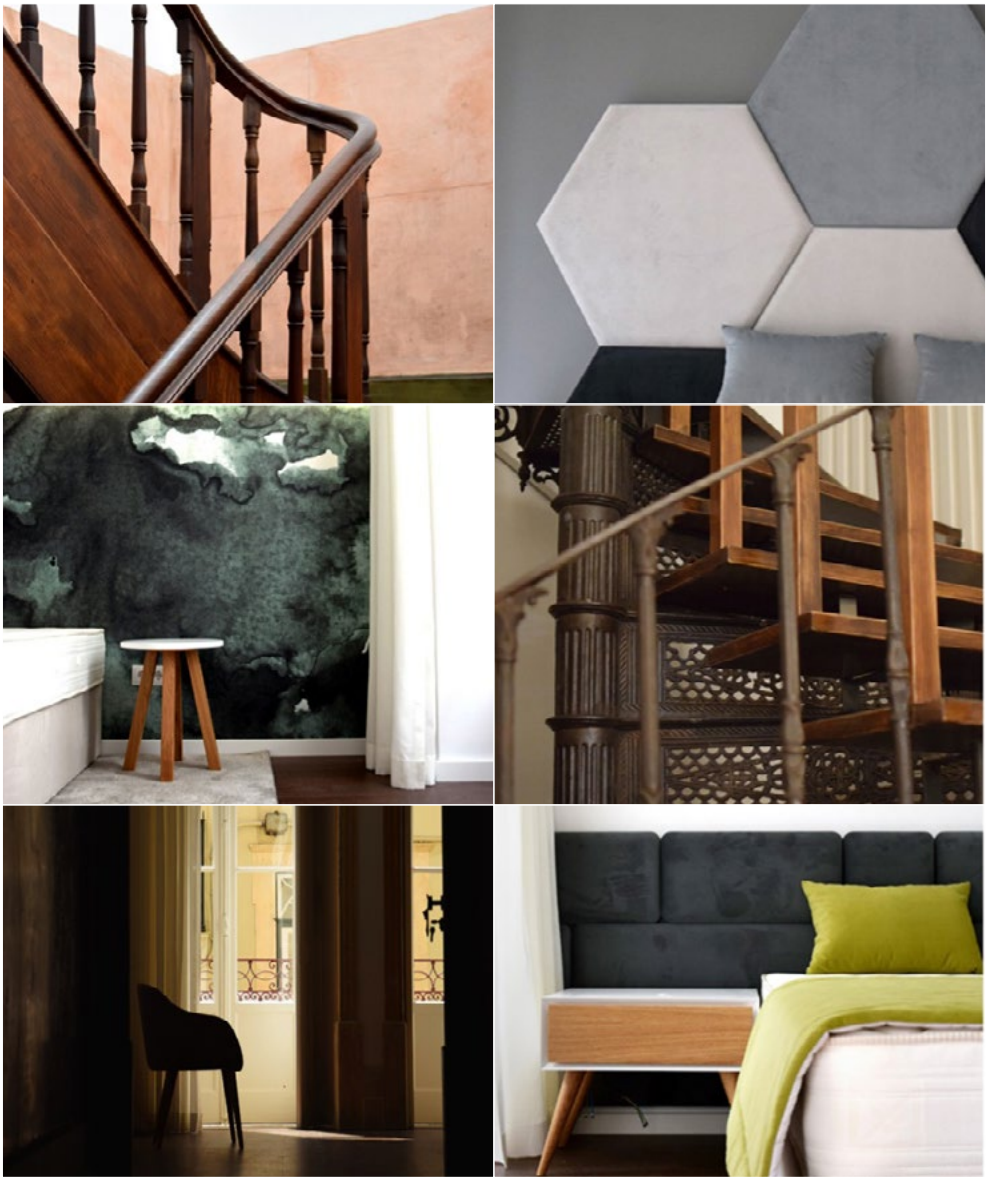

Figure 16. Photos of details of the Guesthouse (still under construction). Aleksandra Kosztyla, Coimbra, 2020.

4. CONCLUSION

The displayed interior design project entitled *The Soporific Guesthouse* is close to completion and will be open to the public soon. We believe that the outcome is a result of the design-led approach that was adopted by the cross-disciplinary design team involved in the process. The design was present throughout all the stages of development of this project, from the definition of the program to the final details of brand identity. This strategy is seen as the main responsible for keeping a homogeneous design language and managing personal expectations of each one involved. It is to stress that design as a problem-solver works as a binder and mediator between all factors.

After the team defined the objectives and generated a guideline narrative, personal interests were analyzed and mediated into the common language through the process. Considering this, we underline the example of intertwining the old and the new staircases into a single artifact that combined functional and aesthetic expectations of each part of the team. The presented design tools defined the procedural approach to the project, and guaranteed that all stakeholders' expectations were safeguarded, and that the key premises were not lost when stumbling into non-perceived aspects of the building.

This article intended to emphasize the importance of the designer's elastic mindset as a binding tool between actors and contexts, valuating different enriching personal contributions and use them as the elements of an integrative whole. We consider that, in this context, the design team not only had the role of the form-giver but also became the mediator between matter and form, the team leader, and the forecaster of the user's emotional experiences. In effect, in a project that is an amalgam of renovation and repurposing and that is rich in historical, decorative, and emotional attributes, metaphors work as storytellers and generate a conversation between spaces and people, resulting in strong emotional experiences. Finally, we underline the importance of generating strong narratives with open outcomes as a core tool in obtaining a common goal that considers the contributions of all stakeholders.

The designer, with a holistic oversight of the project, offers unique advantages when becoming a project leader.

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7 ADDITIVE MANUFACTURING ARTEFACTS: AN EVALUATION MATRIX PROPOSAL

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ABSTRACT

Additive Manufacturing (AM) is changing the way products are designed and manufactured. Evolving from a rapid prototyping tool to an end-use product manufacturing process, AM releases designers from the constraints of the traditional manufacturing processes, offering to product design new opportunities and strategies for innovation. AM improvements have led to a growing awareness about the potential of additive processes, challenging design to exploit an open space of infinite possibilities, and moving it towards an emergent aesthetic and functional language. However, academic studies about the impact and contributions of AM technologies to design field are still scarce. This paper presents a potential contribution by proposing an evaluation matrix to assess AM features on final artefacts aiming to make explicit the knowledge embodied into the products, providing useful information for designers who wants to design AM functional products. The matrix presented in this paper pretends to contribute foundational knowledge about AM potential, aiming to increase AM knowledge through AM artefacts.

Keywords: Additive Manufacturing, Product Design, Phenomenology, Artefacts' Embodied Knowledge, Product Evaluation Matrix

1. INTRODUCTION

In contrast to conventional subtractive processes, additive manufacturing (AM), also known commonly as 3D-printing, is a manufacturing process able to produce a three-dimensional real physical object from a digital model, through the deposition of material, usually layer by layer, in a build-up system, enabling complex geometries to be produced (Gao et al., 2015). Largely used as a rapid prototyping tool to produce models in different stages of a product design process, in the last three decades AM technologies has been evolving to an end-use product manufacturing process (Yang, Tang, & Zhao, 2015) manufacturing

constraints have been largely alleviated and design freedom for part consolidation is extremely broadened. AM enabled part consolidation method promises a more effective way to achieve part count reduction and the ease of assembly compared with traditional Design for Manufacture and Assembly. The paradigm shift is the result of several AM developments such as the increasing material quality, the decreasing cost, surface finish improvements, higher speed production, among others.

The capability to print end-use functional products, provide to designers many opportunities and strategies for innovation in product design (Hague, 2006). By overcoming some of the constrains imposed by conventional processes, AM creates new possibilities like customization, shape complexity, integral assembly, design freedom, enclosed lattices, opening to design an almost unlimited space for creativity, leading to the emergence of products with new aesthetic and functional languages. With AM technologies comes the challenge of designing for a new manufacturing process, which may require more skills, but certainly requiring "break out of the conceptual barriers created by conventional fabrication techniques." (Seepersad, 2014, p. 10).

Often stated in literature, AM potential for product design is creating new possibilities and opportunities for designers to explore unique and innovative design ideas. However, to make the most of the potential of AM techniques and to achieve design freedom with AM, designers have to adapt their approach for these technologies and that "requires either an adaptation of current design practices or new design paradigms." (Sossou, Demoly, Montavon, & Gomes, 2018, p. 3).

The current lack of knowledge of designers about AM subject was recently pointed out by Spallek & Krause (2018) based on an online survey to assess the AM knowledge of 172 designers. The study reveals that the more expert designers were about AM technologies, "the more confident they felt about making decisions on final part productions with AM, and the more definite they stated their intention of fabricating final parts with AM in the next years" (p. 357). Therefore, it becomes crucial for designer's activity the development of Designing for Additive Manufacturing (DfAM) tools as well as accessible and explicit knowledge about AM technologies.

2. CONTEXT

Considering that "design knowledge resides in products themselves: in the forms and materials and finishes which embody design attributes" (Cross, 2006, p.101), the analysis of the shape and configuration of the resulting AM artefacts should contribute to understand AM phenomenological consequences on design. Though, to be relevant for the research context, artefacts must be analysed, interpreted and framed in a theoretical context (Mäkelä, 2007, p. 157). To that end, an evaluation matrix was developed, to guide the analysis of artefacts produced by AM.

The proposed matrix is an analysis tool developed within an ongoing research project (Félix, Dias, & Clemente, 2017) aiming to collect empirical data from designers' experience with AM technologies through their design practice. The main research project intends to explore design possibilities allowed by AM and, at the same time, to understand if and how designers practice and thinking should adapt to the AM technology. Thus, AM implications on design practice are being evaluated according the three categories proposed by Cross (2006): praxeology, epistemology and phenomenology. The evaluation matrix here presented was developed within the phenomenological 'component' of the project, which aims to explore the implicit knowledge embodied into the artefacts.

3. AM PRODUCTS' EVALUATION MATRIX

3.1 Unique capabilities of AM

Starting from the AM advantages reported on technical literature, but mainly relying on the role of the

artefacts in the process of producing knowledge, this matrix is expected to help to identify phenomenological directions, as well as to contribute with accessible, explicit and communicable knowledge that can help designers in decision-taking on DfAM approaches for final products. The matrix was designed to relate artefacts' attributes with AM criteria including opportunities to design such as: integrate functionality, complex geometric shapes, lightweight structures and mass customization.

The opportunities enabled by AM capabilities were grouped in four categories (Gibson, Rosen, & Stucker, 2010):

- Shape complexity: is the ability to produce complex shape geometry, due to the layer-by-layer construction process, not possible with conventional manufacturing techniques.
- Hierarchical complexity: relates to the features that allow design freedom, with complex shapes across internal structure to fill product parts with cellular structures, as honeycombs or lattices designs easily manufactured with AM.
- Functional complexity: is the possibility to produce functional mechanisms because AM enables functional integration of parts in one build, reducing assembly costs and minimizing the number of parts.
- Material complexity: depending on the AM process, material deposition can be varied throughout in different locations of a single product allowing multi-material parts with different properties.

Thus, the opportunities for designers to innovate are real, because "AM is changing not only the way we make things, but also the types of things we make." (Seepersad, 2014, p. 10) To take advantage of these AM opportunities, designers need to "maximise product performance through the synthesis of shapes, sizes, hierarchical structures and material composition, subject to the capabilities of AM technologies" (Rosen, 2014, p. 225) and create original AM concepts or end-use AM products whose features are innovative, but also realistic and valuable.

3.2 Designing the evaluation matrix

The presented matrix is based on the concept of "product evaluation matrix", a research tool usually applied in design projects to evaluate a number of conceptual design proposals by crossing them with defined user-requirements and aiming to support the selection of the most suitable concept(s) for further developments (Milton & Rodgers, 2013).

Starting with the above mentioned unique AM capabilities, the proposed matrix (Table 1) shows how that capabilities are revealed on AM product attributes and the consequent opportunities to design. AM product features and their opportunities to design were identified using data collected from literature review about DfAM, including works from Yang and Zhao (2015), Gao et al. (2015), and Thompson et al. (2016). Information about advantages, trends, opportunities, considerations and constraints of AM technologies in producing complex geometries, customised geometry, multi-functional products and lightweight structures was considered. After that, gathered information was analysed and then categorized, according to the four AM unique capabilities.

On the proposed matrix, six AM product features were considered: (1) Functional integration contribute to product design, for example, reducing costs on parts assembling or the possibility to embed electronic components during the manufacture process, (2) Design freedom, that can be explored, for example, using biomimetic inspiration, resulting in new functionalities inspired by nature; (3) Low-volume production to respond to market needs like personalization, lots 'size of one' with customized geometries that increase customer satisfaction; (4) Lattice structures to take advantages of internal geometries that improve product performance and reduce waste material; (5) Topological optimization tools that can be used to simulate structures with complex shapes which exactly meet the mechanical constraints while requiring as little material as possible; (6) Multi-material to produce a functional end-use product with different properties and performance and reduce the number of parts to assemble.

AM artefacts were evaluated considering their AM features and opportunities to design criteria using a Linkert scale from 1–5, where 1 (one) represents low efficient use and 5 (five) high efficient use.

3.3 Testing the matrix: Pilot test

Aiming to validate the proposed matrix, a pilot test was performed. Matrix strengths and fragilities were discussed on a focus group session with two AM specialists, one Material Engineering researcher with a background in Product Design and the other, a Professor and Researcher in Mechanical Engineering. Participants were selected because of their experience, namely their participation in several research projects based on AM technologies using different materials including polymers, metals, ceramics and composites. Both participants also have significant experience on evaluating students' concepts within Product Design courses.

The pilot test consisted on a focus group session aiming the analysis of two artefacts, designed for AM: the Coralight lamp from Helder L. Santos (figure 1) which four stereolithographic (STL) files and assembly instructions were downloaded from http://www.eumakers.com/it/coralight-lampada-da-tavolo-898.html; and the 3D-printed connector piece (figure 2), part of a custom furniture system using 3D printed connectors and standard pieces, resulting from an academic project of two 2nd year Design students.

The first artefact (130 mm x 130 mm x 190 mm) was printed by Fused Filament Fabrication (FFF), a technique using a one head domestic printer from WITBOX, with DIN-A4 (210 x 297 mm) print volume and a height of up to 20 cm, in a thermoplastic polylactic acid (PLA) filament color metallic green, respecting the settings 0% infill and 1.2 mm of shell thickness, recommended by the designer.

FFF is the most common and accessible material extrusion technology, where the filament in loaded and fed through an extrusion head. The printer moves the extrusion head around, depositing the melted material through a heated printer small nozzle in a precise location, building up layer-by-layer. When the

Figure 1. Coralight lamp from Helder L. Santos (© authors).

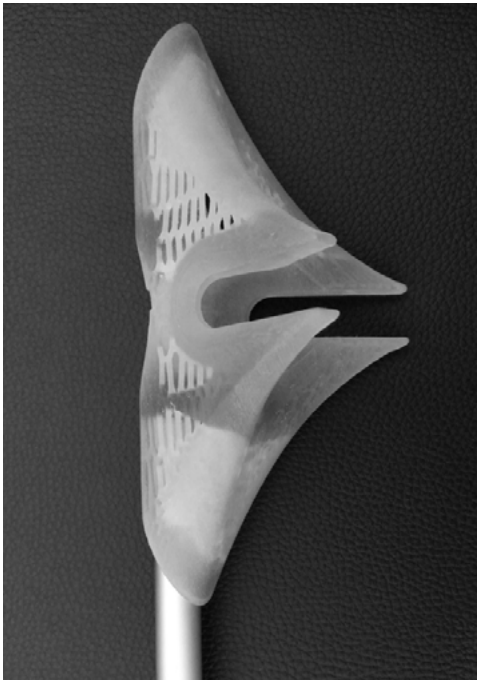

Figure 2. 3D-printed connector part by 2nd year Design students Miguel Alves and Cristóvão Fernandes (@authors).

AM unique capabilities	AM product features (phenomenological approach)	Opportunities to design	Product(s) 01, 02, ...
Functional Complexity	Functional integration	Integrate functionality	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		No assembly need	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Less assembly time	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Embedded components	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Simplifying supply chains	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Minimize the number of parts	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Operational mechanisms	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
Shape complexity	Low-volume production	Customization	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Marketing needs (personalization)	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Customer satisfaction	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Mass customization	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Uniqueness	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
	Design freedom	Biomimetic inspiration	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Explore innovative forms	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Impossible geometries	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		New aesthetic language	○ 1 ○ 2 ○ 3 ○ 4 ○ 5
		Creative surfaces	○ 1 ○ 2 ○ 3 ○ 4 ○ 5

AM unique capabilities	AM product features (phenomenological approach)	Opportunities to design	Product(s) 01, 02, ...				
Hierarchical complexity	Lattice structures	Lightweight structures	○ 1	○ 2	○ 3	○ 4	○ 5
		Improve aesthetics	○ 1	○ 2	○ 3	○ 4	○ 5
		Less material waste	○ 1	○ 2	○ 3	○ 4	○ 5
		Multifunctional design	○ 1	○ 2	○ 3	○ 4	○ 5
		Good energy absorption	○ 1	○ 2	○ 3	○ 4	○ 5
		Improve manufacturability	○ 1	○ 2	○ 3	○ 4	○ 5
	Topological optimization	Less material	○ 1	○ 2	○ 3	○ 4	○ 5
		Less costs	○ 1	○ 2	○ 3	○ 4	○ 5
		Optimized material deposition	○ 1	○ 2	○ 3	○ 4	○ 5
		Change the micro/meso/ macrostructure	○ 1	○ 2	○ 3	○ 4	○ 5
		Improve a specific performance	○ 1	○ 2	○ 3	○ 4	○ 5
Material complexity	Multi-material	No-assembly	○ 1	○ 2	○ 3	○ 4	○ 5
		Functional integration	○ 1	○ 2	○ 3	○ 4	○ 5
		No post-production need	○ 1	○ 2	○ 3	○ 4	○ 5
		Customer satisfaction	○ 1	○ 2	○ 3	○ 4	○ 5
		New surface finishes/ textures	○ 1	○ 2	○ 3	○ 4	○ 5

Table 1. First proposed matrix discussed at focus group with AM specialists

PLA material cools down, it solidifies. The table lamp was chosen from the Helder L. Santos online portfolio. According to the lamp author, the product is optimized for FFF technology in the sense that it doesn't require support material, which means no material waste and the elimination of the contact point of the support material, resulting on a better surface finish. It should be noticed that some aesthetic options, taken by the designer during the product design process, like the zigzag texture on the surface enable to mask the layer's effect, distinctive of this AM technology.

The second artefact (95 mm x 190 mm x 120 mm) was printed by Material Jetting technology, using a Stratasys Object EDEN 260VS with a build size of 255 x 252 x 200 mm, a professional printer that allows dimensionally accurate forms. In this AM technology, all parts are printed in two different materials; one for the main build material and the second as dissolvable support easily removed with water. Printed in a unique material, rigid translucent acrylic resin, the AM-printed part of the furniture system has the appearance of a final product and performs its function of assembling standard wooden or metal parts. Inspired by the cobwebs, this product explores the design freedom allowed by Multijet AM technology. Students decided to switch to that technology after having problems with the FFF technology available, because of the complex geometry and its final appearance.

The focus group, for which a script (in the form of a semi-structured interview) was prepared, intended to find out the participant's opinion about the effectiveness of the proposed evaluation matrix and ask for suggestions to improvement. Immediately after the interview, each participant was asked to individually fill out the evaluation matrix, regarding the two artefacts under appreciation.

To collect their perceptions during the completion of the evaluation matrix, participants were requested to think-aloud and expose their considerations. The focus group lasted about one hour, was audio recorded and fully transcribed and subsequently analysed through idiographic content analysis.

4. MATRIX REDESIGN

After analysing both artefacts, the AM specialists easily identified the AM technology by which they were manufactured and the corresponding material, emphasising that "the product' shape is always constrained by the AM technology and material limitations". For that reason, the evaluation of items such as "Design freedom", "Minimize the number of parts" or "Embedded components" is strongly dependent of the AM technology itself, as well as the equipment model and printing materials.

Due to the very different nature of the two products compared, as well as the particular characteristics of the two technologies by which each one was produced, the main output of the pilot test resulted from the difficulties experienced by the participants themselves when filling in the matrix.

The participants suggested that some items, for example, "No assembly need" and "Less assembly time" were difficult to quantify through a numerical scale, a suggestion that was considered later, on the matrix redesign.

In the "Opportunities to design" column, the participants showed some hesitation when answering to some items, like "Operational mechanisms" and "Customer satisfaction" having the need to ask directly to the researcher to clarify. This fact led us to the conclusion that some items were not clear enough even to AM specialists. When redesigning the matrix, additional information, mainly in the form of schemes and images, should be included.

Another result was the indication to evaluate "Customer satisfaction" separately from the technical issues and divided in subcategories of satisfaction measures related to the products functionality.

Doubts were raised about the division of "Hierarchical complexity" in two items ("Lattice structures" and "Topological optimization") because they are related

and intertwined. For this separation to make sense, there was the need to modify "Lattice structures" to "Lattice structures (aesthetics)", to clarify that it refers only to an aesthetical option, while "Topological optimization" was substituted by "Topological optimization (mechanical properties)", to indicate structures specifically designed to improve part's mechanical performance.

5. CONCLUSION AND FUTURE WORK

In order to effectively design high quality products for AM, designers need a reasonable understanding of AM various processes, benefits and limitations. The proposed matrix pretends to provide a systematic and structured tool to explore AM artefacts' embodied knowledge. Being one of the first published product evaluation matrix specifically designed to AM artefacts, it represents one further step in the development of design methods and tools to fully embrace unique AM capabilities.

Research about AM impact on Design still in its infancy and there is a wide range of challenges that designers and design researchers still need to be overcome, to take advantage of the full potential of this disruptive manufacturing technologies.

An improved version of the proposed matrix is now being applied in our ongoing research project to evaluate a set of concepts for AM artefacts developed by a group of 2nd year design students. From that point, data about students' practices and thought during concept development that were also collected, will be analysed taking our main research project from its phenomenological component to the ones of praxeology and epistemology.

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8 DIGITAL SKETCHING TO IMPROVE SKETCHING PRACTICE IN DESIGN HIGHER EDUCATION

ABSTRACT

Sketching is one of the most important visual thinking tools used by designers. During the creative process, designers use sketching as a communication tool, revealing thoughts, externalising concepts, and exposing ideas. In higher education, sketching is highlighted as a fundamental subject in design courses. Problem-solving skills, spatial abilities, and creative thinking are expected of students and these competencies can improve by exercising sketching. In contrast, there is a growing inhibition and reluctance of design students to engage in sketching during the ideation and concept phases, impacting the quality of the design outcomes. The current generation of design students have become digital natives with a natural tendency to use any and all technologies available to them. Digital sketching with the use of drawing tablets and ultra-sensitive stylus pens is emerging as an alternative for professionals to traditional sketching techniques and thus should be considered as well for higher level design education. The aim of this paper is to be a research starting point. It is based on the premise that technology can reduce students' reluctance to rely on sketching during the design process, encouraging its practice through digital sketching interfaces and subsequently leading to more creative resulting designs. Further studies are required to understand how digital sketching can be applied as a learning methodology to empower students in sketching and enable them to take advantage of these technologies.

Keywords: design education, digital sketching, sketching inibitions, thinking tool

1. INTRODUCTION

Can drawing tablets and ultra-sensitive stylus pens encourage reluctant design students to adopting sketching as a faster means to communication design ideas? Recent studies noted that design students are unwilling to use freehand sketching as a communication and thinking tool (Booth, Taborda, Ramani, & Reid, 2016; Hilton et al., 2017; Thurlow & Ford, 2017; Thurlow, Ford, & Hudson, 2019). Sketch inhibition and design students' reluctance to engage in sketching are increasing phenomena observed in higher education (Booth et al., 2016; Thurlow et al., 2019) with effects on the quality of the design outcomes. Through observation of studio-based teaching sessions, design educators alluded that students avoid putting ideas and thoughts onto paper, feel uncomfortable with the collaborative ideation phase and prefer to immediately start building solutions with CAD (Computer-Aided Design) software to quickly get to a final design. Booth, Taborda, Ramani, & Reid (2016) indicate in their paper that "perhaps due to the lack of sketch training, CAD is being used earlier in the design process" (p. 2), highlighting the correlation between these two realities.

Rather than putting ideas onto paper, students use persuasive computer-generated visuals, like shiny and realistic rendered images, to provide potential solutions that may visually look correct but are in most cases founded on ill-defined arguments supported by cognitive bias. In consequence, they are developing skills on the use of these software tools rather than stimulating and encouraging creativity and ideation as a means to achieve innovative solutions. This inappropriate use shows that students know the tools they have at their disposal but do not understand the purpose of using each one (Thurlow & Ford, 2017).

Sketching is possibly the most relevant visual thinking tool used by designers during the creative process. Designers use sketches to exteriorise thoughts (Hilton et al., 2016) to quickly visualise, ideate, develop and communicate concepts and product ideas to the design team and client (Kwon, Camba, & Kimbrough, 2018). The quality and novelty of ideas increases because a sketch is "disposable, rapid, vague, subject to reinterpretation, and includes only enough information to communicate an idea" (Booth et al., 2016, p. 1) and to construct a visual understanding (Martin-Erro, Dominguez Somonte, & Espinosa Escudero, 2016). Despite the recognised value as a powerful visual thinking tool, "the sketching of ideas is becoming an increasingly rare sight in many university design studios" (Thurlow & Ford, 2017, p. 3). It seems that this personal, immediate and reflective tool for designers, highlighted as an essential part of the design process (Hilton et al., 2016), is struggling for its existence (Thurlow & Ford, 2017).

In recent years, digital sketching emerges as an alternative to paper-based techniques, and designers start to replace the traditional pencil on paper with a pen on a touch screen. Digital sketching experiences using digital sketching tablets with pen-based inputs, commonly known as drawing tablets, have become trendy, and their use has spread across a range of design disciplines (Ranscombe & Bissett-Johnson, 2016). This paper aims to emphasise the value and importance of sketching for design students in higher education and the causal factors that lead to its dismissal. This paper also recommends that design courses in higher education should use drawing tablets to improve design students' sketching skills and become better prepared for industry demands. Studies comparing digital sketching to traditional paper-based techniques expose the usefulness to include digital sketching tools in design curricula, particularly in the area of industrial design.

2. WHY SKETCHING?

Meyer & Norman (2020) mention in "Changing Design Education for the 21st Century" that sketching is a particularly unique skill for designers to inform about their work. Designers can use sketching both as a means of thinking and to communicate ideas to others. Thinking by sketching and using drawings to communicate is one of the movements of the creative design pro-

cess. Sketching can help designers to think differently and promotes constructive discussions with other designers and clients. Cross (2001) suggests that sketches made during early design stages (generation and exploration) are not to communicate ideas, but to assist design cognition, as a "thinking aloud" process.

Early sketches are of low artistic quality. They don't need to represent reality with fidelity. They need to contain enough information to promote critical thinking and alternative idea generation (Schütze, Sachse, & Römer, 2003). The process needs to be "fluent and uninterrupted" (Goldschmidt, 2017, p. 82). Sketching is an essential activity attached to design that given the properties of our cognitive system, has advantages in the early design ideation phase, generative form exploration, and experimentation to generate innovative solutions (Goldschmidt, 2017). Along with the designer's cognitive activities, sketches work like a snapshot in time of the designer's creative process, which becomes visible to others in a sketch representation (Schütze et al., 2003).

Bilda, Gero, & Purcel (2006) highlighted the importance of sketching to design students in learning how to design and how it contributes to design project evolution, "while design students learn how to sketch, they are also learning how to develop ideas, such as starting with one design proposal and developing it into another one. Thus, students learn how to progress their ideas through sketching" (p. 609). During the ideation phase, sketching allows designers to quickly generate a more significant number of ideas, something that is essential in the ideation phase to create innovative ideas. Initial sketching properties like "speed of production, (...) tolerance to ambiguity, inaccuracy, and incompletion" and "transformability and reversibility" (Goldschmidt, 2017, p. 82) can be advantages in the idea generation phase. An exploratory and creative mindset is required to generate a more significant number of ideas quickly, and not being in a hurry to reach the final solution encourages further experimentation throughout the creative process. These minimal and spontaneous representations allow the designer to concentrate on idea exploration preventing a premature commitment to the solution.

The importance and value of sketching as part of the design process has been extensively debated. In literature, several studies refer to sketching as a creative thinking tool underlining the importance of drawing in tackling design-problem tasks (Martin-Erro, Dominguez Somonte, & Espinosa Escudero, 2016), improving spatial visualisation skills to concept generation process (Hilton et al., 2017) and fostering creative thinking.

Studies questioning both students and educators recognise the importance of including sketching as a tool to help with design tasks to solve design problems (Martin-Erro et al., 2016). Sketching for design is not the same as sketching for fine art practice. It's not an artefact activity but is one of process, supporting the designer's cognitive activities (Thurlow & Ford, 2017).

In the last few years, design educators stated that design students struggle with the creative process and reveal difficulties understanding sketching as a thinking tool that makes the project evolve to an innovative solution, "they use sketching to visualise ideas, yet many do not know how to use it as a thinking tool" (Leblanc, 2015, p. 606). Besides, to understand the benefits of sketching, they also need to feel comfortable with it. The lack of acknowledgement of sketching as cognitive support to ideation and the inhibition to perform sketching have led to its disregard.

3. DESIGN STUDENTS' SKETCHING INHIBITION

Extensive research in design education underlines the value and importance of sketching. Unfortunately, today's design students are not sketching as a regular part of their design process, avoiding their engagement with it, especially those that do not have good sketching skills or don't feel comfortable with it. This inhibition is a complex behavioural phenomenon with causal

factors described already in literature (Booth, Taborda, Ramani, & Reid, 2016; Thurlow, Ford, & Hudson, 2019).

Booth et al. (2016) identify several inhibition factors during the design process that can be "correlated with lower creative output" and are "undesirable when generating concepts" (p.3). These can be categorized in three distinctive areas: individual, social and technological (Thurlow et al., 2019).

The first area of inhibition pertains to the individual:

- intellectual inhibition, or a lack of awareness of the benefit of sketching to the design process;
- skill-set inhibition, the lack of expertise needed to use sketching effectively;
- personal inhibition, ego-driven issues of perfectionism that impair the creative flow;

Secondly, the social issues include:

- social and comparative inhibition or the fear of being judged unfavourably by others during the process of creating sketch material;
- social loafing embodying a lack of input in a group situation, either through fear of judgement or laziness.

And thirdly, we have the technological inhibition:

- Technological inhibition, a greater interest in digital visualisations, especially those in 3D, is bringing students out of sketching. It is caused by a prevalence of digital tools, also mentioned in other studies (Hilton et al., 2016) as something that leads to a disinterest in manual sketching. In design higher education, "all of these types of inhibition are evident among students during design-based activities within the studio" (Thurlow & Ford, 2017, p. 1703). The concerning intellectual and social issues should be addressed, reducing the fear of failure, exposing mistakes and embracing that failure is part of the learning process. The entire creative design process grounds on trial and error, risk-taking and experimentation.

During teaching practice, Thurlow et al. (2019) listens to students' complaints about being unable to think on paper, supporting that digital tools are the only means to develop their ideas. "During one observed studio session, inhibited students within a group of undergraduates relied solely on CAD to develop their ideas. These ranged from naïve repeated elements, all straight-line-based, to those containing CAD blocks available online" (p. 485). Students may be under the mistaken impression that only CAD drawings are acceptable in design assignments, which may be true for detailed design tasks (Schmidt, Hernandez, & Ruocco, 2012). The tendency to use CAD in the early stage is more common in students of higher years because they already have developed skills in using such tools. As computer-aided design software becomes more advanced and frequently used, sketching starts falling in disuse (Booth et al., 2016) and used more seldomly (Hilton et al., 2016). An exploratory case study compares the role of computer-aided design and sketching paper-pencil during a design process (Veisz, Namouz, Joshi, & Summers, 2012). The study identifies "what CAD tools are used, when in the design process they are implemented, the justification for their use from the students' perspectives, the actual knowledge gained from their use, the impact on the final designed artefact, and the contributions of any sketches generated" (p.317). Upon completion of a design project and interviews conducted in an industrial and academic context, the results suggest a need to emphasise the importance of sketching and to obtain a deeper understanding of the real usefulness of CAD tools at each stage of the design process. The study also recommended that the probable drawbacks of CAD usage, like circumscribed thinking and premature fixation, are still present in CAD users and "it would be beneficial to teach novice engineers how to avoid them" (p. 334).

While the CAD-focused method has been found helpful in some applications, it runs the risk of missing out on benefits such as the ability to communicate an idea quickly through a sketch (Hilton et al., 2016). Students struggle with their creative process because they see

sketching only as a visual representation tool, neglecting that designs mature by exploring and developing ideas through sketches (Leblanc, 2015).

Few studies in the literature describe initiatives to reduce sketching inhibition with art-based interventions (Booth, Bhasin, & Ramani, 2014; Booth et al., 2016) and encourage sketching practices (Schmidt et al., 2012). Teaching how to draw / sketch is not enough (Booth, Bhasin, & Ramani, 2014) to reduce sketching inhibition. It requires more focused actions, innovative learning methodologies, current technology awareness, mindfulness of the advantages of sketching and motivation to use it as a creative visual thinking tool. Several studies use creative techniques such as mind-mapping and analogies and others take advantage of the digital and gaming appetence for motivating sketch practice (Hilton et al., 2017).

4. DIGITAL SKETCHING

In recent years, digital sketching emerges as an alternative to paper-based techniques and with it designers start using drawing tablets in place of the traditional pencil on paper. This has been made possible by the appearance of high-definition screens and ultra-sensitive stylus pens associated with tailored 2D interface sketching software, like Autodesk Sketchbook Pro (educational version) or Procreate (iPad only). The combination has not only made digital sketching experiences possible but has also started a trend and their use has become widespread across a range of design disciplines (Ranscombe & Bissett-Johnson, 2016). In spite of the evolutions in digital software in mimicking the experience of the traditional paper-based sketching and the continuous appearance of more technologically advanced equipment intended to improve the designer's experience, some studies consider that the experience of paper drawing is still far from being achieved (Booth et al., 2016). The application of these digital sketching tools in education also raises discussion among design educators and researchers (Heidari & Polatoğlu, 2019). This has led to studies comparing the two means to better understand the benefits and drawbacks of their use and in understanding the influence of digital sketching on designers' behaviours.

Evans & Aldoy (2016) developed a qualitative, triangulated longitudinal study during the academic year (nine months) with final year Industrial Design students. The participants used a tablet to support portable sketching during industrial/product design activity. With data collection through sketching and design exercises, focus group and final questionnaire, the results showed a significantly increased student's attention on the digital sketching tool compared to traditional sketching and "significant development in support of sketching capability by increasing confidence which can have a positive impact on the generation of design ideas."(p.763).

Heidari & Polatoğlu (2019) compare and evaluate conventional pen-and-paper sketching with digital-based sketching. The intent was to understand the creative productivity when sketching on 2D and 3D based software solutions in comparison to the traditional techniques. The subjects were presented three design challenges in three separate sessions. In the first session, the participants could only sketch on A4 sheets to match the tablet screen size that would be used in later sessions. In the second session, students were asked to sketch and design on a tablet using Autodesk Sketchbook Pro (2D-based software) and in the third session to do the same with 3D sketching software. The results show that designers had a more productive design process and produced more ideas when using pen-and-paper sketching compared to digital sketching. It was also shown that sketching with Autodesk Sketchbook Pro achieves better results than with the 3D alternative due to the similarity with the sketching experience with a pen on paper.

Kwon, Camba, & Kimbrough (2018) conceptual sketching involves not only the rapid creation of ideas, but also the delivery of high-quality drawings with specific aesthetic attributes and a conventional visual style. The

paper argues that the workflows and creative output produced by digital sketching during conceptual design are comparable (and in some cases enhanced report a study to compare digital sketching as a conceptual tool with the traditional techniques. The focus of this study was to determine digital technology's influence on the quantity of ideas as well as the visual quality of the results that were produced. Traditional and digital sketching data was collected from a group of Industrial Design students and analysed. Authors claimed that "digital sketching experience not only mimics the traditional one but also facilitates a new type of reflective conversation between designer and sketch." (p. 136). The results show some benefits of digital sketching over the traditional counterpart and highlight five crucial advantages that surfaced from the participants' questionnaire: (1) editing capabilities (e.g., undo, copy and paste) and the impact on reinterpretation and composition, (2) use of layers and underlays, (3) visual quality of the sketch; (4) speed and (5) sketch organisation and file management. Unlike traditional sketching, digital sketching allows easy editing and 'undoing' actions. It requires a learning process in the beginning but then enables designers to easily correct mistakes, reinterpret, and improve layout composition. Especially for students starting their learning process, options like undo facilitate multiple iterations on the same concept, providing them risk-free creativity, reinterpretation, and composition improvements.

However, allowing the constant doing and undoing to achieve perfection with the first sketch can distort the concept generation phase's expectations. Trying to achieve a perfect drawing can slow down the creative process, which "could be considered a barrier for ideation, where many ideas need to be generated rapidly" (Kwon, Camba, & Kimbrough, 2018, p. 148). Another fact observed was that participants were more motivated to refining their drawings when working in a digital environment and needing more time (Evans & Aldoy, 2016). It may suggest that traditional sketching favours ideation more than digital sketching, at least in terms of the total number of concepts produced. However, that may not indicate a lack of ideas with digital tools, but taking less time exploring new ideas and more concern improving the existing ones to produce sketches with better visual quality.

Another important advantage that impacts sketch reinterpretation and final composition is the use of layers and underlays. According to Evans & Aldoy (2016) study, using the layer capabilities of digital sketching software is one of the most crucial features. Contrasting to traditional sketching, the "ability to move sketch elements freely is valuable to participants for testing multiple combinations, arrangements, and compositions as well as correcting mistakes" (Kwon, Camba, & Kimbrough, 2018, p.148). Basic operations such as scaling, rotating, and moving can provide unlimited possibilities for creative exploration with influence in sketch aesthetics. While paper drawing requires distributing the different sketch elements on the page, digital drawing allows working on the concepts individually without worrying about their resulting size and location. When visual quality and aesthetics are essential and required, digital sketching can be more effective and achieve better graphic results.

Sketches appear directly on the screen, eliminating the scanning step and the advantage of being able to act directly on the screen with a pen-stylus. This way, design educators can participate more actively in a student's sketching and thinking process, assisting the student by adding corrections and annotations directly on the screen without changing the existing work, providing more comprehensive and personalised feedback to students. Autodesk Sketchbook Pro (desktop and mobile platforms) emulates the pen and paper environment and is one of the most used 2D sketching software (Heidari & Polatoğlu, 2019). The digital sketching interface has numerous painting, drawing, and sketching virtual instruments like brushes, watercolour, markers, and others allowing the designer to explore new (un)limited ways to communicate their sketching. Symmetry tools and perspective guides also facilitate sketching performance. In addition, the ability to organise sketches and manage them is a positive point that impacts the educational

field. Data collected by digital technology, students' work, and progress can be recorded and saved digitally and used to assess student sketching performance. Functional advantages of digital sketching over traditional sketching should be seen as an "opportunity for digital sketching to answer the need to ease this transition by appeasing student desires to use modern technology (overuse of CAD) while maintaining the critical strengths of sketching (freedom and ambiguity)" (Ranscombe & Bissett-Johnson, 2016, p. 4). Digital sketching technology may have the potential to bridge the current gap between freehand conceptual drawing and computer-aided design practices.

The software's editing capabilities foster a conducive environment for students to experiment, take risks, explore new solutions without fear of failure or of making mistakes. Evans & Aldoy (2016) indicates that tablets represent a significant development in the support of sketching capability by increasing confidence, which can positively impact the generation of design ideas. Also stated by Kwon, Camba, & Kimbrough (2018) "80% of the participants claimed to be more confident ideating and creating conceptual designs digitally than traditionally and all of them considered digital sketching an appropriate tool for conceptual design and a beneficial part of the Industrial Design curriculum" suggesting that digital technology itself may not be the problem, "but the way it is used" (p.148). As expected, the authors identified drawbacks and deficiencies in digital sketching, and that's why it is necessary to continue to teach paper-based sketching to undergraduate design students. Traditional paper-pen sketching experience is hard to replicate in a digital environment over a slippery glass screen. New solutions to that have appeared in the last few years from protective displays resembling paper smoothness to pen tips that improve grip and reduce slip when drawing. The major drawback will likely be the initial learning curve, whether it be in the physical adjustments, particularly those used to drawing by hand for many years or the non-physical of having to learn a new software tool (Kwon et al., 2018). Like learning a new program, students needed to explore the interface, memorise a set of operations, identify the tools and their possibilities to take full advantage of the software potential.

CLOSING THOUGHTS

The presence of mobile tablet devices and 2D sketching software in higher education design is more frequent and pertinent. It is expected, in the years to come, that students will start to use digital sketching tools to complement paper-based techniques, that should always remain in practice and education, to record their creative design process. From my perspective, design students are still learning how to take advantage of these digital technologies and design educators are still exploring / discovering how to adjust their pedagogical and methodological approach to take advantage of the digital opportunities, particularly drawing instructors, accustomed to the traditional sketching methods.

Returning to the question: Can digital sketching using drawing tablets and ultra-sensitive stylus pens be a way to engage reluctant students in sketching? The literature indicates that digital sketching can positively impact students' confidence. With constant practice to improve sketching skills, they can achieve better results and reduce their inhibition to sketch. However, empirical studies are required to establish relationships between the digital sketching process and sketching inhibitions. Further research will also be required to find the implications of digital sketching in designing higher education drawing learning methodologies and the impact of sketching skills acquired through digital environment practice over traditional paper-based techniques.

At the same time, it becomes relevant to study, analyse, reflect, and investigate the advantages of these digital technologies to understand the relevance (urgent and necessary) inclusion of these tools in the design courses curriculum.

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9 MAPPING THE TERRITORIES AROUND DESIGN RESEARCH: A FOUR-LAYER ANALYSIS

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ABSTRACT

Despite great progress in the last five decades, Design Research still reveals fragilities in comparison with other academic fields. To avoid stagnation and lack of impact, it needs to strengthen its theoretical and methodological foundations. Following previous work aiming to contribute to Design Research consolidation, we propose in this paper a Map where four categories of Design Research are positioned in relation to territories of Design Research, Education and Practice. The Map also supports the examination of those four Design Research categories based on a four-layer analysis resulting from the conference title keywords: Processes, Philosophy, People and Products. The Map intends to help design researchers, especially inexperienced ones, like PhD students, to visualise where their own research is located within the Design universe and, by that, understand the ontological, epistemological and methodological implications.

Keywords: Design Research, Design Practice, Design Theory, Design Research Methodologies

INTRODUCTION

Design Research was defined by Archer (1981) as a "systematic inquiry whose goal is knowledge of, or in, the embodiment of configurations, composition, structure, purpose, value, and meaning in man-made things" (p. 30). Since the first steps of Design Research in the 60' and 70's, the ambition to provide a strong and coherent basis for Design Research has been pursued. However, as is recognised within its own community, Design Research still remains scattered and confused with some well-known weaknesses (Margolin, 2010; Dorst, 2016).

Within universities, Design Research faces theoretical, methodological, and scientific challenges with consequences on its impact and relevance. According to Cash (2018, p. 97), "lack of methodological development, validation and standardisation limits design researchers' ability to provide convincing evidence to researchers in related fields where such standards are common". The result is, that while Design draws extensively on related fields, "the reverse does not occur" and the more pessimistic believe that "Design risks being superseded by other fields eager to include Design Science in their portfolios".

At the level of PhD Design Courses, which are the origin of academic Design Research, as they educate future professional researchers, the immaturity of Design Research is commonly revealed in poor research orientation, sometimes provided by educators who "are indifferent, if not antipathetic to research, some of them some resentful of their colleagues who involve themselves in research and publishing" (Er & Bayazit, 1999, p. 41).

At the same time, Design Research seems to be disconnected from the day-to-day reality of designers, not only due to weak communication between universities and practitioners, but also because decisions about what to investigate are not always directed at improving design practice (Dorst, 2016).

In previous works (Clemente, Tschimmel & Pombo, 2017), we intended to contribute to the field of Design Research theory, with a special focus on doctoral research, by examining the boundaries between Design Research and Design Practice. We started by synthesising the contributions from authors such as Frayling (1994), Cross (2007), Friedman (2008), Findeli, Brouillet, Martin, Moineau & Tarrago (2008) on a three-category Design Research taxonomy. Following that, we conducted an empirical analysis from which a fourth category emerged, resulting on a four-category Design Research Classification Model that includes research ABOUT, THROUGH, FROM and FOR Design. In the resultant work, we moved to the paradigm level, explaining the ontological, epistemological and methodological differences between the four previously presented categories (Clemente, Tschimmel & Pombo, 2018). REDES 19 conference provided us with the opportunity to go further with the discussion and extend our reflection to Design Education.

Through the Map presented in the next section, we clarify the relative positions between the different places and agents around Design Research, aiming to find a consensual, common-ground language to include all kinds of research around design and its relations, at the same time providing the opportunity to find occasions to bring different parties together and enhance fruitful connections between them.

A 4-LAYER MAP OF DESIGN RESEARCH, EDUCATION AND PRACTICE TERRITORIES

The Map (figure 1) is organised around the four design research categories and their positions in relation with Design Research, Practice and Education. Our reflection was guided by the keywords that compose the conference's thematic: Processes, Philosophy, Products and People, which constitute four different layers of analysis, as described next.

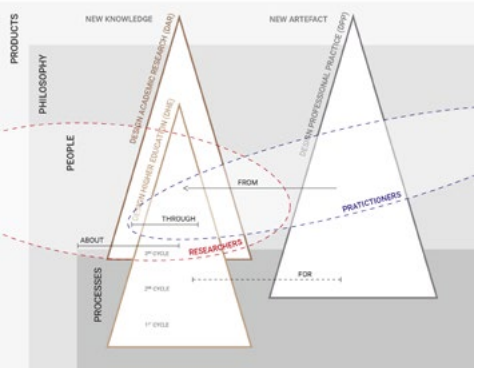

Figure 1. Design Research Processes, People, Philosophy and Products Map @authors

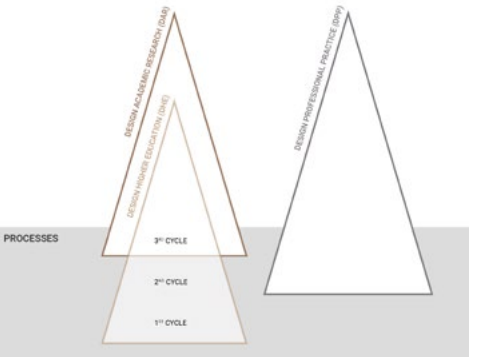

Figure 2. Design Research Processes Partial Map @authors

Processes

The Map presents three main processes within the Design field, identified at the bottom, in the darker area: Design Academic Research, Design Higher Education and Design Professional Practice (Figure 2).

These processes can also be seen as personal trajectories that an individual undergoes as design student, researcher and practitioner. Although we recognise the three processes are interrelated, we chose to represent them by three different pyramids to clearly identify the singularities of each of them and the interconnection between them.

At the centre of the Map, the Design Academic Research (DAC) pyramid represents acceptable research in the academic design field – which is the core of our discussion. The pyramid below, Design Higher Education (DHE), refers to the typical hierarchical organisation of academic design education starting with the 1st cycle level (Bachelor) at the base, followed by 2nd (Master) and 3rd cycles (PhD) above.

Since the PhD is recognised worldwide as the pinnacle qualification for scholarly endeavour, we obviously locate it near the top of the DHE pyramid. At the same time, "a PhD is awarded on the basis of good practice in research" (Pedgley & Wormald, 2007, p. 71). Er & Bayazit (1999, p. 35 – 36, 39-40) describe a PhD in Design as a certificate or licence that states that "this person has successfully demonstrated the ability to undertake independent research that contributed to knowledge" and not that he or she is "able to design a better product". In accordance with those authors view, PhD, 3rd cycle Design Education, is simultaneously located at the top of the DHE pyramid and at the bottom of the DAR.

PhD research can't be seen as just another, bigger, longer and more complex, design project similar to those conducted at 1st or even 2nd cycle studies. This position is not acceptable within the vision of doctoral research as producing new knowledge and contributing to educate future independent design researchers (Findeli & Coste, 2007). To that end, 3rd cycle education must provide structured and explicit "training in research skills, such as literature review", research proposal writing and theoretical basis grounding of knowledge about different research paradigms and methodology. PhD students must learn about a variety of research methods, adequate to address different kinds of research questions. Even if they are not going to use all the learned methods, the exposure to different approaches will help students to develop research skills and promote research methodological reflexivity, avoiding "mistakes in meth-

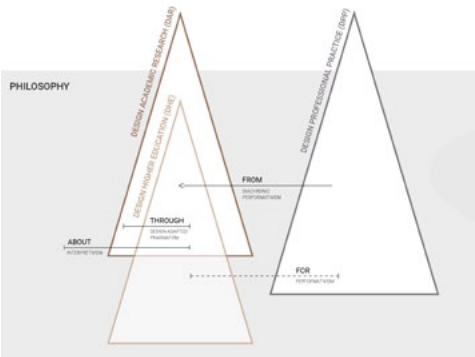

Figure 3. Design Research Philosophy Partial Map @authors

odology that are seen in the design area" (Melles, 2009, p. 256, 262).

At the right side of the Map, and outside 'university walls', is the Design Professional Practice (DPP) pyramid, representing the design professional activity. The pyramid shape was also chosen, in this case to represent the personal growth of a design practitioner.

Philosophy

Going up to the Map's Philosophy area (Figure 3), we find the four categories of Design Research presented and discussed previously (Clemente, Tschimmel & Pombo 2017, 2018): Research ABOUT Design, Research THROUGH Design, Research FROM Design, and Research FOR Design. The horizontal lines are positioned to show the relations between each category and the pyramids described above.

Research ABOUT Design is usually performed by disciplines outside the design field, following scientific standards already well established in the academic community. The issue about Research ABOUT Design is on its relevance for the design field. Frequently conducted by other disciplines' scientists, its main goal is to contribute to the advancement of such disciplines, and not necessarily to Design. It should be the design community which decides if such knowledge is relevant for designers and, if such is the case, how the new knowledge may be implemented in their respective practices (Findeli et al., 2008).

On the extreme bottom right of the Map, and clearly out of the range of the academic realm, is Research FOR Design which is the same as project research and is mainly associated with "information-gathering activities" required by design projects (Pedgley & Wormald, 2007, p. 74). The main outcome of Research FOR Design is a product, service or process, and even producing some new tacit knowledge, it does not necessarily create new communicable and explicit knowledge, and it does not follow rigorous scientific standards. Frayling (1994), Friedman (2008) and Findeli et. al. (2008) all agree that this kind of research is not considered scientifically acceptable.

However, it is recognised that design practice produces tacit knowledge that, if made explicit and communicable, contributes to the advancement of the design field. As stated by Cross (2007), for practice work to qualify as research, "there must be a reflection by the practitioner on the work, and the communication of some re-usable results from that reflection" (p. 126). That leads to Research THROUGH Design and Research FROM Design. The difference between these two categories lies in the time and context in which that reflection takes place. Table 1 summarises the relation between Design Project and Research ABOUT, THROUGH, FROM and FOR Design.

Research THROUGH Design, which according to Pedgley & Wormald (2007) would be more appropriately termed "Research through Designing", explicitly refers to "research with a practical design element" or "research incorporating a design project". That means that "selected periods of a research study are occupied by a design project carried out by the researcher" since "integration of design activity must be a means to an end, and not and end in itself" (p. 72-73).

The Research FROM Design category was introduced by Clemente et. al. (2017, 2018) and refers to research

Acceptable academic design research			**Non-acceptable academic design research**
Research ABOUT Design	**Research THROUGH Design**	**Research FROM design**	**Research FOR design**
No researcher own design projects involved	Design project developed *inside* the academy	Design project developed *outside* the academy	
	Theory produced *inside* the academy		No *explicit* theory production
	Researcher reflection and analysis as design author occur *in parallel* with the design project	Researcher reflection and analysis as design author occur *after* market's validation of design project(s) outputs	No *structured* reflection and analysis from the designer as author
	Theory precedes practice (practice being an application, illustration or validation of a previously developed theoretical intentionality)	Practice precedes theory (theory resulting from the translation of implicit knowledge embodied in the products and process)	Theory embodied in the process and final products but not made explicit or communicable

Table 1. Characterisation of the Four Design Research Categories (@authors)

that results from the diachronic study of one's own relevant and professionally validated design activity. Therefore, in both categories, design projects assume a central role. However, they differ on the place where the design project is developed and on the time when author's reflection and analysis occurs. Research THROUGH Design involves design projects developed inside universities. In this kind of research, author's reflection, research project and design project, all occur in parallel, at the same place and within the same period of time. In Research FROM Design, on the contrary, the studied design project(s) belong to the researcher's past professional activity, developed outside the academy. The author's reflection and analysis is diachronic because it only happens after the output of the studied project(s) have been validated by the market. Research THROUGH and Research FROM Design also differ in the way theory and practice are related. In Research THROUGH Design, theory precedes practice, practice being an application, an illustration or a validation of a previously developed theoretical intention. In Research FROM Design, practice precedes theory, theory resulting from the translation of implicit knowledge embodied in the design products and processes. That is the reason why the solid line representing Research THROUGH Design is fully contained inside the DAR pyramid, while the line representing Research FROM Design is positioned between DAR and DPP and oriented from knowledge origin towards knowledge theory production.

This Philosophy layer also provides the opportunity to reinforce our argument that a coherent theory for Design Research needs to be supported by a consensual and widely spread discourse about Research Paradigms. The fact that a great part of published design research misrepresents paradigmatic assumptions, reveals that researchers are frequently uncon-

scious of those "silent, implicit or even hidden, but fundamental" philosophical assumptions underlying their own research and their consequences and implications (Lukka, 2010). In spite of some voices claiming "aparadigmatic" approaches (Shannon-Baker, 2016, p. 320), we argue that any research is always conducted under a certain system of beliefs about how the research problem should be addressed, including what is to be studied, what kind of research questions are supposed to be asked and how they should be formulated, with which methods these studies should be conducted, and how their results should be interpreted. That means "aparadigmatic" research doesn't really exist. It is probably just a "shortcut" to avoid the paradigmatic question. However, usually shortcuts come with pitfalls. It is not uncommon to see inexperienced researchers, especially, PhD students, already at an advanced stage of the research, rambling and struggling with methodological questions which should have been addressed earlier. A clear establishment of the research paradigm is not a waste of time but, on the contrary, a strong basis to guide research. Even when unforeseen obstacles emerge during the investigation, it becomes easier to find an alternative way to address the research problem respecting the same belief system. Beyond this utilitarian perspective, the explicit identification of the paradigm that has been followed is a requirement of honest research, informing the audience about the values underlying and influencing the investigation, also contributing to the legitimation of Design Research by other academic disciplines.

Because, as was explained above, Research ABOUT Design can be performed by disciplines outside of the design field, it is natural that it follows research paradigms inherited by those well-established disciplines. When Research ABOUT Design consists of descriptive, historical and phenomenological studies, it is considered to follow an Interpretative (or Constructive) paradigm. Interpretive research methods are usually qualitative, including Case Studies, Phenomenology, Hermeneutics and Ethnography. Interpretive theory is usually grounded (inductive). The applied techniques include, for example, Open-ended Interviews, Focus Groups or Think Aloud Protocols. When Research ABOUT Design involves researchers' values, their critical position, their intention to change, their agenda, it can also be conducted under the Critical paradigm. Socio-critical methods include, for example, Critical Ethnography and Action Research. Applied techniques can include Open-ended Interviews, Focus Groups, Open-ended Questionnaires, resulting usually in qualitative data, similar to Interpretivism, but the data analysis is influenced by the researcher's explicit intention to change reality, instead of just describing it (Guba, 1994, Scotland, 2012).

Design Research resulting from design projects, however, seems to "not easily fit within existing paradigms" (Isley & Rider, 2018, p. 359), with some arguing the value of pre-existing paradigms and others claiming the need of a totally new, specially fitted, paradigm. Melles (2008), Morgan (2007, 2014) and Rylander (2012) are among those defending the virtues of enlarged or adapted versions of classical Pragmatism, because it accepts both objective and subjective ontological orientation, moving back and forth between inductive and deductive epistemological approaches. For these same reasons, we agree that Pragmatism is appropriated to Research THROUGH Design, where the 'rigorous' research project is punctuated by periods of design project, where creativity, intuition and nonconformist thinking takes place. We go further in suggesting Design Thinking as a research method that perfectly fits into the methodological pluralism that characterises Pragmatism. Under this paradigm, that we would designate as Design-Adapted Pragmatism, Design Thinking techniques must follow academic standards as much as possible (for example when applying Surveys, Interview or Focus Groups). At the same time, space for intuition and imagination is also permitted and material and visual elements of design such as Sketching and Prototyping are accepted.

Among the arguments of those defending a disruptive paradigm to accommodate Design Research is "The manifesto for the Performative Paradigm", by Haseman (2006). The first peculiarity of this paradigm

is the fact that research is not led by one problem or research question, but instead by practice itself. The author argues that while conventional problem-led research flows from a central research question, practice-led research does "not commence with a sense of a problem" but, instead, with an "enthusiasm of practice" from which the problem emerges. This description is aligned with Rosenberg's (2000) concept of Poetic Research that also isn't "channelled by a research problem" because "the focal territory is found through the process", emerging "from a questioning of practice" (p. 2). A second peculiarity of the Performative Paradigm is related with research outputs. It is stated that embodied knowledge, resulting from practice, doesn't need to be translated into numbers and words as in traditional research paradigms, because performativity is not primarily about artefacts' meaning, but rather about their effect on the world (Bolt, 2009).

Following that, and because academic "good research" needs to be purposeful, based on the identification of an issue or problem worthy and capable of investigation, and communicable, generating and reporting results which are testable and accessible by others (Cross, 2007), we clearly oppose the idea that academic research can be addressed by the Performative Paradigm. However, we accept that Performative Paradigm is suited for non-academic design research, conducted in a professional context, of which the main outcome is a product, service or process. Even though it may produce some new tacit knowledge, it does not necessarily create new communicable and explicit knowledge. It doesn't follow rigorous scientific standards (and it doesn't have to) and that's why it is not scientifically acceptable (Clemente et. al, 2018).

However, because Research FROM Design arises from tacit knowledge resulting from professional practice once it is made explicit and communicable, we accept it could be framed by a modified version of the Performative Paradigm, that we would name Diachronic-Performative Paradigm. In this modified version, ontology remains the same (knowledge and the research question itself are embedded in practical results), however, epistemology and methodology are modified because it is recognised that this knowledge, to be academically acceptable, needs to be translated and transferred by its author (epistemology), through a diachronic and idiosyncratic reflection process (methodology).

People

Although people moving around the three universes of Design Education, Research and Practice include students, professors, users, among others, the core of this discussion is Design Research, so we focused our discussion on those who conduct research. In the middle of the Map (Figure 4) we find Research FROM Design and Research THROUGH Design both developed by those who are, at the same time, design researchers and practitioners and their research involves their own design project(s).

Research FROM Design occurs inside the academy but deals with data coming from a designer's own projects developed previously, as design practitioner, and already validated by the clients and the market. For that reason, the line representing Research FROM Design is placed between the DAR and the DPP pyramid, because it lies on this connection between Design Practice and Research. It is also intentionally positioned at the top of the DPP pyramid because research FROM Design should be conducted only by experienced professional designers with a relevant history of already validated design projects.

On the contrary, Research THROUGH Design is well centred within the DAR pyramid because even when the design project (which is only part of a bigger project of research) is not just an academic exercise but, instead, a "real" project asked for by the market, the main goal of the researcher is to provide an answer to the research question. For that reason, project methodology, procedures and decisions are governed by academy research rules. Some had argued that to became an academic design researcher, which involves being familiar with academic research rules, and formulating and approaching problems according

to the rules of a well-established scientific discipline, a designer almost needs to "forget" what is to be a designer (Findeli & Coste, 2007). In fact, until recently, people with this dualistic profile of researcher and practitioner were mostly professional designers or graduates seeking an academic career, for which holding a PhD is a precondition. However, as it is described by Dorst (2016), "with more and more design researchers working in companies, design research has already found multiple homes. A good deal of the best academic design takes place in companies like IDEO", (p. 7). He claims the distance between academic design research and professional day-to-day design reality can be reduced by increasing people with a "nomadic" profile, with a "foot in practice as well as in universities".

Moving to the left, we find Research ABOUT Design which is done by academic researchers but not necessarily designers since it does not include researcher's personal design activity. It can be, for example, about "other people's designing, artefacts", or about "people who use artefacts" (Pedgley & Wormald, 2007, p. 71). This means that academic researchers without a design background can conduct Research ABOUT Design. That's why the line representing Research ABOUT Design extends to the left of the DAR pyramid. Because Research ABOUT Design welcomes research done by people from other academic fields such as psychology, education, sociology, engineering, with the proviso that the produced knowledge contributes to the advancement of design knowledge.

On the right side, we find Research FOR Design which is carried by design practitioners who are not necessarily design researchers, in the academic sense of research, because design projects usually don't have to (and should not) follow academic rules. However, it is possible to connect People from ABOUT and FOR territories through research. Although a designer "practicing activities when creating work (...) cannot be considered research, it is possible for an external observer to do research into how", a designer "is working on his or her work (...) to make a contribution to common knowledge" (Bayazit, 2004, p. 16). Although it is also possible

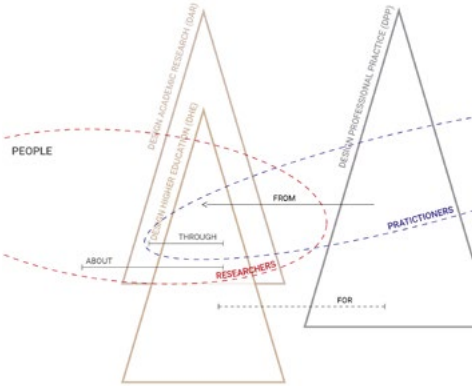

Figure 4. Design Research People Partial Map @authors

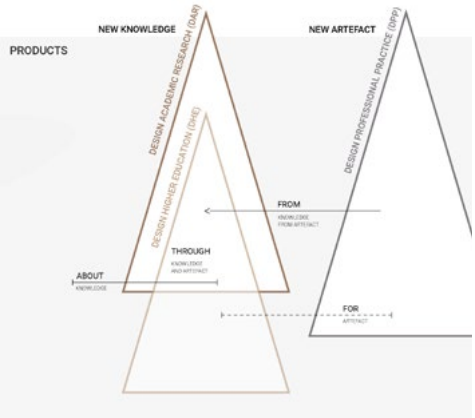

Figure 5. Design Research Products Partial Map @authors

to connect Design students at 1st and 2nd cycle levels with professional designers/researchers, for example, by including "real market" problems within academic courses, that possibility is not represented on the Map because it is not directly related with the discussion core which is academic research.

Products
In the Map, products from Design Research and Design Practice are positioned at the top of the DAR and DPP pyramids, respectively (Figure 5).

The main products of Design Practice, and for that reason, of Research FOR Design are artefacts (products, services, spaces, images, etc.) including outcome such as design registrations, patents, sales, global recognition, between others. On the other hand, new knowledge, and only in a communicable form, is the main output of academic Design Research, including Research ABOUT, THROUGH and FROM Design (Pedgley & Wormald, 2007).

New knowledge resulting from Design Research may be focused on the designer/design team, design outputs, design processe(s), design management, creativity, cognition, innovation, users/customers, cultural issues, emotional responses and there are infinite possibilities to add to this list (McMahon, 2012).

In Research ABOUT Design, new knowledge is the only expected output. In Research THROUGH Design, (although it is not its main objective), designed outputs coexist with knowledge as research outputs. In Research FROM Design, the research product is the explicit and communicable translation of knowledge embodied in designed outputs of previous practice projects, of which the legitimacy and appropriateness was already appreciated and demonstrated in the professional universe.

CONCLUSIONS

With this paper, we intend to provide a visual conceptualisation about Design Research and its adjacent and sometimes intersecting areas. The analysis is based upon the four sources of design knowledge which constitute the REDES 19 Conference themes: Processes, Philosophy, People and Products. The resulting Map, and its partial versions, allows a better understanding of the four categories of Design Research.

The Map visually shows where Design Research is situated in relation with design professional activity, design doctoral education and academic research outside design. Additionally, it clarifies the characteristics of each Design Research category by indicating their distinct outputs and the different profiles of involved researchers, enabling a deeper understanding of the underlying philosophical assumptions. Ultimately, it contributes to the epistemological basis required to academically legitimate design knowledge by providing a common shared discourse facilitated by a common visualisation of all the places and agents around Design Research.

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10 DOES THE EUROPEAN PARADOX STILL HOLD FOR PORTUGAL?

ABSTRACT

In Ala and Vilarinho (Ala & Vilarinho, 2004b) article, data from the 2014 Innovation Union Scoreboard (IUS) for Portugal was used to illustrate the on date actuality of the European Paradox and the need for policies to reinforce the downstream activities in the knowledge valorisation chain, if European Union (EU) Member States want to enforce the policy strategy stated in the Lisbon agenda in which the EU set itself a new strategic goal to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion. Having Portugal joined, for the first time, in the 2020 IUS, the group of countries classified as Strong Innovator, after 10 years classified as Moderate Innovator, the present stage of this research addresses the question if the European Paradox still hold for Portugal and most European countries by comparing the data from the 2020 IUS knowledge chain indicators for the EU countries with the same indicators, concluding that even if diminished the mismatch between knowledge generation and deployment remains.

Keywords: knowledge valorisation, innovation scoreboard, european paradox, knowledge transfer

INTRODUCTION

In the Lisbon Agenda the European Union (EU) "set itself a new strategic goal for the next decade: to become the most competitive and dynamic knowledge-based economy in the world, capable of sustaiable economic growth with more and better jobs and greater social cohesion"(European Commission, 2004). This statement is reaffirmed in the Europe 2020 strategy (European Commission, 2010) of smart growth through more effective investments in education, research and innovation, and reinforced in the 2030 Agenda - Moving towards a sustainable Europe by 2030 - a commitment to eradicate poverty and achieve sustainable development by 2030 world-wide through "upgrading people's living standards by giving people real choices, creating an enabling environment, and disseminating knowledge, and better information. (...) Citizens, businesses, social partners and the research and knowledge community will have to team up.(...) Education, science, technology, research and innovation are a prerequisite for achieving a sustainable EU economy meeting the Sustainable Development Goals (SDGs)" (European Commission, 2019, pp. 14-26).

Knowledge-based economy is an expression used to describe "trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors" (OECD, 1997, p. 12). Knowledge based economies competitiveness, characterized by the process of production, dissemination, and application of knowledge (Audretsch & Aldridge, 2009; European Commission, 2004, 2010) is increasingly dependent on the success of research and innovation systems as well as the investments made in these systems. Hence, successful innovation process depends on much more than simply new knowledge production, it requires knowledge dissemination. In this line of though, being knowledge an important base for innovation, cooperation efforts, between research centres and industry, should be intensified to spark innovation, the creation of new businesses and the transfer and dissemination of knowledge (European Commission, 2010, 2019; OECD, 2019; Thurow, 2002). The missing link, in these efforts, stands on the translation of the knowledge produced in research and development (R&D) organisations to the societal sectors, in order to create value. The key term in this translation process is knowledge valorisation, meaning the formal transfer of knowledge resulting from basic or applied research in R&D organizations (universities, research institutes or companies) to other parties in order to create social and economic value from this knowledge.

In Europe, over the last decades, a significant investment in science and technology has increased the generation of scientific findings, however this investment was not accompanied by an identical effort in the deployment of the knowledge generated. The substantiation of this mismatch between knowledge generation and deployment can be traced back to 1995, when the European Commission (European Comission, 2009) coined the term 'European Paradox', referring to the failure of most European countries to convert the significant investment carried out in R&D into economic benefits and jobs creation (Audretsch & Aldridge, 2009).

The mismatch between knowledge generation and deployment is known as European Paradox. This researched aimed to verify if the European Paradox still hold for Portugal given the fact that for the first time Portugal joined the group of strong innovators, reaching its best position ever in the ranking of the European Commission's annual publication. To that end, data from the 2020 Innovation Union Scoreboard (European Commission, 2020a) for Portugal is used to verify the actuality of the European Paradox verified in previous research (Ala & Vilarinho, 2004b). To that ends the article begins with a short contextual review of the literature on innovation, knowledge, and value, then the Innovation Union Scoreboard is briefly presented and the data for Portugal is analysed to show if the European Paradox stands true.

2. INNOVATION, KNOWLEDGE AND VALUE

Innovation can be defined as the process of implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (OECD, 2005). Innovation activities are scientific, technological, organisational, financial, and commercial steps which actually lead, or are intended to lead, to the implementation of innovations. Some activities are themselves innovative, others even not novel are necessary for the implementation of innovations. The R&D term covers (i) basic research, (ii) applied research and (iii) experimental development (OECD, 2002). Experimental development, is systematic work, drawing on existing knowledge gained from research or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed. R&D covers both formal R&D in R&D units and informal or occasional R&D in other units. Applied research refers to original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective. The Frascati Manual (OECD, 2002)defines basic research, as the experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view. Basic research aims, by definition, new knowledge acquisition, playing a vital role in innovation processes.

In a value creation approach, the knowledge transfer process can be viewed as a set of interconnected activities each one contributing to value creation in each process stage until new knowledge reaches the interested parties (Ala, 2016) intense and dynamic competitive environment, efficiency and development lead time of new products and services enablers' differentiation and competitive advantage. In order to make innovation a sustained competence, an efficient knowledge transfer process from Research and Development (R&D. There are three major interpretations of the concept of transforming knowledge generated through R&D into value (Liu & Sharifi, 2008): (i) knowledge valorisation, (ii) knowledge commercialization and (iii) knowledge capitalization. The concept of knowledge valorisation is commonly used and can be traced back to the Lisbon Agenda and the policy measures designed to turn the European economy into the most dynamic knowledge-based economy in the world. The concept of transforming knowledge into value includes three major phases:

1. Knowledge acquisition: amassing the relevant internal and external information required for the transfer of knowledge is collected and quickly deploying this information to its potential users.
2. Knowledge processing: assess the market value of the relevant research and package the knowledge with market potential for business requirements.
3. Knowledge dissemination: delivering of the knowledge package to business and assisting in the knowledge deployment.

In a knowledge valorisation approach, knowledge-based economies' competitiveness is increasingly dependent on the success of research and innovation systems as well as the investments made in these systems. Consequently, successful innovation process depends on much more than simply new knowledge production. In this context, it is important to consider both the production of new knowledge and the resources that a country is able to mobilize to deploy this knowledge.

Nowadays, there is a large set of innovation indicators that aim at measuring the output from innovative processes, the resources needed, and the processes that must be implemented to turn innovation inputs into innovative outputs. The Frascati Manual was the first formal guide for gathering R&D data, back in the 60's (OECD, 2002). However, dealing specifically with collecting and interpreting innovation data, the Oslo Manual (1992) is much more recent and so, coherent methodological guidelines for innovation data have only been available since the 1990s (OECD, 2005).

The Innovation Union Scoreboard (European Commission, 2020a) is a model to evaluate a country's innovation capacity, in the context of knowledge transfer and dissemination, based on a model of innovation performance indicators. The annual European Innovation Scoreboard (EIS) provides a comparative assessment of the research and innovation performance of the EU Member States and the relative strengths and weaknesses of their research and innovation systems. It helps Member States assess areas in which they need to concentrate their efforts in order to boost their innovation performance.

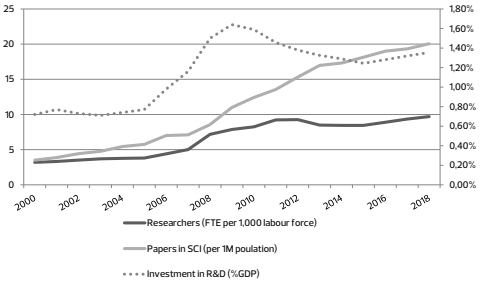

Figure 1. Portugal science and technology indicators evolution over the last decades (data obtained from (RICYT, 2019), (OECD, 2019))

3. DATA

For a better grasp of Portugal's sizeable increase in knowledge production over the last 2 decades, the same set of relevant indicators used in previously research are presented in Figure 1, in which one can observe an increase in: (i) the investment in science and technology as a percentage of the GDP (1.9 times), (ii) the number of researchers (3.0 times), and (iii) the number of papers (5.7 times), over the last 2 decades. The data used to plot the charts in Figure 1 was obtained from the Network for Science and Technology Indicators – Ibero-American and Inter-American (RICYT, 2019).

Similar increase was observed in the decade from 2000 to 2011 exception for the number of papers that almost duplicated compared with the previously analysis (OECD, 2019).

Innovation Union Scoreboard (IUS) provides a comparative assessment of the research and innovation performance of the EU Member States being the most relevant and up-to-date statistical publication to analyse the Portuguese context regarding the knowledge valorisation chain (from knowledge production to value creation through knowledge). The IUS report on the state-of-the-art of innovation performance in EU members and some other countries is published yearly and was developed by the European Commission to provide a comparative evaluation of the innovation performance in regard to the Lisbon Strategy. A comparison with leading global competitors, like the USA, Japan, Korea, and BRIC countries is also a part of this report.

After 10 years classified as Moderate Innovator, Portugal is now, for the first time, in the group of countries classified as Strong Innovator, group that includes Germany, France, Austria, Belgium, Ireland and Estonia. The Innovation Union Scoreboard 2020 (European Commission, 2020a) places the Member States into four different innovation performance groups, as follows:

I. The first group of Innovation Leaders includes 5 Member States where performance is above 125% of the EU average. The Innovation Leaders are Denmark, Finland, Luxembourg, the Netherlands, and Sweden.
II. The second group of Strong Innovators includes 7 Member States with a performance between 95% and 125% of the EU average. Austria, Belgium, Estonia, France, Germany, Ireland, and Portugal are Strong Innovators.
III. The third group of Moderate Innovators includes 13 Member States where performance is between 50% and 95% of the EU average. Croatia, Cyprus, Czechia, Greece, Hungary, Italy, Latvia, Lithuania,

Malta, Poland, Slovakia, Slovenia, and Spain belong to this group.

IV. The fourth group of Modest Innovators includes two Member States that show a performance level below 50% of the EU average. This group includes Bulgaria and Romania.

The 2020 Scoreboard collects data for 27 indicators (partially shown in Table 1), capturing 10 innovation dimensions that represent 4 main areas of the innovation process (Hollanders & Van Cruysen, 2008), namely the framework conditions, the investments, the innovation activities and impacts.

Framework conditions area captures the main drivers of innovation performance external to the firm and differentiates between three innovation dimensions: (i) The *human resources* dimension includes three indicators and measures the availability of a high-skilled and educated workforce. It captures new doctorate graduates, population aged 25-34 with completed tertiary education, and population aged 25-64 involved in education and training. (ii) *Attractive research systems dimension* includes three indicators and measures the international competitiveness of the science base by focusing on International scientific co-publications, most cited publications, and foreign doctorate students. (iii) *Innovation-friendly environment* dimension captures the environment in which enterprises operate and includes two indicators, broadband penetration among enterprises and opportunity driven entrepreneurship, measuring the degree to which individuals pursue entrepreneurial activities as they see new opportunities.

Investment's area captures investments made in both the public and business sector and differentiates between two innovation dimensions: (i) *Finance and support* dimension includes two indicators and measures the availability of finance for innovation projects by venture capital expenditures, and the support of governments for research and innovation activities by R&D expenditures in universities and government research organisations. (ii) *Firm investments* dimension includes three indicators of both R&D and non-R&D investments that firms make to generate innovations and the efforts enterprises make to upgrade the ICT skills of their personnel.

Innovation activities area captures different aspects of innovation in the business sector and differentiates between three dimensions: (i) *Innovators* dimension includes three indicators measuring the share of firms that have introduced innovations into the market or within their organisations, covering both product and process innovators, marketing and organisational innovators, and SMEs that innovate in-house. (ii) *Linkages* dimension includes three indicators measuring innovation capabilities by looking at collaboration efforts between innovating firms, research collaboration between the private and public sector, and the extent to which the private sector finances public R&D activities. (iii) *Intellectual assets* dimension captures different forms of Intellectual Property Rights (IPR) generated in the innovation process, including PCT patent applications, trademark applications and design applications.

Impacts area captures the effects of firms' innovation activities and differentiates between two innovation dimensions. (i) *Employment impacts* measures the impact on employment and includes two indicators measuring Employment in knowledge-intensive activities and Employment in fast-growing firms in innovative sectors. (ii) *Sales impacts* measures the economic impact of innovation and includes three indicators measuring Exports of medium and high-tech products, Exports of knowledge-intensive services and Sales due to innovation activities.

It is important to note that in 2017 EIS the measurement framework has been significantly revised. The first change to the measurement framework involves a regrouping of the innovation dimensions. The objective of this regrouping is to better distinguish between framework conditions and investments in innovation, enterprises' innovation activities, and the impact of these activities.

2011 measurement framework	Dimension	2017 measurement framework	Dimension	Indicator
Enablers	Human resources	Framework conditions	Human resources	New doctorate graduates per 1000 population aged 25–34
	Open, excellent and attractive research systems		Attractive research systems	Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country
	Finance and support	Investments	Finance and support	Public R&D expenditures (% of GDP)
				Venture capital (% of GDP)
Firm activities	Linkages & entrepreneurship	Innovation activities	Linkages	Public–private co-publications per million population
	Intellectual assets		Intellectual assets	PCT patent applications per thousand million GDP (in PPP€)
Outputs	Innovators	Impacts	impacts	Employment fast-growing enterprises of innovative sector[1]
	Economic effects			Employment in knowledge-intensive activities as % of total employment

Table 1. Innovation Union Scoreboard selected indicators

As a second change, one more dimension has been added to better capture the environment in which enterprises operate. Enterprises innovate in response to changes in their environment, in particular to new opportunities to expand their business or to threats from either existing enterprises or new entrants. Results show that most enterprises innovate to improve the quality of goods or services, to increase the range of goods or services, or to increase their market share. A lack of internal funds, excessive innovation costs or a lack of external funds, are for most enterprises the most important factors hampering their innovation activities. Also, a lack of qualified personnel, markets being dominated by established enterprises, and uncertain demand for innovative goods or services, score high among the factors hin-

[1] Employment in fast-growing enterprises of innovative sectors' suffered from being excessively complex, making it difficult to explain year-on-year changes in country performance. The indicator originates from the European Commission's Innovation Output Indicator (IOI). The previous indicator was computed by weighting sectoral innovation coefficients with sectoral shares of employment in high-growth enterprises. The revised indicator instead measures more simply the share of employment in high-growth enterprises in the top 50% most innovative sectors within total employment. The top 50% most innovative sectors are selected based on a ranking of innovation coefficients measuring the degree of innovation of each industry at EU level.

dering innovation. An environment which is "innovation-friendly" will act as a catalyst, helping enterprises to innovate or innovate more. A third change involves splitting the dimension measuring economic effects in two dimensions, one measuring employment impacts and the other one measuring sales impacts. Table 1 first two columns show indicators and areas corresponding regardless previously work based in 2011 measurement framework.

4. DATA ANALYSIS

To characterize the Portuguese context regarding the knowledge valorisation chain, a subset of 8 indicators were selected (see Table 1) as being the ones that better capture knowledge production and value creation through knowledge.

Figure 2 shows Portugal's positioning among the 27 EU Member States. It is evident from this chart that Portugal performs better in the upstream activities of the knowledge chain (i.e., knowledge production) than on the downstream activities (i.e., value creation from knowledge) when compared to its EU counterparts.

Performance in Human Resources and Attractive research systems largely reflects the overall classification according the four performance groups having Portugal in line with EU average for the first indicator and above average for the second.

Portugal performs below the EU average what concerns Performance in Finance and Support. Portugal's lowest indicator scores comprise exports of knowledge-intensive services, R&D expenditures in the business sector, Private co-funding of public R&D expenditures, and Public-private co-publications.

Regardless Performance in Firm Investments Portugal reaches the highest rate of performance increase (21.8%). Performance in the Innovators dimension deviates from the overall classification into four performance groups. Portugal, a Strong Innovator, is the overall best performing country.

There was an increase of 25.5% without the number of international patent applications originating in Portugal: from 200 applications in 2019, to 251 in 2020, a sign of a relevant propensity to safeguard industrial property rights in other territories. The importance of policies

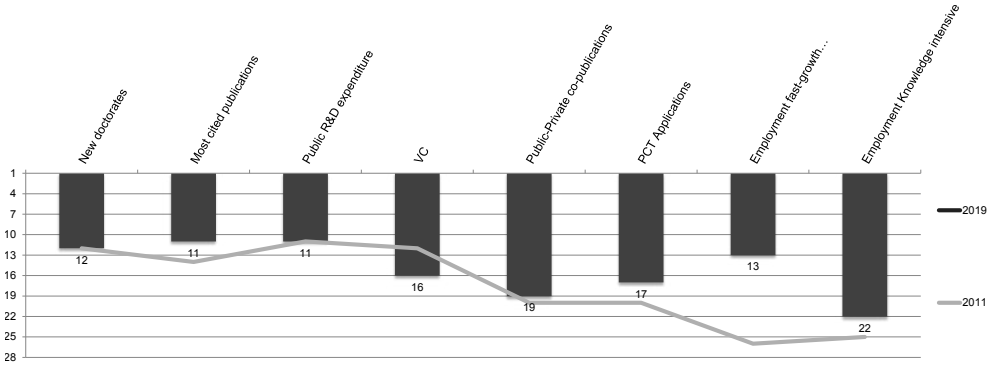

Figure 2. IUS 2019 – Portugal's positioning relative to the 27 EU member states for the knowledge valorisation chain indicators (data obtained from (European Commission, 2020a))

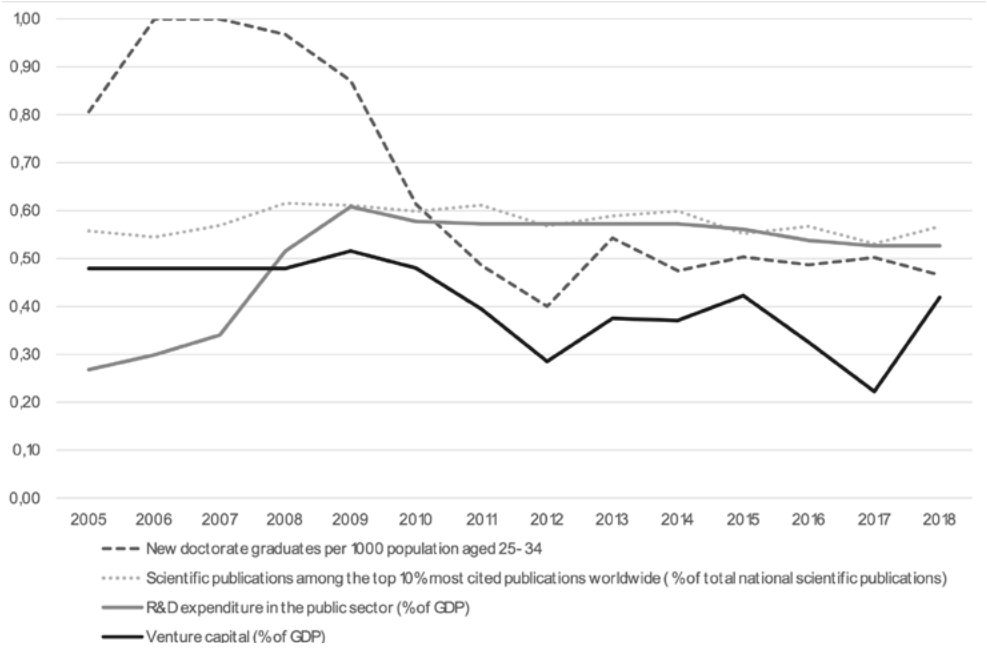

Figure 3. Time series for the knowledge chain upstream indicators (data obtained from (European Commission, 2020a)

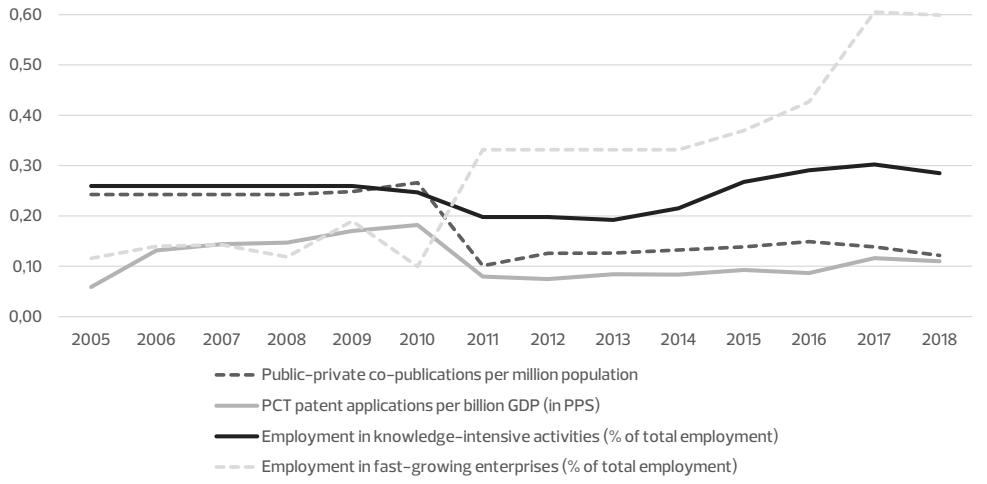

Figure 4. Time series for the knowledge chain downstream indicators (data obtained from (European Commission, 2020a)

favourable to small and medium-sized enterprises (SMEs), more specifically as it encourages the protection of assets such as industrial property rights, has a direct impact on technological development and innovation.

Innovators, Innovation-friendly environment and Attractive research systems are the strongest innovation dimensions. Portugal scores particularly well on SMEs innovating in-house, Broadband penetration, SMEs with product or process innovations, and Foreign doctorate students. Sales impacts, Linkages and Intellectual assets are the weakest innovation dimensions. Portugal is pointed as the leader, for the second consecutive year, in the dimension of the ranking focused on the level of innovation in small and medium-sized enterprises (SMEs), followed by Finland, Austria, and Belgium.

If one looks at the time series depicting the normalized values of these indicators (a value of one being the highest score among EU members plus the six neighbouring countries), presented in Figure 3 (for the upstream indicators) and Figure 4 (for the downstream indicators) it is clear (i) the gap of Portugal's performance in the downstream indicators when compared to its EU counterparts, (ii) that for these downstream indicators the performance slightly improved compared with 2011 (iii) the maintenance of relative good performance in the enabler indicators (i.e., the upstream indicators) in spite the sizeable degradation in the indicator for new doctorates from 2007 onwards and the negative trend in R&D expenditure in the public sector from 2009 to 2018.

5. CONCLUSIONS AND FUTURE DEVELOPMENTS

Knowledge value will be created by delivering innovative products with high-quality. In a value creation approach, the knowledge transfer process can be viewed as a set of interconnected activities each one contributing to value creation (Ala, 2016) from knowledge acquisition to knowledge deploy. The mismatch between knowledge generation and deployment is known as 'European Paradox'. This researched aimed to verify the actuality of the European Paradox for Portugal, given the fact that for the first time, Portugal joined the group of "strong innovators", reaching its best position ever in the ranking of the European Commission's annual publication.

Analysis at the time series from 2005 to 2018 shows (see Figure 3 and Figure 4):

I. that the gap of Portugal's performance in the downstream indicators, when compared to its EU counterparts, remains,
II. that for these downstream indicators the performance slightly improved compared with 2011,
III. that employment in fast-growth enterprises of innovative sectors is the downstream indicator that showed the highest improvement,
IV. the maintenance of relatively good performance in the enabler indicators (i.e., the upstream indicators),
V. that most cited publications had the best improvement in enablers indicators.

An environment favourable for innovation, the introduction of innovation in the market and organizations, and attractive research systems are pointed out as the main factors for, Portugal now being one of the frontline countries (European Commission, 2020a) and the results achieved regardless the European Paradox.

Ensuring stronger linkages between science and industry challenge remains which is difficult to be successfully addressed, given its structural nature (E. Union, 2018), and the response requires a systemic approach, considering the perspectives of both scientific and technological organisations and business firms (European Commission, 2017b).

There is widespread agreement that interactions between academia and industry continue to be weak (European Commission, 2020b) reflected in the behaviour of indicators regarding SME cooperation and public-private co-publications. It had been

recognised that some efforts had been made by the Portuguese government in encouraging the interaction between universities and the business sector ((European Commission, 2020b; Union, 2018)), nevertheless the response requires a continuous systemic approach, considering the perspectives of both scientific and technological organisations and business firms (European Commission, 2017b). The challenge here is not just to promote 'knowledge transfer', but rather to develop 'participatory' co-design and co-action initiatives involving key players from both the demand and the supply sides.

In the field of research and innovation, information and communication technologies are lagging behind and the cooperation between business and academia is not strong enough (E. Union, 2018). As consequence this is having a "negative impact on the innovation capacity of the Portuguese economy".

The relevant literature (A3ES, 2017; European Commission, 2020b; OECD Economic Surveys Portugal, 2019; E. Union, 2018) identified a set of enablers to increase the efficacy of knowledge valorisation in Portugal, namely:

I. Improving firms' innovation performance by strengthening their technological and managerial capabilities.
II. Stimulating the emergence of new companies in knowledge-intensive activities.
III. Ensuring stronger linkages between science and industry: tackling this challenge requires sustained action from both ends. The challenge here is not just transfer, but rather the development of co-design and co-action initiatives involving players from both sides.
IV. Defining jointly developed agendas on innovation policy: this challenge is closely related to the previous one. Measures taken to involve the business sector in R&I policy design risk remaining limited. Further efforts to stimulate real 'bottom-up' initiatives for the definition of R&I agendas are still needed.
V. Fostering the recruitment of researchers by business firms: Portugal has one of the lowest shares of researchers employed by businesses in the EU. Promoting employment of high-skilled workers, especially PhD holders, would enable human capital to be put to productive use. This would in turn contribute to address some of the previous challenges.

According to the European commission:

> Investment in research and development has recently picked up but remains insufficient to upgrade the Portuguese national research and innovation system. The share of spending on research and development in relation to GDP increased recently and in 2017, business research and development intensity slightly surpassed the public research and development intensity. (European Commission, 2020b, p. 7)

In addition, to increase R&D effectiveness, it is important to fully understand the ultimate value of a project very early in development and know how this information can be leveraged in individual perspectives and trade-offs in portfolio decision making. The determinants of overall value are likely to be different depending on the perspective represented all along the process, from the lab to the market (Ala & Vilarinho, 2004b). These multiple nodes, towards the process, decrease the probability of success, acting as barriers. The relevant literature identified a set of barriers to knowledge valorisation (Ambos, Mäkelä, Birkinshaw, & D'Este, 2008; Bers & Dismukes, 2009; Geuna & Muscio, 2009; Grimaldi, Kenney, Siegel, & Wright, 2011; Markham, Ward, Aiman-Smith, & Kingon, 2010; Siegel, Waldman, Atwater, & Link, 2004; Steve H. Barr Stephen K. Markham, Angus I. Kingon, 2009; Wilson, 2011), namely:

I. The lack of alignment between research publication and intellectual property protection.
II. The lack of alignment between the skills required for knowledge valorisation and the incentives of the research career.

III. The limited competencies to connect technical knowledge to a commercial opportunity.
IV. The conflicts of interest among the different stakeholders in the process of knowledge valorisation.
V. The lack of an entrepreneurial culture among the researchers.
VI. The limited availability of pre-seed funding.
VII. The asymmetry of information between researchers and investors, making the assessment of the knowledge value (i.e., the pre-money valuation) difficult to estimate.

To overcome these barriers, specific policies need to be put in place in order to reinforce the downstream activities in the knowledge valorisation chain. According to the European Commission the EU's external policies will continue

> (...) it is expected that the EU will have made further significant progress on eradicating poverty and social exclusion where employment growth will play an important role. Access for all to adequate social protection, quality healthcare, education, housing, and social services will need to be adapted to future demographic changes, new technologies, evolving forms of work, migration, and climate change challenges. To that end, continuous progress is expected from a broad range of stakeholders at all levels, including local, national and European. (European Commission, 2019, p. 69)

Standing from the fact that economic growth, in knowledge-based economies, is driven by the innovative capacity supported by new knowledge (Ala & Vilarinho, 2004a), and that there is a positive correlation between the innovation and education performance of nations and economic growth, as a future development of this research, we will address the hypothesis that the reinforcement of participatory co-design and co-action initiatives involving key players from both the demand and the supply sides, has an impact on European Paradox dissipation using as case study the number of PHD in the Design Discipline in Portugal. To that end data from IUS, Design applications per billion GDP (in PPS)[2] and New doctorate graduates per 1000 population, will be crossed with the number of PHD in the Design Field in Portugal, in order to plot correlation coefficients.

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[2] Designs applications per billion GDP (in PPS)—"A design is the outward appearance of a product or part of it resulting from the lines, contours, colours, shape, texture, materials and/or its ornamentation. A product can be any industrial or handicraft item including packaging, graphic symbols and typographic typefaces but excluding computer programmes. It also includes products that are composed of multiple components, which may be disassembled and reassembled. Community design protection is directly enforceable in each Member State and it provides both the option of an unregistered and a registered Community design right for one area encompassing all Member States." (European Commission, 2020a)

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