

Springer Series in Design and Innovation 9

Daniel Raposo · João Neves · José Silva ·
Luísa Correia Castilho · Rui Dias *Editors*

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7th Meeting of Research in Music,
Arts and Design, EIMAD 2020,
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Editors

Advances in Design, Music and Arts

7th Meeting of Research in Music, Arts
and Design, EIMAD 2020, May 14–15, 2020

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Preface

These chapters are the result of a double-blind peer-review process which was a requirement for inclusion in the 7th EIMAD 2020, Meeting of Research in Music, Arts and Design, that took place on May 14–15 during coronavirus COVID-19 pandemic.

For the first time in EIMAD's history, the conference was held in an online format, affirming with a spirit of the mission the need to continue sharing research results in the areas of design, music and arts, which have a direct impact on people's quality of life.

More than ever, scientific research has assumed a paramount importance, and it is important to enhance scientific cooperation, continuing to foster knowledge sharing, scientific publication, the relationship between research and society and to stimulate further research in design, music, arts and intersecting areas.

Research is an essential component for informing and making informed decisions in educational, social, political, technical and cultural contexts. On the other hand, research is also the best way of evaluating and measuring the results of decision-making and understanding the sequence of events, establishing correlations, knowing how things work and identifying causes and effects. Data becomes information when they receive correlation and sense, depending on the research process which needs a conceptual rigor base grounded on facts, robust methods, accurate, relevant and reliable outcomes, promoting complex predictions, with contrastable and revisable results.

Design, music and art are multidisciplinary perspectives inseparable from people and above all from everyday life, because isolated they lose their meaning. For this reason, in particular, the researcher in the fields of design, music and art is an observer and an interpreter. An observer in the sense that he is responsible for mapping, knowing, dissecting, correlating, describing and explaining complex phenomena in their context and an interpreter when creating artifacts of design, music or art or even proposing new perspectives, promoting politics, activities, behaviors or experiences.

This book presents research results, proposing new theoretical and practical perspectives in design and music, arts, education, among other societal issues. It can be viewed concerning specific practices in design or music education or practice as well as addressing broad perspectives, namely for the improvement of the quality of life from the microscale to the world, taking into account a contemporary key individual or societal needs.

Book's chapters are organized into four sections:

- Design, Communication and Education
- Fashion Design, Interiors and Equipment
- Design and Society
- Music, Musicology and Music Education

The first section deals with issues such as the influence of technology on designers' graphic thinking, new ways of doing and thinking, both in creative, graphic and procedural terms; also new perspectives on the process of ideation and design thinking, codesign in active citizenship associated with civic responsibility and new forms of design education; how design can revitalize and reintegrate small-scale industries and how to improve technical communication at the production level; the design research processes, namely in the analysis of graphic data and its transposition to the project; new approaches, use of technologies, tools and digital media in teaching, including in response to the COVID-19 pandemic; issues such as time continuances in video games, but also as a form of learning based on the discussion of narrative of video games, videos and films, or the advertisement video on demand in the logic of the digital entertainment industry and the influence of digital on consumer trends and behaviors.

The second section covers areas such as the intersections of fashion and art, narratives in museum spaces dedicated to fashion and new expressions of trans-modernity such as the obsession with the widespread aestheticization of people and objects; sustainability in fashion and sustainability as innovation; the ecology and design of products that promote animal well-being, particularly with allergies; the user experience in fashion design, namely in the development of products for people with disabilities, in the promotion of health and well-being or in the design of leisurewear. Similarly, new inclusive design practices are addressed in furniture and toys for children with blindness or low vision from revitalization of craftsmanship in fashion design to paths of innovation in jewelry design and how history opens new possibilities in furniture design for children, but also how technologies like virtual reality can extend the knowledge and dissemination of interior design history.

The third section deals with ways of improving people's daily lives associated with their surroundings, namely how art can revitalize places or how inclusive design fosters housing spaces prepared for all ages; how to learn from disasters and the resilience of some people to create strategic thinking applicable to the creative process of design; design policies and how the critical and creative nature of design thinking relates to territory development through a knowledge-based society and

knowledge-based policies; design seen as a way to achieve happiness and as an integrated work strategy, more collaborative and participatory in processes of social innovation or in responding to users with special needs and the context of circular economy, the relationship between various stakeholders, behaviors and expectations associated with social well-being, inclusion and business sustainability.

Finally, the fourth section deals with various topics such as music history, music teaching, music composition and codicological analysis of musical contents as well as the relations between art, design and music. The themes also go through the use of technologies in instrumental teaching and practice, promoting the practice of melodic improvisation, anchored in blues/jazz language, or the conception of efficient auditory alarms with the use of the psychoacoustic model of the peripheral human auditory system.

As mentioned before, various chapters include research results, new perspectives, principles and assumptions based on conceptual rigor, experiences, practices and facts.

Daniel Raposo
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Design, Communication and Education

Creative Graphic Thinking and Contemporary Graphic Representation



Roberta Barban Franceschi 

Abstract The article fundamentally seeks to demonstrate to what extent technologies have changed the graphic thinking process of industrial designers. It verifies what type of innovation graphic representation has undergone in the ideation and creation phase, and detects that creative graphic thinking is the result of the three thoughts: creative thinking, where “associations” are the essence of our imaginative world, created between mind and knowledge through combinations and associations; project thinking, a dialogue between the solution and the discovery of problems, a fractal process in constant transformation, the designer’s faculty in which he expresses, formulates and materializes his ideas; and graphic thinking, which is manifested in the conceptual design stages, to the development of ideas, the language of communication in a design project, dialogue and the expression of the designer’s thought. The research recognizes a new perception, a new way of doing and thinking both graphically, creatively and at project level, amplifying the possibilities of graphic registers identified as five types of creative graphic thinking: analogue, three-dimensional analogue, digital, three-dimensional digital and experimental digital-diagram. The contemporary design process changes the act of creative drawing carried out in two dimensions towards a virtual modeling in three dimensions, creating surfaces freely. A process with greater experimental freedom.

Keywords Creative graphic thinking · Contemporary graphic representation · Ideation

1 Creative, Projective and Graphic Thinking

By analyzing various authors who talk about the design process and mention the creation phase, we verify that, currently, the continuous cycle between brain, eye, hands and image can be configured in five ways. It is observed that, of the five cycles,

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the only element that remains in all of them is the brain (thinking), while the others differ alterations.

The evolution of technologies and graphic tools makes it possible for the brain, eye, hands and image cycle to be configured differently, in addition to that described by Julián and Albarracín (2011) and Hanks (1995), which would be from the traditional way, expressing itself with paper sketches, going through physical and three-dimensional to even digital ones, through which innovative experiments are carried out.

Below we will explain the cycles and changes that the use of different graphic tools meant in this context.

2 Creative Graphic Thinking

2.1 Analogical Creative Graphic Thinking

It is the traditional process of the “brain, eye, hands and image”, which is characterized by the traditional way of sketching done by hand to express the ideas and put them on paper. The designer uses different means and drawing supports, such as conventional pencils, mechanical pencils, colored pencils, pens and plume pens to communicate the idea.

In the analogue cycle, the brain imagines, creates, generates ideas. These ideas are projected into the physical environment through the hand that works together with the eye that develops the deepest perception of reality and a greater objectivity. The eye visualizes and the hand is the means that enables images visualized in the brain to be captured in sketches on paper (Fig. 1).

The expression of thought can be both a simple pencil technique on paper or any other material. According to Julián and Albarracín (2011), the designer must know

Fig. 1 Analogue sketch by De Luchi (Serrazanetti, F. & Schubert, M.: *La mano del designer*. Moleskine, Milán, p 111 (2010))



these techniques in order to express himself. “Drawing is creating, but for this we must know the tools that make this phenomenon possible. Knowledge facilitates the interpretation of the different nuances, tones and values of our work... (Julián and Albarracín 2011).”

The analogue cycle is related to rational projective thinking by the graphic conventions used, which lead to a more rational than complex elaboration, a very individual way, a very intimate communication between the designer and the act of conception of the object.

2.2 Digital Creative Graphic Thinking

In the Digital Creative Graphic Thinking, the change is in the image, a digital drawing generated on tablets or computers. As for the digital creative cycle, the brain, eye and hand remain the same as in the analogue cycle. The hand captures the images in digital sketches using other supports for the sketch, such as the pen for tablets or the mouse for the computer. These tools are the means where the digital sketches are manifested. The use of specific software for the graphic area is essential for the digital sketch cycle to occur.

Whether we like it or not, the computer has become an indispensable means for the designer, integrated in almost every stage of the design process. It is an enabling technology with the potential to give the designer complete control over his designs, something that would have been temporarily denied to him when the demands of industrial evolution led to a division of the work and the fragmentation of the entire design-production process. (Pipes 2008: 17).

The digital sketch (Fig. 2) demands from the designer the same skills as a traditional sketch. What differs is the use of digital tools such as tablets and computers that work with specific applications for digital drawing.

The digital cycle, as we have said, is the same as the analogue. The difference is that the digital allows the development of a drawing with greater fidelity to the object



Fig. 2 Digital sketch The Voids (2003) by Ron Arad. (Antonelli, P.: Ron Arad. No discipline. The Museum of Modern Art, New York MOMA, New York, p. 110 (2008))

than the analogue because of the resources that the digital means provide. That does not mean that the digital sketch does not have a lower fidelity - it is dependent on the skill of the designer.

2.3 Analogical Three-Dimensional Creative Graphic Thinking

In this three-dimensional analogue cycle, the image manifests itself not as a drawing, but as a physical model. The brain and the eye work the same in the analogue and digital cycle. The change occurs in the hands and image elements. The brain imagines, creates, generates ideas; the eye has the perception of reality; the hand shapes the models, either on paper or in other material (wood, wire, plastic, cloth, rope, pipe,...). The designer uses the three-dimensional models as a sketch of his ideas that are elaborated in real size. The model is located in the image stage in the three-dimensional analogue cycle. Its role is to communicate the idea in the matter, where the designer expresses his ideas.

Three-dimensional sketches are a methodology invented by Rowena Reed Kostellow and used at the Pratt Institute, a methodology widely used in the United States and applied by various universities in Europe. The methodology developed by Rowena was called by her “Structures of Abstract Visual Relationships”, divided into three stages: three-dimensional sketches, proportion sketches and space notes. Rowena worked with abstract volumes, geometric elements that, through compositions, managed to lead students to develop volumetry from simple to complex compositions. Her philosophy of beauty was in the progressive search to purify impurities and balance.

“Building models is one of the methods of visualizing space and shape... As an extension of rational thought or irrational experimentation, the fact of building models shows iconic forms. Models are a primary mode of communication; without being language, they constitute a game of forms, symbols and communicative materials that sculpt the space and transmit ideas and emotions... (Dollens 2002).”

We can see in the images of the initial development of the Chair one by Konstantin Grcic, the three-dimensional analogue cycle, where the model is a way widely used by him to start the project. Grcic constructs his objects directly physical by exploring the possibilities of form and construction. He calls these models three-dimensional sketches (Fig. 3).

Cabezas (2011) reports that drawing was not always the most important tool in the process of communicating the ideas. Many of the architects, in their method of projecting, did not use it to express their ideas. He also comments that this is not a fact that happened in this period, nor in centuries past; a pre-industrial work system where creative people did not make sketches or drawings to communicate their ideas.

According to Parsons (2009), the essence of the three-dimensional sketch is speed, which must allow the fluidity of ideas like traditional sketches, with a different

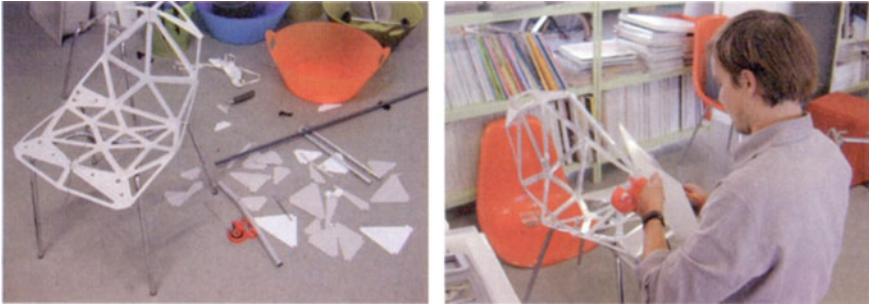


Fig. 3 Three-Dimensional Analogue Sketch. Chair One (2003) Konstantin Grcic (Mir, A. & Padrós, E.: Happy End 10 procesos de diseño. Punto Verde Artes Gráficas, Madrid, p. 43 (2003))

characteristic: the sketch is made in three dimensions in order to be seen and analyzed to formulate another sketch or an improvement of it.

Unlike a functional prototype, in which functional mechanisms of the object are checked, three-dimensional sketches allow the generation of many models that meet one or two criteria. These two provide the necessary information.

Three-dimensional sketches investigate proportions and the visual appearance, a volumetric survey of the object, and intentionally ignore criteria such as structural resistance. The model can also be closely related to the material and not to the shape, allowing its material properties to be freely explored. The choice of model material will depend on its qualities, which must be the same or similar to the material of the final object.

The three-dimensional analogue cycle allows the development of shapes that are many times more related to the material used than the shape imagined by the designer.

In this cycle, the creative worker can also work with industrialized elements marketed for other markets. It is a way of working that is close to the artisanal by working directly with the material and not with sketches, and also by using industrialized objects in the creation of new objects such as the Ready-made of Dadaist aesthetics.

2.4 Three-Dimensional Digital Creative Graphic Thinking

In the three-dimensional digital, the change occurs in the part of the hands and image. The image is like a digital model, which has the same image function as the model in a three-dimensional analogue cycle. What changes is that, in this three-dimensional digital cycle, the communication of the idea is carried out virtually, using specific graphic tools (software) to capture these virtual models.

The incorporation of the softwares as a creation tool in the project area has generated a change when thinking about the object, since they replace the constructions

of lines, planes applied to the perspective, by the direct creation of surfaces and geometric solids. It is like modelling volumes in a virtual space.

The hand works with the mouse or pens to capture the models on the computer with graphic software that make it possible to model the shape in 3D. These models are the three-dimensional digital sketches, generated in a virtual space.

According to Pipes (2008), computer modeling programmes have always combined the two-dimensional system with the three-dimensional one, which has helped designers build more complex shapes than before. Without modelling programmes, it was more difficult. For him, specialized programmes for drawing on the computer have been a fundamental element, since they have put aside hundreds of years of “tradition”, returning to basic design actions such as carving and sculpting solids.

Henry (2012) comments that the softwares applied to the design are only useful when the designer has the traditional skills, such as the analogue sketch to work on it, because the programmes do not visualize by themselves. Therefore, they need the designer to carry out the operations.

A good example of the development of a three-dimensional digital graphic thinking project is that of the Entropia lamp developed by designer Lionel Theodore Dean, who works with the concept of mass individualization applied to the creation of parametric CAD models, with the aim of allowing the design customization (Fig. 4).

Gregorio Spini has commissioned Leonel with a lamp that was a flower of Eden, where Spini did not want any indication of man-made design and that showed no clues on how the pieces are made, an intriguing design for the person who looked at it and that evidenced the creative process of the object.

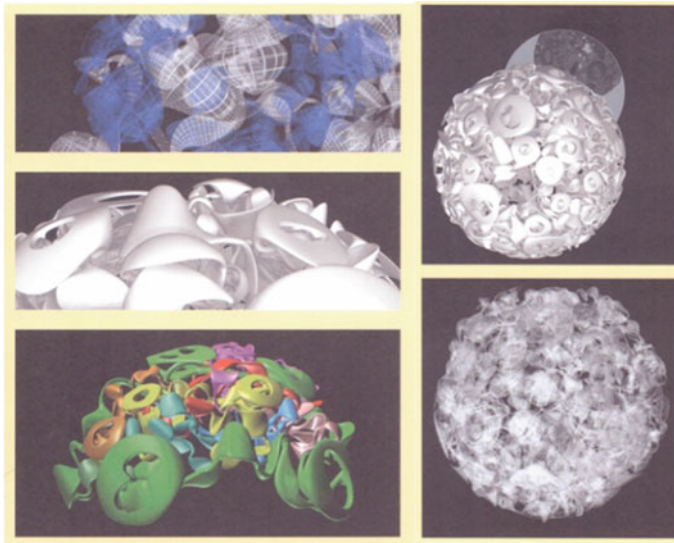


Fig. 4 Three-dimensional Digital Sketch. Entropia Lamp by Lionel Theodore Dean (Bryden 2014)

Entropia Lamp is inspired by the natural growth of organic oral forms. This growth should be a source of light. Prior knowledge of the design of its complexity made it impossible to use two-dimensional analogue sketches. Therefore, it was created from various elements that fit around the light bulb, various 3D patterns, around 1000 elements, modeled directly in the Alias and Imagenstudio software, which were embedded and experimented on digital models (Henry 2012).

This cycle of thought allows the development of more complex forms than in the analogue cycle, since the digital tool, when all its possibilities of generating the form are known, enables the designer to apply all his creativity and with a range of composition of the forms less limited than in the analogue cycle.

2.5 Experimental Digital Creative Graphic Thinking

The experimental digital cycle is a way of generating forms through establishing relationships, associations or connections between things through questions and analogies (Fig. 5). The idea (relationships, associations and connections) is represented by symbols, images or graphics that explain its reasoning. The diagram is the graph that represents the spark that will trigger the entire materialization process, in which an association will evolve towards an object.

In this cycle, the existing relationships “brain, eye, hands and image” are completely broken. The function of the brain is maintained, the designer imagines, creates the idea and relationships to things. The eye no longer has the perception of reality and the hand does not act in the materialization of the sketch (analogue or digital) or a three-dimensional model (analog or digital). The designer works materializing relationships and analogies between things by means of diagrams, which are made by hand. However, he will not know the shape of the final object, because this process will be carried out by the algorithm and the software used by the computer.



Fig. 5 Experimental digital sketch diagram. Rococo Rocks (2008) by Benjamin Arande and Cris Lasch (Terstiege, G.: The making of design. From the first model to de final product. Birkhäuser GmbH, Basel, p. 38 (2009))

In this cycle, we see the influences of the software on contemporary design that, through the insertion of codes in the generative process, amplify its field of action, previously used in the final phase of the project. Now, the software can act as a collaborator in the design process.

Reas et al. (2010) comment that various architects and designers widely use custom software and programmes to materialize their ideas. They report that the relationship of form and code define shape as visual and spatial structures and the code is mainly defined as computer programmes. The code is a series of instructions called algorithm.

So as to be a tool for the mind, the software expands the intellect, increases the ability to think and provides new and different ways of thinking (Reas et al. 2010).

The big change occurs when the designer who has the idea and processes the data in the tools used (software) generates a form that the designer does not control. The creator completely disconnects from the process and does not know what will happen, thus not being able to make sketches or models to materialize the idea. This function becomes the “software” tool used to process the data, which involves generating objects that have a different aesthetic and does not go through the elaboration of the form through the mind.

In the “experimental digital diagrams” cycle, objects are created that are not rectilinear, geometric or curvilinear. They do not just go through human thought: they are a hybrid between the human and the machine, they are cybernetic objects.

The brain, eye, hands and image cycle is disarticulated with the arrival of the computer that enables other relationships with drawing. It is evident that technology changes the process of creating and materializing the form, expanding the possibilities of materializing the idea into the physical. The arrival of technologies has enabled changes in both the process of thinking and making design, altering the aesthetics of the object.

For Laseau (2001), the analogies can be established in different personal or direct ways and the classic ones in physical analogies: structural (structure of a tree), mechanical (such as the movement of the wind through the houses) or of control (opening and closing mechanisms controlling or not its visualization), organic analogies (plants and animals) or cultural (man, society or symbols). With this, we can say that the designer has a wide field of experimentation on analogy and the elaboration of diagrams (code+form) in the phase of conceiving the object.

The experimental digital graphic thinking diagrams cycle allows the development of more complex forms than in the other graphic thinking cycles. When all the possibilities of digital tools are known or when collaborating with people who master them, the generation of creative forms is potentiated through the expansion of connections made by codes and software.

3 Contemporary Graphic Thinking

Today's graph is manifested through ways of thinking and by associations created by designers, characterized here by the Analogue, Digital, Analogue Three-Dimensional, Digital Three-Dimensional, and Experimental Digital Thinking.

The tools applied and the way of thinking are different in each cycle, making it possible for the creative worker to use sketches, models or diagrams in the process. It is verified that the sketch continues to be used by designers as a tool of the conceptual stage of the project, but it is not the only one that makes it possible to register ideas.

It can be seen that, when the tools are changed, whether analogue or digital, the language of the objects and their shape change. They are configured from a rational traditional geometric form to a more complex and organic form. The contemporary designer adds to the traditional knowledge of the know-how of the profession and of new forms of technological know-how, creating new synergies between tradition and innovation.

This five graphic thinking representation it has been shown that technologies have changed the creation process of designers and technologies have also favored creating objects of complex shapes.

Before, what used to be a working method, today it manifests itself as a way of thinking, impacting the way of seeing and thinking in design, promoting a substantial change in creative, projective and graphic thoughts.

Projective thinking has evolved and adopted various configurations in the "input - process - output" scheme over the decades, a context that oscillates between a predominance of individual creative artist processes and collective universal ones. The determining factors for this transformation were the cultural and technological context of each era, which guided the use of the most appropriate graphics (analogue, digital or hybrid) and that oscillate between a tradition or innovation in the use of technology, materials and production processes.

The context of current design demands a high level of autonomy from the designer, where it becomes an indispensable element in the entire process. The contemporary designer is freer and more autonomous in his thinking, reflecting a more active creative intelligence, both individually and culturally, enhancing the association and connection that is so important in this creative process.

It is essential that the contemporary designer is able to establish relationships, combinations and associations of content. The greater their knowledge of things, the greater the relationships created and also the innovations made. His memory should be the archive of lived experiences and, through "associative intelligence", connect past experiences with future ones, a fundamental aspect of the design process. The essence of creative thinking is to establish relationships and new combinations.

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Design for Non-designers (D4ND)



Ana Thudichum Vasconcelos, Carla Paoliello, and Ana Lia Santos

Abstract This article exposes a methodology of design workshops for non-designers (D4ND) developed in an academic context interested in (1) deepening the explanation for what is the design for non-designers and (2) the strategies which may be to provide the tools of design thinking to non-designers. It is not a matter of transposing formal training structures to non-formal training, but rather, to explore new pedagogical processes involving design students to be applied to non-designers. Design is seen here as a discipline supported by an active learning process, critical, and directed towards problem-solving. We use the word design in its broadest sense, contemplating a humanist vision capable of generating social transformations, promoting more democratic actions that aim at a better, more just and equal world. At an individual level, it can empower people (students and non-designers) to increase their quality of life. In the first part, we address the assumption of D4ND project, beginning by describing its goals and identifying its actors. Later we questioned the work process through design and how to create knowledge through the implementation of the workshops. In the second part, we expose the methodology of the exercise of D4ND and present a synthesis of its outputs: five projects. We conclude with an analysis of the outcomes of this pedagogical experience, at the level of the students, as well as the team teachers. Closing this paper with the perspective of the future of the D4ND project.

Keywords Design · Design thinking · Workshops · Pedagogical practices

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I Part: D4ND Assumption Concepts

1 Introduction

This article presents and discusses an exercise made with last year's students from Product Design Bachelor in the Fine Arts Faculty of Lisbon University. The exercise proposed to develop a design workshop for non-designers. This term non-designer was adopted to refer to an audience that does not have formal knowledge in the area of design.

As described by Vasconcelos,

The (design) teaching activities are developed around the theoretical and practical exercises (...) On one hand, guide the theoretical component, on another hand, ensure a student's work orientation base, establishing itself as the tone or as a main argument for research, exploration, development of ideas, and students' skills (Vasconcelos 2014, p. 2).

The initiative exposed here provided a new look at the design discipline in favor of ideas and actions that allow access to its concepts and methodologies. In this case, design through its conceptual, projective, and transformative capacity is at the heart of the problem that was revised to be disseminated in other fields.

2 D4ND Goals

Fontoura defends the idea of 'Education through Design' (EdaDe) which is close to the one proposed here. As the author states "the term 'through means': from one side to the other, across. The expression 'Education through Design' has been used for some time and its origin is in the expressions 'Education through Design' and 'Education by Design'" (Fontoura 2002, p.7).

In this case, 'through design' is the common denominator of the objectives of our proposal:

- to provide knowledge of the work of several leading designers and architects with the possibility of identifying their modus operandi;
- to reflect on the strategies and design tools and make intelligible the extent and complexity of the factors that most affect the exercise of design;
- to promote the development of integrated, disruptive and critical thinking and know how to apply methods of analysis, planning, organization and design management;
- to increase autonomy, the creation of common and individual values resulting from the synthesis of learning and testing, as well as rehearsing ways of approaching the discipline and its practice;

- to guide to know how to apply acquired pedagogical and scientific knowledge to the academic path and real situations. And, to prepare students to respond, monitored by the teacher, to any of the three levels of active design within the organization: the strategic, the tactical, and the operational.
- to promote the search for strategic solutions for internal communication of group dynamics management and also for visual communication of the results of the planning of the workshop activity.

By taking this knowledge out of the academy, we wanted to develop, test, adapt, and apply innovative design practices to a non-formal educational environment. To foster closer ties and strategic cooperation between institutions in different sectors of education, peer-based learning was promoted based on workshops.

This step aimed to promote the connection to other realities and to encourage multi, inter, and transdisciplinarity. Motivated by Brown's phrase (2010, book subtitle) where he considers that "design is a powerful tool", capable of providing working methodologies to intervene in very diverse areas (Vasconcelos 2017, p. 61).

Design is seen here as a human activity, as an area of knowledge, as an active process of learning and critical problem-solving. This design perspective promotes skills capable of generating social transformation; through the recovery of man's design capacity and the promotion of these more democratic actions that, collectively, aim at a better, more just and egalitarian world.

3 D4ND Actors

To disseminate this creative and innovative culture, partnerships were established with the educational services of museums and educational centers. In this way, it was possible to approach the target audience - non-designers - and promote the transfer of knowledge on the application of the methodologies, tools, and concepts studied. The institutions contacted understood the importance of this work and contributed to the dissemination of the workshops as an approach to the reality external to the academy.

They realized the design in its broadest sense and meaning, as a power able to actively collaborate in the field of informal education. As a result of this process, four types of actors were involved:

- the teachers who assumed the role of tutors and who questioned how the design, as a formative element of culture and troubleshooting process, can promote the formation of non-designers (the basic question of work);
- the students who developed their autonomy and critical capacity assumed freedom, rights, and obligations and defined how the knowledge of design can be expanded and be available to the general public. For Pilloton (2009, p. 41) "student designers are one of the few groups overwhelmingly filled with optimism and belief in the potential for design to ameliorate social ills and make life better".

- the museums, educational centers, and training centers that hosted the proposed activities. They gave space to the project experiences and made the bridge with the target audience;
- the non-designers who understood the potential of design, making use of its tools, its foundations, its working methodologies as a way to interact with material and immaterial culture and design objects.

4 Through Design?

The creation process is often a complex and open problem-solving process. For being too vague and sometimes inaccurate, Simon (1981) illustrated it as “an exploration within an immense labyrinth of possibilities”.

However, as the resolution process progresses, it can be structured and better specified. From the various possible solutions and the use of validation procedures for the design options, the solution becomes clearer. Design can then be understood as this possibility of critical thinking that offers tools to organize and seek better solutions. It is architectural thinking that is transformative, creative, and innovative.

And, what is design thinking? For many authors (Steck et al. 2011, p. 3), “Design Thinking is a mindset. Thinking like a designer can transform the way you approach the world when imagining and creating new solutions for the future”.

It is also a process, which begins with the definition of a purpose and develops through a series of questions and answers to obtain solutions (Bernsen 2006, p. 11). If designing is an activity inherent to human beings (Cross 2008, p. 11), the knowledge of the design tools activates and reveals these design capacities, helps in the interpretation of needs and the elaboration of viable solutions.

It can also be perceived through the project management function, as a conceptual activity, or even as a cultural phenomenon. It is a vehicle for social and political change, a way to make responsible decisions with planning. Andrea Branzi advocates when he said that “the design lies not in the finished products, but in the act of making them. Not in the result but the process” (Branzi apud Manu 1995, p. 63).

It is in this broad sense, that is, as a fundamental human activity (Bonsiepe 1997, p. 15) that argues the role of design as a tool that encourages creative and critical thinking with the purpose of implementing projects through know-how and critical making.

In this sense, it is believed that the design has a great potential for solving complex problems, difficult or simple, and can be a formative contribution to the overall education of all, here called non-designers. The skills associated with the design process - critical problem solving - are found in the development of creativity, empathy, autonomy, proactivity, and entrepreneurship. These features are arguably useful for people, contributing to their self-satisfaction and consequently increasing their quality of life.

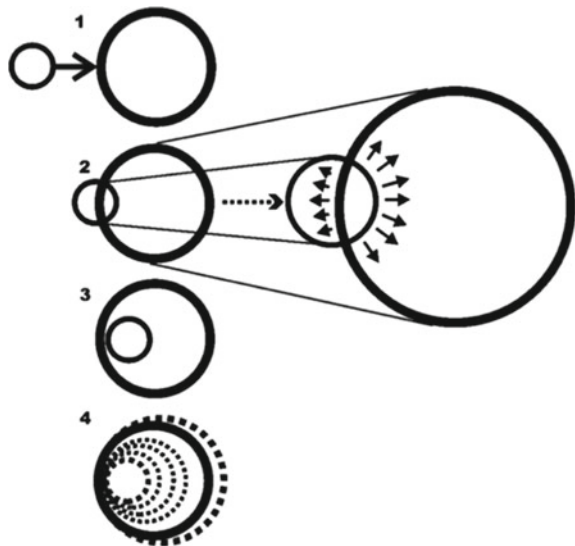
The design process or the methodology of the project needs to foster individual skills and personality profiles at various levels as Brown (2008, p. 3) values included:

- Empathy (...) able to imagine the world from multiples perspectives;
- Integrative thinking (...) not only rely on analytical processes (those that produce either/or choices) but also exhibit the ability to see all of the salient – and sometimes contradictory – aspects of a confounding problem and create novel solutions that go beyond and dramatically improve on existing alternatives;
- Optimism (...) that assumes that no matter how challenging the constraints of a given problem, at least one potential solutions in better than the existing alternatives;
- Experimentalism - significant innovation doesn't come from incremental tweaks. Design thinkers pose questions and explore constraints in creative ways that proceed in an entirely new direction;
- Collaboration - the increasing complexity of products, services, and experiences has replaced the myth of the lone creative genius with the reality of the enthusiastic interdisciplinary collaborator.

We assume that this set of skills that goes through the design process can (and should) be promoted to a wider group of people. It means involving non-designers with the procedures adopted by design (methodologies, methods, and techniques) and using them as learning resources. This is not simply a transposed projective structure for training. It is rather to identify the processes used by designers, interpret the modus operandi of the potential reference of professionals within the design culture to critical thinking, and thus explore their educational potential.

The path of this design knowledge was illustrated by Fontoura in the diagram on the acquisition/construction of knowledge (Fig. 1).

Fig. 1 Acquisition/construction of knowledge. (Fontoura 2002, p. 173)



According to this author,

The acquisition and development of skills lead to competence. This term can take on several meanings, so it is important to make clear the meaning is given. The notion adopted here is the broadest; it integrates knowledge, skills, and attitudes. It's understood as "knowing in action" or "knowing in use" (Fontoura 2002, p. 172).

Knowledge, from this point of view, does not occur through its transmission, which would result in a mere reproduction of acquired knowledge. The proposals presented for the workshops allow the appropriation of knowledge and above all, its construction. This is why they are called tools, instruments, or devices, which provide the Design Thinking, from critical thinking to critical making.

5 Why Workshops?

It is building that men become builders.

Aristóteles *in* Ética a Nicômaco

According to Scaletsky, "a workshop is a moment of creative immersion, of launching ideas that seek, through various techniques, to lead the formulation of project scenarios, creation of concepts or even the proposition of concrete first ideas" (2008, p. 1135). It is a dynamic knowledge platform and open enough to practice and collaboration. Usually, the action is directed towards a group or a system. It is considered a decentralized activity, which follows the guidelines of a monitor. It happens in a short time and is based on intellectual curiosity and unconventional attitudes towards the presentation and resolution of problems. In short, it is a field of experience.

In the Tactile Workshop's purpose, Munari states that "children need to understand and to classify, to put in order what they learn", referring to the way "communications skills are built up in language" (2004, p. 3). He adds that these moments are crucial for the preparation and development of the personality, in a performance of action without imposing oneself (Lao Tse).

The workshops have the potential to deepen, namely, concerning innovation and by generating rapid changes in those involved in the process. This statement is valid not only for those who participate in the activity itself (non-designers) but also for those who develop/create it. The contact between student-teachers was also an opportunity to work together on themes specific to the culture of design and mutual interest. The design was discussed, its essence was chosen and its form of transmission was defined.

Outside the academic scope, in contact with real life, the workshop promotes experimental research in the field. The workshop is the moment when the various topics or knowledge about design were evaluated. To measure the impact of the meeting, the focus was on creativity and innovation and to assess the opportunities of informal learning of the proposed actions.

Part II – The Design Experience

6 D4ND Methodology

As already mentioned, D4ND is the result of an exercise proposed by the subject Projeto IV, intended for students of the last year of Product Design Bachelor in the Fine Arts Faculty of Lisbon University. It was intended to actively engage students, not only in class but also in society.

From a list of given reference professionals, they studied one's works and philosophy to identify its essence and translate it into a non-formal educational activity, including its planning, organization, and evaluation. The methodology is based on selecting the work to be carried out, establishing the research objectives, developing the concept, testing it, and debating it to present the proposed conclusions.

The methodology adopted is a qualitative approach to the literature review and documentary research application in the first instance. The teachers worked as tutors guiding the students to be active agents for the development of the design knowledge dissemination process. The concepts and themes addressed in addition to those on design were inventiveness, innovation, interdisciplinarity, openness, and learning processes, especially the characteristics of pedagogy in action. Throughout the development of the project activities, they were encouraged to express their opinions, listen to other groups, discuss their ideas, and explain their decisions.

The dynamics of the workshops promoted in the students (and also in the teachers) the acquisition of management skills, namely concerning intercultural learning and social relations, and also the planning and execution of projects. Teachers essentially played the role of 'facilitators' thus allowing students to be independent constructors of knowledge.

The pedagogical theories discussed are underlying the acquisition of knowledge and learning as the constructivism school that deals with the study of cognition and cognitive processes, which describes what knowledge is and how it is reached.

The constructive view suggests that learning occurs by performing specific experiments and significant within well-defined contexts. These experiences allow them to build mental models and develop ideas, concepts, and personal strategies. The speech, activity, and reflection are constant in this vision. It explores the individual's cognitive processes (Fontoura 2002, p. 38).

The aspects of Escola Nova were also discussed, especially learning by doing philosophy. It was a pedagogical movement established by John Dewey in America and by Rui Barbosa in Brazil, based on the respect of each individual's curiosity and interests. The students were in the center of education. In the educational process, interactions with other group colleagues and an active and participative attitude were valued. Learning, stimuli and individual and group motivation were also discussed to arrive at the implicit question of the proposal for this exercise: how does real and meaningful learning take place?

The concept of openness appeared in some classes and was understood as Popper when he defined an open and democratic society, that is, a “society in which individuals are confronted with personal decisions” (1974, p. 188). The individual or the student is part of the decision-making. He interprets the world of design and chooses the direction of the activity. Umberto Eco also brought this responsibility when he assesses the active participation of the user or observer who takes on a new position and becomes an agent and co-designer (Eco 1991, p. 62).

To encourage initial research, a list with fifty names of reference professionals was available. Each group could choose only one name from this list. After this decision, students analyzed the works and philosophy, searching for the professional essence. At this moment, questions arose about what the designer’s activity is all about, which action is specific to the chosen designer, and how his work can respond to the exercise statement.

The workshop is, therefore, the representation, adaptation, and simplification of the reality studied. It is where the studied processes promote the prospective transfer of analogical reasoning to construct the “scenario” of non-formal teaching activity. Here, scenario means a space that is not necessarily material, but a possible world in which the student can act. Moodboards or other forms of concept maps served as support to represent the investigated references and acted as a lever for the creation of the ideas.

The next step was the organization of knowledge and its translation into a pedagogical activity. The proposed experience was tested, adapted, and tested again to make the most significant process. New learning was build and the expression “learning by doing” by João Amós Comênio (1592–1670) was achieved.

The participating students were not just directors/designers. They were the guinea pigs of the projects of colleagues and invited others (designers and non-designers) to participate in the process. Therefore, they tested their proposals evaluated and improved their activity proposals.

7 Design Workshops Outcomes: “w/ Saul Bass”, “Speculative Design”, “Ar-chi-tec-ture”, “Cochostruir”, “Object (Id)entity”

A good class project is combustible, it is the fuel that powers the creative engine; or put less metaphorically, it is the beginning, not the end, of an experience. (Heller 2009, p. 12)

To illustrate the results of the exercise, we present five of the proposed workshops. They are examples of the work of multiple expression protocols in groups, dialogue, writing, drawing, cutting, photography, performance, construction of models, and/or simple objects, among others. They are activities that promoted the discovery of

design as a system that generates value (political, economic, social, technological, cultural, or symbolic) transmitted as design thinking tools accessible to anyone. The workshops provided space and time for reflection and experimentation to observe, debate, imagine, and create.

The students' work was guided based on the following questions about the proposed activities:

- what was being 'drawn'?
- what was the concept/essence of the work for whom were they 'drawing'?
- how to plan and disseminate the acquired knowledge?
- what design methods and methodology were chosen to be presented?

The examples presented here demonstrate the range of the selected theme, the different realities, and different design methods worked. An action that was characterized by always stimulating creativity, seeking to develop critical thinking and finding solutions to problems.

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Workshop 1 – “w/ Saul Bass” by Joel Antunes, Natália Svabeková, Rodrigo Afonso

This workshop had as a premise to explore the work of designer Saul Bass. His minimalist and simplified approach helped to develop the creative process. The result was individual flipbooks. The workshop is intended for an audience of young people and adults, with a duration of 1 h 30. The materials needed were colored and white sheets, scissors, glue, with which a sequence of actions was carried out (Fig. 2).

Workshop 2 – “Speculative Design” by Inês Guimar, João Calado, and Xavier Guerra

This activity introduces the speculative design of the duo Dunne & Raby through the conception of a project for an alternative reality. Following design thinking, sheats were made with questions that instigated creativity. Diagrams illustrated the concepts related to speculative scenarios, a list of future assumptions were used, and also cards for describing the proposal were created (Fig. 3).



Fig. 2 Workshop 1 plan and photos of one of the tests performed

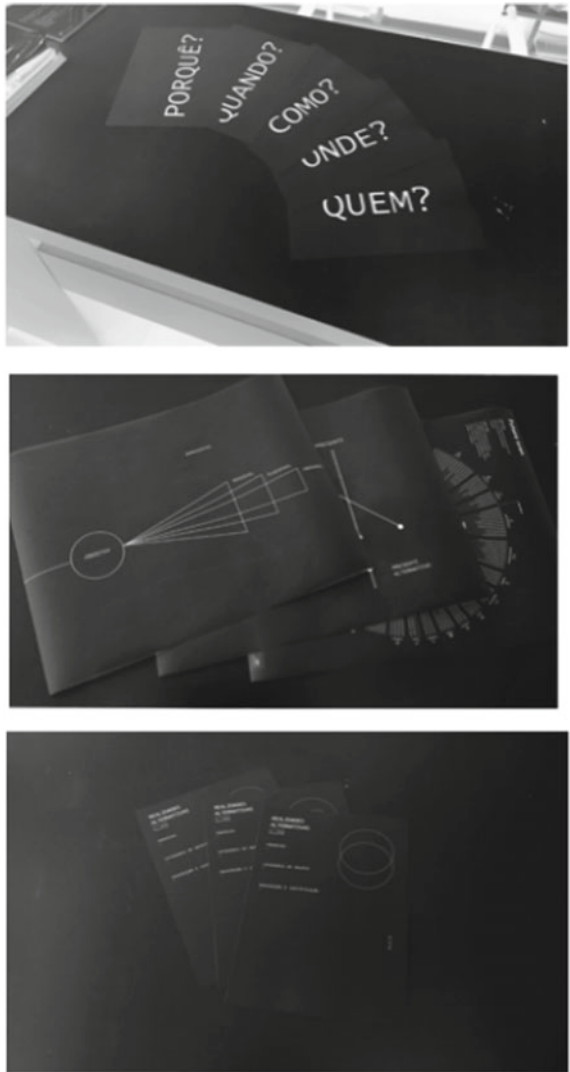


Fig. 2 (continued)

Workshop 3 – “Ar-chi-tec-ture” by Marta Bat and Stijn Haegen

This activity (Fig. 4) aims to introduce the architect Peter Zumthor to those interested in architecture and interior design. The proposal is based on a construction kit (Fig. 5). Spatial speculation occurs not only through the use of the pieces available but also through a re-look at everyday textures that were transformed into backgrounds in the creation of new worlds (Figs. 6 and 7). The exercise covers the dimension of the micro to the macro, from the specific to a general situation, from the solved to the act of solving.

Fig. 3 Toolkit created for workshop 2



Workshop 4 – “Cochostruir” by Ana Margarida Lapa, André Monteiro, and Joana Santos

Its purpose was to contextualize the designer Naoto Fukasawa (Fig. 8) and explore the object production processes, using experimentation and prototyping (Fig. 9). The students wanted to encourage participants to formulate objects’ hypotheses that would respond to what was proposed: the handmade production of a ‘cocho’ (Fig. 10)

WORKSHOP PEDAGOGY

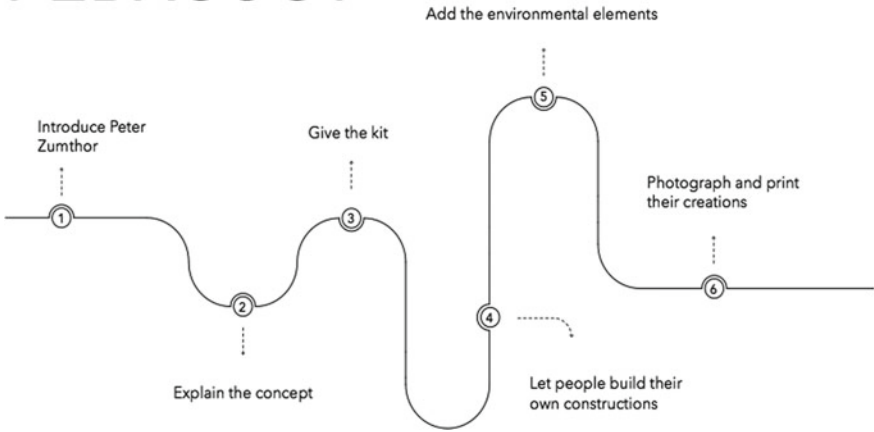


Fig. 4 Planning the workshop 3



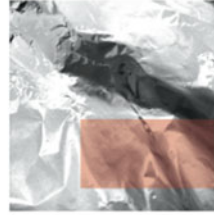
Fig. 5 Constructive kit developed for workshop 3

from simple materials such as cardboard, glue, paper, scissors, x-act, ruler, plaque board, pencil, eraser. They used design thinking as a tool to look at a traditional object that is no longer used today, to exalt its primary function and to investigate current solutions for drinking water.

Workshop 5 – “Object (Id)entity” by Maria Amélia Silva, Gustavo Calé, and Mariana Martins

Andrea Branzi’s work and philosophy is the starting point for this activity. The theme started from the dichotomous premise ‘object-culture’ with the elaboration

VISUAL RESEARCH OF MATERIALS !



We tried to take materials out of
there context and creat a whole now
scene with some basic materials.

BREAD



Fig. 6 Visual and material research

of a cultural scenario and after the integration of a sitting artifact in the projected context. The general objective is to reflect on the current society through brainstorming and theoretical discussions. A project activity of creating an object happened at the end (Figs. 11, 12, and 13).



Fig. 7 One of the built scenarios



Fig. 8 Presentation of the studied designer

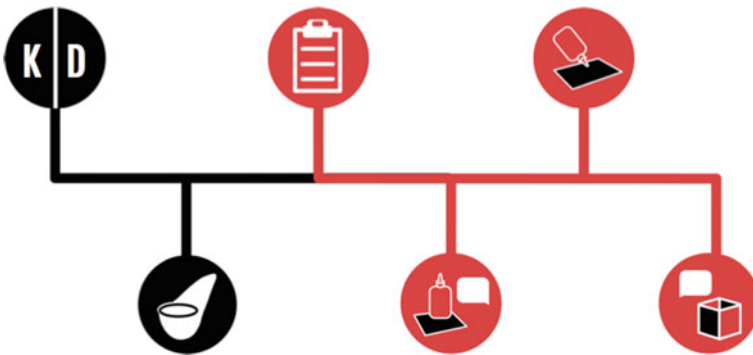


Fig. 9 Workshop 4 plan of action

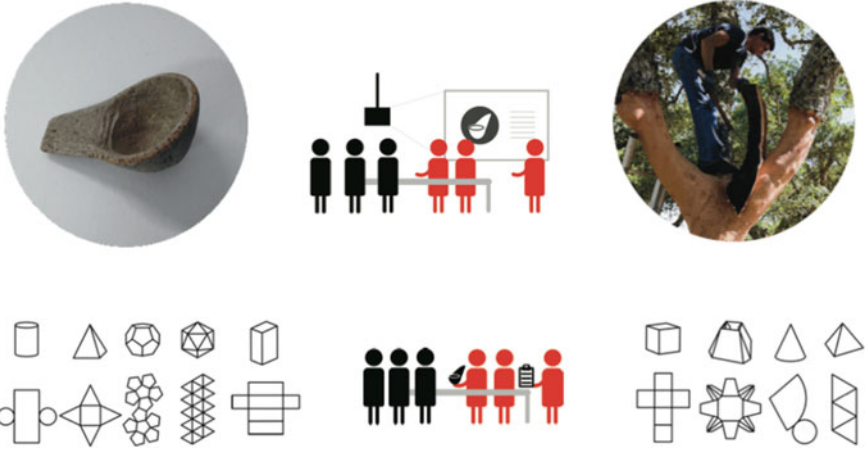


Fig. 10 Workshop 4 organization



Fig. 11 Phase 1 of workshop 5: discussion on objects for a society

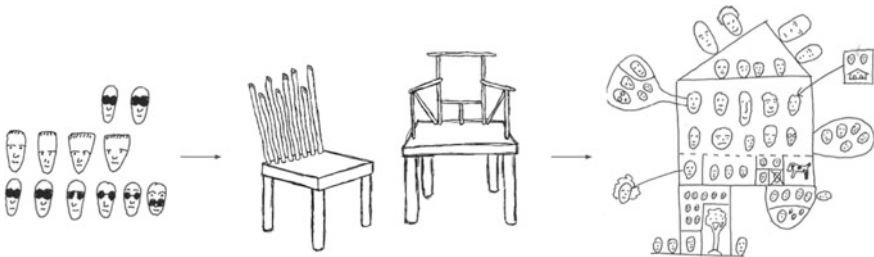


Fig. 12 Phase 2 of workshop 5: discussion on societies for objects

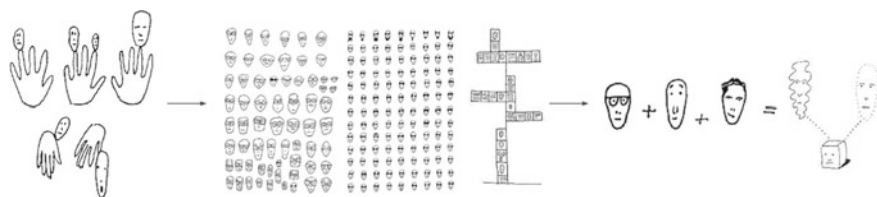


Fig. 13 Phase 3 of workshop 5: development of a scenario and an object about the created society

8 Final Remarks

Creating design workshops for non-designers helps to disseminate knowledge about the designer's activities and the skills associated with design thinking. However, these examples were not only to complement and assist the formation of others (non-designers), but also to empower the students involved. In the classroom, their self-transformation was perceived as a participatory actor, conscious of their profession and skills. They became aware of design methods and simplified this knowledge, realizing that they were able to disseminate them.

In structured workshops, there was the development of an imaginative reflective and critical mind, architectural design thinking, creativity and generalist thinking, observation skills, and learning through experience. We worked with ideational, associative, and expressionist fluency; with concepts of originality and innovation; symbolic and semantic redefinition.

When the workshops were held, students realized the importance to be open to the real world and real people. They also realized that the university could be integrated into the community; as a meeting and learning place. The design has this capability as a discipline to empower, imagine, express, social act. The design 'building through experience' method shows a way to do better.

This was an important experience that still has much to be explored. Future work will be to develop strategies for the implementation of a program of 'education through design' suitable to the Portuguese educational reality. It is a future project that will disseminate design and its creative and innovative culture.

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Codesigners of Classroom 52: A Case Study for Codesign in Active Citizenship



Olga Glumac and Maria Raquel Canedo de Sousa Morais

Abstract This paper analyses the potential of working with the principle of *codesign in active citizenship* as an objective and a process in the vocational education at the secondary level. The authors of this paper developed and implemented a case study of graphic design education through codesign practice in Porto, Portugal, with youngsters of age between 15 to 17 years old. The key findings of the paper stress that the: i) stronger connection between the designer's professional role and civic responsibility could be encouraged by staging the *codesign in active citizenship*; ii) design students have the capability to share and own responsibility of codesign when working together on the real-case scenarios; iii) additional research on the impact of individual design methods is needed, especially when working with non-designers.

Keywords Design education · Codesign in active citizenship · Youth

1 Introduction: Codesign in Active Youth Citizenship

This paper reflects on youngsters' codesign practice of the learning processes through co-creation with their peers and other relevant stakeholders of the vocational design and art education at the secondary level. If the students are not considered and evaluated solely as the *professionals-in-making*, don't they have the right to not only co-produce the final work but also to co-create the trajectories for the codesign and co-production processes? In order to do so, how can *codesign in active citizenship* facilitate building such capacities of young designers within an age bracket of 15 to 18 years old?

These are some of the questions that the paper attempts to address through a concept of *codesign in active citizenship* and to advocate for the expansion of youth

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civic participation in the classroom. The first necessity is to create the conditions in each classroom for the intergenerational collaboration, based on learning and knowledge exchange. Subsequently, the idea is that codesign is a tool that enables negotiation between motivational drivers and learning needs of the individuals/peers and the curricula and conditions existing in the learning environment. The second necessity is to shift the responsibility of facilitation from the adult-experts to young learner-citizens. This is achieved by encouraging youngsters to own and share the responsibility for learning creation and acquisition about and with each other.

The professional design schools were developed at the beginning of the XX century. Their purpose was to give the meaning and to indicate specifications of designer's profession, departing from traditional arts and defence of universal, scientific and political assumptions for solving the problems. Moreover, the central issues were the form and function dichotomy and the overtake of mass production, to produce objects which are more accessible and designed for everyone, and linked to democracy and issue policies (de Sousa Morais 2015). Today designer is not limited to transmitting a message and to giving the shape to information, either his own or someone else's. The designer can conceive and deal with the message by creating a ground for transmission and sharing, making the recipients intervening in the content and sending new messages. Design, in addition to the eternal connection to the craft and technologies, also has a connection with the arts and concerns felt in today's society (de Sousa Morais 2015).

2 Design Education at the Secondary Level in Portugal

In Portugal, the vocational education at the secondary level was designed in 1989 to increase the literacy and employment rates of young professionals who didn't necessarily want to pursue higher education (de Sousa Morais 2015). This implied that the measure exists to combat early school leaving, thus, to invest in increasing 'the number of vocational training routes leading to dual certification of academic and vocational abilities' (Cedefop 2020). Each professional course is conducted through 3-years-long schooling and corresponds to the 10th, 11th and 12th grades of the Portuguese formal education system.

Design education curricula at the secondary level are focused on the provision of professional courses, such as the product design, multimedia, fashion design, web design, 3D digital modelling and animation, and graphic design. The educational activities are usually project-based, therefore, the students have an opportunity to develop and implement their design experiments and to learn-by-doing through the learning modules/themes (e.g. illustration, visual identity, movie, campaign, among others). These modules are a division of the course programme into independent and concrete units which can work solely or intertwined. Considering the progression and rhythm of each student's capacity-building there is a possibility of different modules coexisting in the same classroom (de Sousa Morais 2015).

The attendance of such professional courses can support youngsters to acquire their designers' competencies which are needed for solving problems of tangible and thematic matters of concern. The overall idea is that after the conclusion of the course each student should be task-oriented and ready for the labour market and work in the specialised service area. Conversely, design education doesn't necessarily tend to explore the connection between a professional and a *codesigner-learner-citizen* role (of intangible and process-oriented nature). In this case, the *codesigner-learner-citizen* role refers to experiencing design practice more than for a professional purpose – it is about individuals increasing their levels of self-discovery and self-efficacy while creating for a common good/shared objective.

Subsequently, the questions of student's social identity and social responsibility practice require to be addressed in design and art learning modules and curricula. The authors of this paper argue that the stronger connection between the designer's role and codesign in active citizenship concept should be explicitly stressed in the processes of capacity-building for professional purposes. Hence, the integration of the transversal competencies such as learning to learn and social responsibility/social and civic competency and appropriation of the codesign tools into the learning modules implementation is needed (Glumac 2018).

The projects led by the students encourage the development of a relationship with knowledge and graphic design, and a better understanding of the methodological premises in design and education, as a tool for the construction of the young author (de Sousa Morais 2015). This young individuals thus can construct and reconstruct their identities, from the experiences and meanings, in a continuous and dynamic way (de Sousa Morais 2015). The young author thus appears as an active agent of the process and as the person in a 'unity of body and mind, bearer of singular experiences, memories, skills, intelligence and culture' (Quental 2009). Any design project could be seen as a process of construction of subjective meanings that can create emotional and affective limits between students, teachers, in a class and a school (de Sousa Morais 2015).

The question of authorship largely depends on the capacity of young individual/student/designer to provide answers that could maintain the same threshold faithful to a set of characteristics (Alves 2013) and liberties to the expression and creativity. The young student should be able to develop personal references that will allow the development of a personal style, thus, to have the authority in the action and creation. Being an author is seen as a fundamental pedagogical strategy. When establishing the environment and providing students with tools, the possibilities open up for experimentation and learning. This is somewhat still innovative approach for the aforementioned target audiences and vocational schooling ecosystem in Portugal.

3 Staging Codesign in Active Citizenship

The concept of codesign in active citizenship is a set of praxis principles when designing with, for and by youth (Glumac 2018).

The first praxis principle is to stage codesign in active citizenship in a way that can intertwine the concept of Youth Participation (Hart 1992); (Glumac 2014) with the Design for, with and by people (Lee 2007). As seen below in Table 1. The three highest levels of Hart's *Ladder of Children Participation* are observed and compared in the design process. The indication is that co-creation through codesign and co-production involves all three levels of engagement, however, it emphasizes the need of deliberate intention to design with and by young people (for example see the concept of youngsters as participants of design processes (Druin 2002), as protagonist (Iversen et al. 2017), and co-researchers (Van Doorn et al. 2016)), and not just for the young people. Design for young people is a precondition, and possibly a measure to confirm and validate the design outcomes with other youth – the non-participants.

The second praxis principle is that the codesign in active citizenship is composed of three pillars: youth participation, youth power and youth empowerment (Glumac 2018); (Glumac 2014). These are the preconditions for the individual citizenship practice in which any individual builds capacities (youth self-empowerment) by exercising the highest levels of youth participation and youth power over the processes, recognised through the intergenerational collaboration and codesign of educational activities.

The third praxis principle is to organise peers to working together as a community of co-learners-citizens and codesigners. This is usually achieved through developing a codesign educational programme within the classroom in the lab format in which codesign experiments are developed and implemented by youth, and the outcomes are validated and evaluated by the class and their peers that are affected by the design solution (Glumac 2018).

3.1 Student's Social Identity and Roles

The sense of belonging to the specific group/community influences the outcomes of the situated co-creation (codesign and co-production). The codesign in active citizenship doesn't only relate to the engagement of and giving power to the youth, it also depends on how the relationships are explored and constructed during the

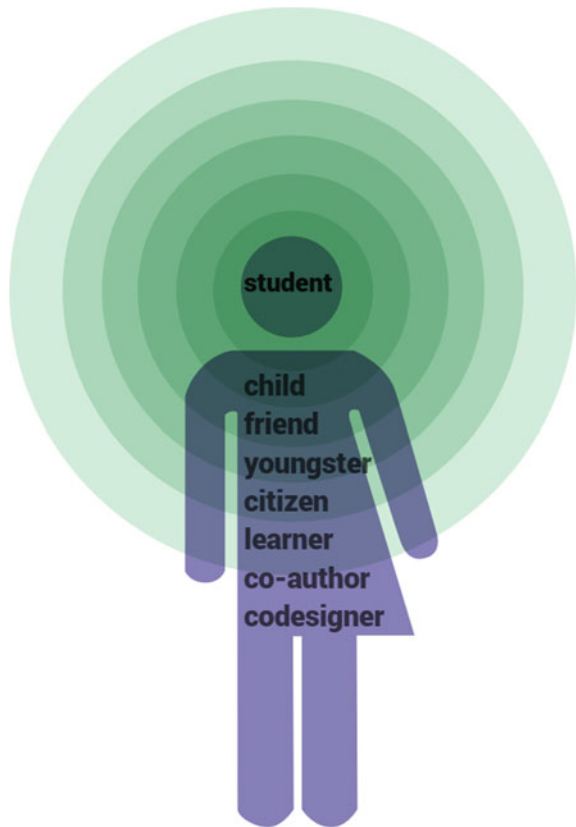
Table 1 First conceptual praxis of codesign in active citizenship

| | |
|--|---|
| Youth participation (Hart 1992) | (Co)Design for, with and by youth (Lee 2007) |
| Youth-initiated, shared decision-making; Youth-initiated and led | Design <i>by</i> young people—youth is owning and leading the process as codesigner-learner-citizen; adult-codesigner has a punctual role of a coach but interpheres only when necessary; |
| Adult-initiated, shared decision making | Design <i>with</i> young people—codesigner is sharing the design process with young people, who become active participants in the work; |
| Youth as consulted and informed | Design <i>for</i> young people—when designer studies and consult young people as experts of design process; |

intergenerational collaboration (Glumac 2018). For example, at certain moments of co-creation, young people could explore some of their social roles more than the others. Some of the roles recognized throughout the so far work are student, child, friend, youngster, citizen, learner, co-author, codesigner, participant, end-user (see Fig. 1).

In different occasions, young people can sense belonging to the class and their role of students/colleagues will be more dominant. In other situations of informal talk and exchange, the dominant role could be one of a friend/peer. To learn to recognise when the role of citizen, co-designer/co-author and learner are active and dominant, for that it serves *reflection-in-action* (Schön 1983) based on peer learning and collective reflections. The outcome of self-discovery in the participatory process supports individuals to acquire self-awareness and understanding of their roles and meanings in the contexts. Mastering the social role, levels of responsibility and ownership will make any young individual expert of their experiences. The same exercise goes for the adults/teachers who participate in the process. They are thus encouraged to re-establish their relationships with students and explore less authoritative roles such as the role of participant, codesigner, colleague, coach/moderator, among others.

Fig. 1 Social identity and roles of students



3.2 Competence Framework

To work with the conceptual framework of codesign in active citizenship in the vocational education at the secondary level dedicated to art and design education, the authors stress 2 transversal competencies which can encourage youth to build capacities for and in the co-creation processes. These are learning to learn and social and civic (collaborative) competency and were introduced by the European Union's framework of the Key Competencies for Lifelong Learning (2020). In practice, when students of specific profession acquire knowledge, skills, attitudes, values and dispositions of the aforementioned competencies, it means that they are building resilience to everchanging reality and are more confident and prepared to confront and act upon their beliefs. Subsequently, this means that they are increasing their levels of self-awareness and self-efficacy.

Conversely, the key competencies and its descriptions were elaborated and appropriated to the framework of codesign in active citizenship and the target audiences (i.e. local youngsters) as briefly shown in Table 2.

Table 2 Key competencies for codesign in active citizenship

| Key competency | Description |
|--|--|
| Learning to learn: Authorship; | Students understand that they are the (co)authors of their learning processes and learning outcomes; and that their role of learner stays with them after the completion of the compulsory education |
| Learning to Learn: Self-awareness and Self-efficacy; | Students are aware of their capabilities and what they can learn with and from others; Students understand experiential learning cycles and how iterative processes of co-creation function; Students build disposition to acquiring new knowledge and skills in regard to their abilities to collaborate and co-produce tangible results; |
| Social and civic competence: Social responsibility and collaboration; | Students have a sense of responsibility towards the collaboration; |
| Social and civic competence: Citizenship practice through codesign; | Students understand their role in society and their actions with civic responsibility, as they have an ability to use and practice power, therefore, have sense that their (co)designers-citizens' actions matter; Students have an ability to understand and address societal challenges of relevance to them and their surrounding; |

4 Educational Codesign Programme: *Codesigners of Classroom 52*

The educational codesign programme entitled *Codesigners of Classroom 52* has been developed in one of the Porto's vocational art schools for a period between 9 April and 14 May 2018 by the Lab of Collaborative Youth (LoCY). It was implemented within the discipline of graphic design and in the learning module *Visual Identity* proposed to the 10th-grade students (first year of the secondary education) of a respective school. This programme aimed at shaping experiential and experimental learning spaces in which youngsters are encouraged to learn how to learn as the individuals responsible for their capacity-building and of their peers, yet with the support of adults, when required. As design practitioners, they were thus challenged to experience the co-creation and practice their power in decision-making and co-management of the overall codesign processes. The programme has had an action plan structure similar to the one of the learning module within a curriculum or project-based learning (PBL). It identified and counted of the following elements:

- Learning aims and specific objectives;
- Desired outcomes as the performance indicators;
- Methodology with the appropriated design methods and tools; and
- Validation, monitoring and evaluation tools and techniques embedded in the programming.

Conversely to the strict learning module, the way codesign programme is built, reinforces the idea that the learning is:

- Open-ended: therefore, learning needs, motivations, expectations, are defined and redefined inputs/elements that through iteration change the course of action in planning and managing learning;
- Challenge-related: instead of specific discipline and linearity, the process is built on multidisciplinary and lateral thinking;
- Co-created: between students/peers and other stakeholders in the process of negotiation (individual vs. collective);
- Iterative: after each session/experiment, there is a moment of reflection and readjustment;
- Fostering self-efficacy: therefore, encouraging youngsters to follow their path of self-awareness and self-discovery;
- Based on a qualitative evaluation through individual and collective reflection-in-action.

Following these principles for staging the intergenerational collaboration and codesign in the classroom, the authors together with the third facilitator prepared 4 working sessions organised every week and a final evaluation session as shown in Table 3. Within the specified timeframe, the class of design students/participants was invited to codesign the visual identity of the local informal platform that promotes

Table 3 Overview of the codesign in active citizenship processes

| Session #, Date | Activities | Participants | Process documentation and data collection |
|--------------------------------------|--|--|---|
| Working session #1, 9 April 2018 | Getting to know each other; Getting to know the projet of informal platform for intergenerational codesign; Learning about codesign through sensitization and codesign challenge; Setting up the expectations for the next sessions; | 25 youngsters (17 female students, 8 male students), 1 teacher, 1 youth worker/psychologist, 1 youth worker/design researcher; | Audio and video recordings; Field notes; Session plans and post-evaluation; Facilitators' reflective discussions; |
| Working session #2, 16 April 2018 | Codesign in definition; Action plan and time schedule; Ideation through defining key concepts, textures, colours which are integrated in the mission of the platform (i.e. Moodboard); Working groups and discussions; | 25 youngsters (17 female students, 8 male students), 1 teacher, 1 youth worker/psychologist, 1 youth worker/design researcher; | Audio and video recordings; Field notes; Session plans and post-evaluation; Facilitators' reflective discussions; |
| Working session #3, 23 April 2018 | Prototyping - first sketches of the logo (shapes, colours, textures); Formation to larger working groups and discussions; | 25 youngsters (17 female students, 8 male students), 1 teacher, 1 youth worker/psychologist, 1 youth worker/design researcher; | Audio and video recordings; Field notes; Session plans and post-evaluation; Facilitators' reflective discussions; |
| Working session #4, 30 April 2018 | Voting and discussion for the single solution; Formation to the single working group and co-production of the final visual solution of the informal platform; Division into different working groups for logo, colour coding, typography, writing manual on the graphic standards for the use of logo; | 25 youngsters (17 female students, 8 male students), 1 teacher, 1 youth worker/psychologist, 1 youth worker/design researcher; | Audio and video recordings; Field notes; Session plans and post-evaluation; Facilitators' reflective discussions; |

(continued)

Table 3 (continued)

| Session #, Date | Activities | Participants | Process documentation and data collection |
|---------------------------------|--|--|---|
| Evaluation session, 14 May 2018 | Self-evaluation and evaluation of the peers; Collective discussion on the process and achieved outcomes; | 25 youngsters (17 female students, 8 male students), 1 teacher, 1 youth worker/psychologist, 1 youth worker/design researcher; | Audio and video recordings; Field notes; Session plans and post-evaluation; Facilitators’ reflective discussions; |

intergenerational collaboration through codesign. The outcome was a single solution to which ideation, prototyping and co-production each student contributed equitably.

4.1 Participants’ Selection

The school teacher and 2 external facilitators gathered around the idea to develop a collaborative project with the graphic design students. The youngest grade was chosen as this was an opportunity to sensitise the class for long-term collaboration and mutual support in their vocational education. The desired outcome was to create a community of co-learners sensitized to codesign practice. The class of 25 students was composed of 17 girls and 8 boys, with an age bracket between 15 and 17 years old Fig. 2.

4.2 Procedures

Codesigners of Classroom 52 was a programme formatted as a collaborative lab for design experimentation and active *learning-by-doing*. Considering the framework of codesign in active citizenship, the graphic design class pretended to be a “real” design studio as in the professional life and the unit was the *Visual Identity* module. The programme’s codesign methodology was divided into:

- Preliminary exploration (context, partners, (co)design challenge);
- Learning design (iterative pedagogical scenario of planned learning sessions/activities):
 - Exploration (pre-assessment of needs, participants’ profile, challenges);
 - Design of the learning cycle for each session/experiment;
 - Implementation of the session/experiment;
 - Reflections (participants; facilitators);



Fig. 2 Students-participants in the classroom 52 (Graphic Design)

- Final evaluation (group reflection and validation; self-assessment);

In addition, the organisation of learning was composed of several units:

- Raising awareness among design students towards co-creation (codesign and co-production) of design solutions;
- Learning-by-doing on how to design a visual identity;
- Implementation of the co-creation (codesign (ideation, prototyping) and co-production) of the visual solutions;
- Establishing norms for collaborative peer practice and forming a community of co-learners.

In total, design students spent 10 h developing visual solution, and a couple of hours in evaluating the participatory process, collaboration, achieved results and mastering codesign as a community of co-learners. Regardless of installing the collaborative lab, the design students would have the learning module implemented and they would be evaluated according to the achieved results. The team of facilitators (teacher, youth workers/design researcher) proposed the collaborative project to the class and asked everyone's opinion about working together on a singular solution. The tangible idea was proposed (= a concrete case of the informal platform).

For each co-creation stage, specific design and learning tools were used. They aspired design students to move, draw, think, tell stories and discuss certain aspects of the processes, having in mind their roles as colleagues, co-designers, co-learners and citizens. In the following text the methods are explained in more detail (Fig. 3):

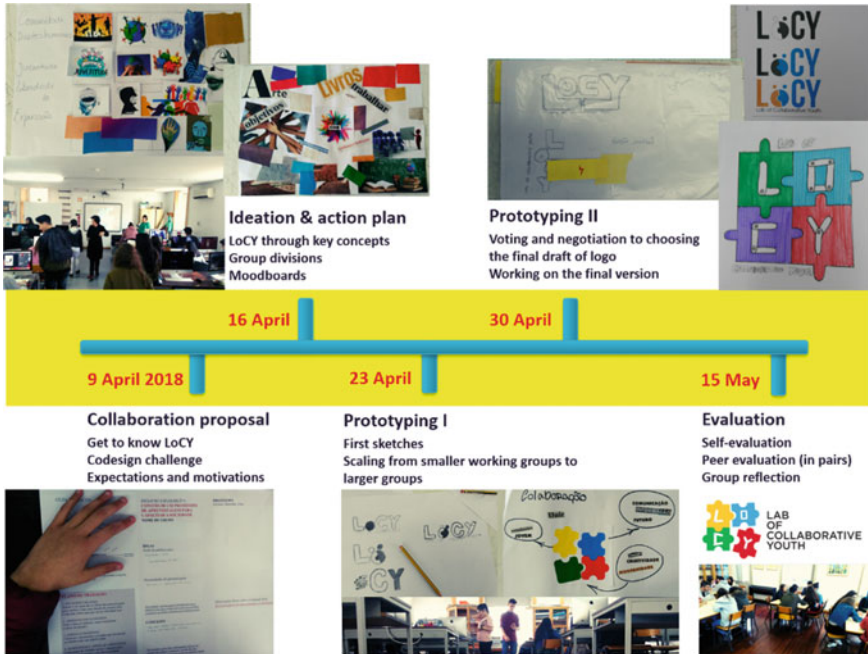


Fig. 3 Overview of design tools and methods for each workshop/participatory session

- Codesign challenge (Working session #1)**
This method (see Fig. 3 and 4) was developed in order for youngsters to learn that they can codesign tools pertinent for them and their peers. The proposed challenge was to co-create a learning tool for themselves and their peers which could be used in their classroom.
- Jogo de macaco (Working session #1)**
To introduce the informal collaborative platform as a case study and a subject-matter for developing the visual identity, the team developed a game through which students playing together learnt about the aim and objective of platform, about the mission and vision, application of codesign methodology, as about the previous projects developed by their peers. Meanwhile, they also practiced team work and active listening, as each of them was introducing new information at every step of the progress in game.
- Ideation through Moodboard (Working session #2)**
The moodboard tool was used to translate identified key concepts to visual representations by playing with ideas on patterns, existing inspirations, colours, font, images, etc. (see Fig. 5).
- Prototyping (Working session #3 & #4)**
In the working groups, students had to set up their rules and principles of collaboration and to develop the first prototypes of the logo (see Fig. 6). Afterwards, 28

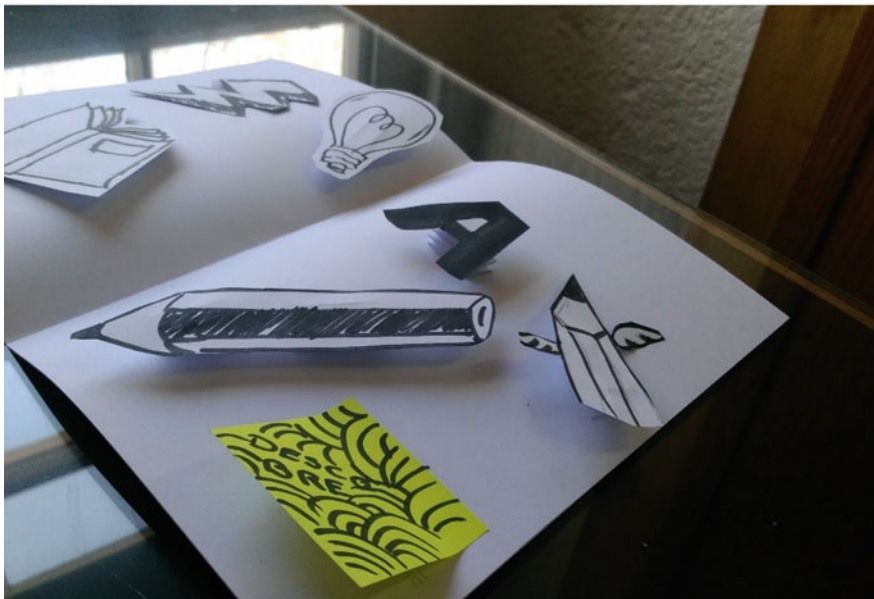
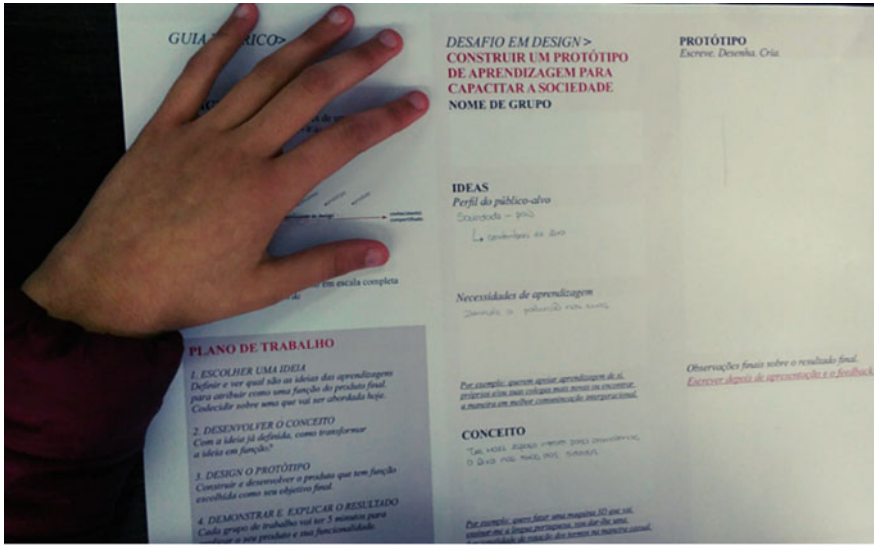


Fig. 4 Codesign challenge: Handout as a design tool for ideating and prototyping of design solutions (top); Example of co-produced solution prototypes (bottom)



Fig. 7 Logo: prototypes (top); final solution (below)

To conclude, applied design methods, tools and techniques were appropriated and adjusted to the learning module and design students' profiles. Hence, they served to engage and guide students to sharing responsibility and ownership in creating one visual solution, instead of 25 (see Fig. 7).

4.3 *Quality Assessment and Evaluation*

From the previous experiences of working with youngsters and young people (Glumac 2015), the team knew that it is important to make concrete proposals and results in a measurable way, and straight from the beginning. Working with a 'real' client in a vocational and professional environment gave to the students special disposal and focused action. The students appreciated to have something to work on and to negotiate, rather than to initiate a process from a too abstract perspective (= focus only on the process, rather than on the results). Subsequently, design students received an opportunity to work for the first time on the real-case scenario which, according to them, has increased motivation to developing qualitative work. The 'real' client has also given them different feedback from the one usually received

from the teacher: it’s a test to the competencies learned at the school, yet, design experiments in the professional area, also tests the quality of the teaching.

To assess the quality of collaboration, achieved results and learning outcomes from peer and intergenerational learning and students’ perspective, the facilitators’ team developed three iterations of which the first two were interlinked (implemented at the same time):

- Self-evaluation;
- Peer evaluation (in pairs); and
- Group reflection.

It seemed more appropriate to start with group analysis and encourage the group to collectively reflect on the following aspects:

- Students’ participation and engagement;
- Students’ learning outcomes;
- The relevance of project and results; and
- Collaboration and responsibility.

This was implemented in three groups with a *world café/carousel* technique, therefore, each table presented a specific topic to write about on the large sheet of paper (see Fig. 8). The groups would change tables every 15 min and would read existing contributions and think of the missing ideas/feedback. At the end of the exercise, the groups came back to the initial table/topic and made a summary of written contributions. The whole group discussed summaries and looked into potential improvements.

The students appreciated the real-case project and indicated the following acquired competencies:



Fig. 8 Collective reflection in a school library

- Concentration/task-orientation;
- Receiving the feedback;
- Parallel co-production (task-efficiency); and
- Teamwork and codesign also mean time management and discipline.

Considering the students had to receive a final grade for this project, the idea was to introduce the self-assessment tool (see Fig. 9) that would be used by students to evaluate themselves and their peers (pair colleague).

The results of the tool were quantified and inserted in the evaluation/grade matrix which allocates a maximum of:

FICHA DE AUTO-AVALIAÇÃO

Escola Artística e Profissional Álvaro

DISCIPLINA: DESIGN GRÁFICO MÓDULO: 4 (Identidade Visual) ANO: 2017/2018

NOME DE ALUNO/A: _____

Nº: _____

TURMA: _____

Assinalar com uma cruz por cima do retângulo que achar correto:

| COMPETÊNCIAS SOCIAIS - COLABORAÇÃO | | | | |
|---|--|--|---|---|
| Competências | Não satisfaz | Satisfaz | Bom | Muito bom |
| Responsabilidade social durante o co-trabalho (trabalho em equipa) | Não tive nenhuma responsabilidade no co-trabalho e no resultado do grupo/par envolvido | Tenho alguma responsabilidade no co-trabalho e no resultado do grupo/par envolvido | Sinto-me responsável e tento co-trabalhar e contribuir para o resultado do trabalho no grupo/par envolvido | Sou sempre responsável: co-trabalho e contribuo para o processo e para o resultado do grupo/par envolvido |
| Solidariedade | Nunca ajudei os colegas | Às vezes ajudo os colegas | Tento ajudar os colegas | Ajudo sempre quando tenho oportunidade em ajudar (quando pedem ou por minha iniciativa) |
| Co-decisão no co-trabalho (trabalho em equipa) | Nunca dei feedback e nunca participei ativamente no processo de co-decisão | Às vezes participo na co-decisão | Tento participar ativamente na co-decisão: dou feedback e ideias durante o co-trabalho | Sempre dei feedback, ideias e razões para a minha opinião como contributos para co-decisão no co-trabalho |
| Comunicação assertiva - feedback dos colegas sobre o meu desempenho | Nunca aceitei o feedback dos colegas sobre o meu desempenho no co-trabalho | Às vezes ouço o feedback dos colegas sobre o meu desempenho durante o co-trabalho | Muitas vezes ouço e aceito o feedback dos colegas sobre o meu desempenho no co-trabalho | Aceito sempre o feedback de forma positiva sobre o meu desempenho durante o co-trabalho |
| Comunicação assertiva - o meu feedback sobre o desempenho dos colegas | Nunca dei o melhor feedback aos colegas | Às vezes tento dar o melhor feedback aos colegas | Tento muitas vezes construir e dar o melhor feedback aos colegas | Estou sempre a dar o melhor feedback aos colegas |
| Respeito pelo outro | Nunca respeitei um colega com quem co-trabalhei | Às vezes respeito alguém com quem co-trabalho | Tento mostrar respeito e respeito os colegas com quem co-trabalho | Mostro sempre, sinto e promovo o respeito dentro da equipa. |
| Interculturalidade | Nunca respeito ou não gosto de co-trabalhar com alguém muito diferente de mim | Às vezes co-trabalho com alguém que tem interesses e formas de trabalhar diferentes dos meus e está ok | Tento trabalhar com pessoas diferentes e vejo valor para poder co-aprender com eles (experiências diferentes das minhas, etc) | Gosto muito de co-trabalhar com pessoas diferentes e partilhar experiências, aprendizagens e culturas durante a nossa colaboração |
| Gestão dos recursos (tempo, materiais, espaço) | Não consegui gerir bem o tempo, os materiais e o espaço de trabalho | Consegui gerir mais ou menos o tempo, os materiais e o espaço de trabalho | Consegui gerir bem o tempo, os materiais e o espaço de trabalho | Consegui gerir muito bem o tempo, os materiais e o espaço de trabalho |

Fig. 9 Self-assessment tool

- 50% for active involvement in the process (participation and engagement; collaboration and responsibility);
- 10% as a merit of the achieved result (the final version of the logo);
- 20% as a result of self-assessment (self-assessment; peer self-assessment);
- 20% for presence.

The average grade was 19/20.

5 Findings

The educational codesign programme offered tasks that are different and students could interact and learn with each other. This helped them to practice codesign methods, as they were motivated to practice their power and freedom as the co-authors. From analytical point of view, new links between students’ social roles and competence framework were verified (see Fig. 10).

Firstly, from a perspective of the *learner*, new competencies confirmed useful: social responsibility and collaboration; and citizenship practice through codesign. Secondly, concerning the *codesigner*, the link has been made with the competency of learning to learn (self-awareness; self-efficacy). Finally, from the perspective of

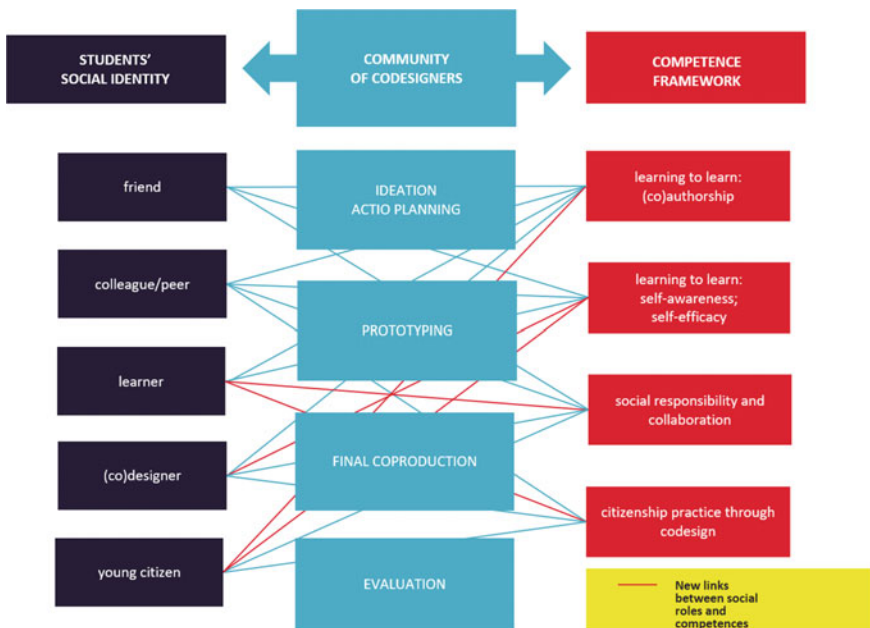


Fig. 10 Synergy model between social roles and competences

a *young citizen*, one should be aware of right and know-how to (co)authorship and self-awareness and self-efficacy.

6 Discussion and Conclusions

The implementation of the learning modules at the vocational design schools do not necessarily correspond to the daily reality and needs of companies and regions of the country, yet, they are programmed to obey specific political, economic and personal interests (de Sousa Morais 2015). This activities developed in those learning modules can have the influence on the students' acquirement of knowledge, self-organisation and self-determination in the professional work. The sense of responsibility developed in and through the students' actions had an impact on the final result and in the conduct of daily procedures with their peers.

Therefore, the authors think that the classes in which graphic design is being studied and practised, combining teachers and students engagement, should have a constant flow of the reflection about the design process, thus, the collective conscience about the world around, and the concerns about the individual concerning the community, in respect of the existing culture and traditions. The co-created solutions become secondary and they are just a pretext of interconnection and construction of affective group relations. In the learning environment students should be encouraged to "grow" as citizens concerned of their social roles, actions and choices to be made in their lives, as they become more aware of the possibilities and the use of tools for the unpredictable future (de Sousa Morais 2015); (Glumac 2018).

The role of the teacher is not only to teach the subjects of the curricula but also to try to pass on to the student the awareness of the responsibility that has as an author of his life. The teacher should be willing and able to coach each student on how to raise self-awareness and increase the sense of responsibility and authorship of one's life; and to recognise and promote co-creation phases when developing learning modules.

The vocational school must act as an alternative space to unify and promote the significance of the concept of learning. It should be common that school and teachers create a space for discussion and freedom.

7 Future Work

The codesigner-students of this case study have expressed their interest in continuing the use of codesign practice in the learning modules related to graphic design. Moreover, in the following semesters (2018/2019), they implemented 2 other codesign projects with the support of their graphic design teacher (one of the authors of this paper).

The *Codesigners of Classroom 52* was the 4th educational codesign programme implemented by the authors of this paper. The authors plan to invest further into design

research of measuring the impact of tools and methods applied, so to understand how the scaling deep, out and up could be arranged in the vocational school context and the city.

LoCY intends to popularise codesign as a pedagogical method in the school context, not only in graphic design or technological classes but also, in so-called “theoric” classes combined with projects and interdisciplinarity. The final goal should be to have projects instead of classes. In addition, LoCY aims to popularise the use of youth-led codesign as a tool for developing/elaborating youth policies (= give tools to youngsters that provide self-awareness to manage their future).

Acknowledgements We are thankful for the openness and responsiveness of the vocational art school and its school community to letting us develop this voluntary project together. Special thanks for the *Codesigners of Classroom 52* who sustained their eagerness to learn from each other and stay together, to reach further, as a community of co-learners.

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Anti-Amnesia: Articulating Design-Led Active Pedagogy Towards Craft Heritage Preservation in Portugal



Abhishek Chatterjee, Jorge Brandão Pereira, and Heitor Alvelos

Abstract Anti-Amnesia is a design research and mediation project dedicated to the recovery, reinstatement, and reinvention of declining traditional industrial cultures in Portugal.

The project is based on growing evidence of craft and small-scale industries in Northern and Central Portugal dissipating due to modern-day commercial and technological realities; in conjunction, it considers four related case studies as vantage points for understanding the underlying factors and impacts of such capitulation. These comprise contexts of handweaving, tilemaking, shoemaking, and letterpress typography. The project employs a number of design and ethnography based research actions towards maintaining, and where possible, augmenting the status quo of traditional making in contemporary culture, alongside potentiating the recovered knowledge and empirical wisdom.

The project identifies a symbiotic connection between restorative research and the curricular requirements of art and design education, and envisions natural reciprocity. It thus puts special emphasis on a constant reversion of the generated outcomes and learnings towards facilitating the transposition of knowledge between generations and disciplines.

The paper correspondingly discusses the pedagogic affordances of the project's active learning based interventions with graphic design students of the Polytechnic institute of Cávado and Ave; the objective was to explore and reinterpret visual narratives surrounding traditional crafts towards developing packaging design concepts that promoted the associated material, social and cultural legacies.

Keywords Heritage crafts · Design research · Active pedagogy

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1 Introduction

1.1 Project Anti-Amnesia

Anti-Amnesia is a design-led research project that focuses on securing and sustaining systems of traditional knowledge and intangible value prospects embedded in craft and small-scale industrial practices of North and Central Portugal. It is based on the growing evidence that a significant number of such practices in the said regions are on the decline due to the rapid transitioning of manufacturing standards and shifts in commercial and consumption-related realities (Gomes 2016; de Almeida and Chatterjee 2016; Albino 2017).

In this regard, the project considers four instances of traditional making from the respective regions that represent varying degrees of technological obsolescence as vantage points for studying the multiplicity of factors behind the ongoing capitulation: Almalaguês handweaving, Azulejos tilework, traditional shoemaking, and letterpress typography.

Correspondingly, the project is employing a set of complementary research actions encompassing several conservational, curatorial, and pedagogic mediations that aim to maintain, and where possible, augment the status quo of traditional making in the above contexts, and ensure sustained intergenerational transfer of the associated specialized knowledge.

The project's approach to the revivification of these craft and small-scale industrial practices considers 'identity' as a decisive factor in the dignified recovery of cultural and socioeconomic values. Its actions thus emphasize on:

- rescuing *sui generis* materials, documents, testimonies, and historical facts that may otherwise be lost or forgotten;
- recognizing the processes and narratives of these industries and crafts as a heritage in themselves;
- communicating the allegorical and historical values that are intrinsic to these contexts, and arguing for their distinctive uniqueness in present times;
- experimenting with the hybridization of materials and aesthetics from different study contexts, in order to obtain new product and market prospects as well as foster a collaborative network geared towards mutual support and innovation.

Based on research and mediation experience with the study contexts, the project also argues that the process to determine the viability of traditional making should not be restricted to pecuniary validation, and should accommodate intangible and long-term influences of crafts and small-scale industries. In relation, it conjectures that the prevailing signification of the term 'value' as corresponding to monetary gain is reductive, and in the case of traditional making, devalorizes crucial constituents such as distinctive historical legacies, empirical and tacit wisdom, practical know-how, interpersonal connections, and existential resolutions: these are key to the continuity of the associated traditional knowledge and communities of practice.

The project's research methodology is respectively underpinned by ethnographic methods from the social sciences (Pink 2007; Rose 2011) that have proven to be highly effective when applied in an articulated manner with more intuitive approaches of design (de Almeida 2012). The research team accordingly works closely with members of the associated practice communities in order to uncover emic perspectives and other elements that can potentially help extend the associated value propositions.

The intervention thus includes:

- building human and social narratives through gathering personal testimonies, stories, and anecdotes.
- documenting related folkloric customs and traditions;
- documenting materials, processes, and tools;
- documenting produced articles, designs, patterns and other visual materials;
- collecting specimens of products, swatches, and samples;
- collecting specimens of contextual externalities, including residual material;
- collating previously published media and academic articles on the specific contexts, and the associated craft practices in general.

Upon documentation and archiving, the obtained elements form an evidential base that is analyzed further in order to determine the different forms of embedded 'value' in the aforementioned practice cultures, and is correspondingly utilized as a generative resource for creative research actions, including design-led reinterpretation.

Anti-Amnesia comprehends that while it is not its objective to counter the organic evolution of manufacturing standards, it can make meaningful contributions by focusing on sustaining the specialized knowledge that is inherent in surviving traditional industrial cultures. Correspondingly, it is articulating a creative interrelationship between design, media, and heritage crafts with the intention of arriving at an adaptable model of engagement that can play a mediating role in the ongoing conflict between past and present praxis.

1.2 Case Study Contexts

In each of the four study contexts, Anti-Amnesia has established key partnerships with representative entities, not only towards acquiring emic standpoints, but also for securing conditions that are conducive to research and the collaborative articulation of restoration strategies. These key partners are:

1. A community of weavers pertaining to a unique and historically significant hand-loom technique from Almalaguês, represented by their association: *Herança do Passado*.
2. A typography related initiative based in a traditional letterpress studio that encourages original perspectives on the age-old art form with a view to derive

unconventional forms and charter new territories of printmaking: *Clube dos Tipos/Tipografia Damasceno*.

3. A family-run footwear factory based in the industrial town of São João de Madeira that is presently relatively stable but is witnessing an increasing rate of disinterest from younger age-groups towards shoemaking as a career option: *Fábrica Netos*.
4. A collective that seeks to recover, sustain and promote the legacy of traditional Azulejos tilework which, despite its significance to Portugal's architectural heritage, is facing an onslaught of theft, insensitivity and invalidation: *Gazete Azulejos*.

These particular industrial contexts have been selected in order to cover a broad spectrum of risk factors associable with the ongoing capitulation of traditional making. As case studies, they synchronically depict a precarious current reality defined by an incompatibility with modern manufacturing protocols and consumption demands; however, they also embody creative human enterprise whose value as a specialized art (and activity) is irreplaceable and enduring. The project conjectures that this element is a crucial component of traditional making, and if tactically employed, can help form and orient the required resolutions for mitigating the prevailing circumstances of cultural and economic uncertainty.

These scenarios also provide design research with an opportunity to be more hands-on in procuring means for sustaining and potentiating traditional making knowledge; therefore, the project is paying particular attention to consistently reviewing its intervention actions and outcomes in academic terms in order to identify theoretical and pedagogical affordances.

The article correspondingly describes one such intervention scenario where the project is collaborating with Almalaguês weavers and Gazete Azulejos in order to organize curricular workshops for students of graphic design. The aim is to develop creative resolutions based on the design of packaging materials that can help communicate the associated historical and allegorical values. The sections expand on the above two case study contexts individually before detailing how the workshops were devised as a tactical outcome for all stakeholders. It is pertinent to note here that the following exercises and outcomes are among a number of similar pedagogical actions that are being held in collaboration with each of the four case study contexts, and include curricular modules at postgraduate and undergraduate levels dedicated to product design, eco-design, printmaking, and graphic art.

Almalaguês Weaving

Almalaguês artisanal weaving is an 11th Century textile craft found to be in practice specifically in two rural communities located on the outskirts of Coimbra in Central Portugal (Gomes 2016), the artistry behind this homespun craft is characterized by subtle warp and weft manipulations that allow the weave to be presented as a stratiform with jacquard-like reliefs of geometric motifs displaying over a regular two-ply base. The handloom on which the textile is woven is configured in a manner that lends robustness to the weave structure, to such an extent that the eventuating products, such as bed covers and floor rugs have been known to last several generations of use upon being passed down as family heirlooms.

A typical household industry run entirely by women, the craft's deep significance to the historical and cultural landscape of the region, and to Portugal overall, is marred by its relative obscurity, abetted by limited market ingress and a deficit of inscription in public/academic spheres. The situation is exacerbated by a growing impassivity towards this rare practice from within the newer generations of the related communities who are aware of the decimation of their traditional markets over the past decades caused by the influx of foreign machine-made products that offer greater variety at an inferior cost—a proposition which the regular customer segments have given preference to over the local craft's superior quality and authenticity that comes in at a slightly higher ticket value.

In consideration of the lack of expertise and resources to counter such seemingly insurmountable challenges to scale and profitability, the younger generations of weavers have turned to alternative vocations for sustenance. However, for the more seasoned practitioners who rely solely on their craft to earn a livelihood, a similar occupational switch has proven to be infeasible. The ruling untenability of the situation is thus effectively imperiling not only the established means of subsistence for the weavers but is also jeopardizing the continuity of the active and tacit streams of unique knowledge present in the craft's human, material and cultural aspects.

The project in this regard is collaborating with Associação Herança do Passado, a non-profit entity that was internally established by the weaving community in 2010 for countering the situation of decline, and has since been leading the way in promoting and nurturing the craft through documenting, preserving, communicating, and sustaining the legacy of Almalaguês handweaving.

Azulejos Tilework

A definitive element of Portuguese architecture for the better part of the past millennium, and unlike Almalaguês weaving, Azulejos tile making has typically had ample representation in the country's cultural discourses. The recent surge in tourism has led to a corresponding rise in the tiles' value and demand, influencing city tours and souvenir markets, with the Azulejos theme witnessing countless iconographic reinterpretations in physical and digital forms.

Amidst the ensuing frenzy of symbolism, a vital aspect of the original tile-making process has been routinely overlooked, which is the sheer mastery of the original tile-makers who have blended math and mysticism by hand to arrive at a distinctive visual lexicon, conveying diverse historical and cultural chronicles of Portugal. The graphical approaches over the years have varied from tessellated and recursive patterns to pixel-based configurations for large-scale artworks, such as murals, that can be commonly seen adorning church facades and train station hallways. Variations also exist in dimensional relief, incorporating features such as patterns and textures, that reveal nuances of the practice.

However, such manually created attributes are the very aspects of the craft that have borne the brunt of large-scale industrialization—and correspondingly, digitalization. Traditional flatbed techniques first conceded to mechanized rotary presses, and then to inkjet, whereupon the production quantities may have grown substantially, but progress has come at the cost of artistry and authenticity.

The discontinuation of the original technique coinciding with the boom in tourism is instigating unprecedented paradoxical circumstances for the craft in Portugal, wherein antique hand-painted pieces are augmenting in value and appeal at a considerable rate, while traditional kilns have succumbed to obsolescence. The culmination of this conflict is evident on the bald facades of once festooned edifices that have become casualties of tile theft, although, it is also not uncommon to find hand-painted tiles dislodged and discarded from old buildings that are being renovated or replaced.

Respectively, the project has established collaboration with *Gazete Azulejos*, a collective that aims to revive and sustain the original practice of hand painted tile-making. The Porto-based initiative is one of the few remaining entities that are still involved in small-scale production of hand-painted tiles, in a city which was once home to a substantial number of large tile-producing kilns.

Gazete Azulejos seeks to leverage a series of most pressing concerns regarding Azulejos, such as the surge in tourism, to work in favor of the restoration of traditional tile making. It addresses the prevailing disinvestment surrounding the craft by:

- doing on-ground research on the technical, factual and contextual aspects of the craft to gather evidence for supporting the argument for the craft's safeguarding and restoration;
- developing a digital open-source catalogue of Azulejos designs in the city marking precise street locations, which in terms of archiving, is increasingly gaining importance due to tile theft and the tearing down of older facades in the interest of new construction. The catalogue is accessible online and assimilates contributions from the general public;
- incorporating the acquired practical knowledge of the craft towards conducting Azulejos-making workshops. These sessions are publicized online and have been received with enthusiasm by locals and tourists alike. For the tourism sector, in particular, the workshops present a creative alternative to the tile-theft issue, wherein the initiative encourages visitors to make their own Azulejos instead of buying stolen pieces as souvenirs from street fairs or antique shops.
- inviting eminent illustrators and artists to create Azulejos artworks which are correspondingly presented at exhibitions, thereby advancing tilemaking as an unconventional artistic medium to contemporary creative communities, as well as bringing its historical, cultural, and processual significance to their attention.

Additionally in recent times, the initiative has also begun to accept orders for custom-made batches from homeowners seeking to replace their lost or destroyed original Azulejos.

As a result of these restorative measures, *Gazete Azulejos* represents an intervention scenario which not only promotes active community-based creative engagement with a heritage craft but also communicates the undiminished resonance of a local traditional practice to contemporaneity.

2 Heritage Conservation Through Pedagogic Actions

2.1 *Establishing Learning-Based Dialogues Between Traditional Industries and Design Research*

Anti-Amnesia acknowledges a symbiotic connection between the restoration of traditional making and the curricular requirements of design education, and sees potential for reciprocity. It thereby constantly seeks pathways for the reversion of learnings and outcomes during the research process, also partially in lieu of its limited implementation timeframe (2 years). The curricular integration of design students within its collaborative engagement is one such pathway for the project to consolidate its “build-measure-learn” approach towards making meaningful and sustainable impacts in the respective craft contexts. The exercises are also intended to support an internal network of knowledge transfer between makers, researchers, educators, and students from various academic levels and disciplines.

The project argues that active pedagogy is the primary vehicle for a functional perpetuation of the legacies in question, and a sustained dialogue between craft and education is imperative for mutual amelioration. Anti-Amnesia’s approach is thus based on three broad intervention categories, to which the incorporated pedagogical activities contribute:

1. **Recovery:** Activities concern the audio-visual documentation of ‘evidence’ related to traditional knowledge in the study contexts, including the recording of personal testimonies materials, processes, and oral histories. The project consequently maintains a source material library built to facilitate accessibility to the gathered/generated information for dynamic reuse.
2. **Re-interpretation:** Workshops in this regard are intended to explore different application scenarios for the recovered information/material knowledge/specimens. Related sessions have included the conceptualization of new product categories that can be made with or serviced by traditional techniques.
3. **Dissemination:** Activities that help communicate the enduring value of traditional making and makers to the general public are also found to be of particular relevance, and entail project dissemination across platforms such as web and radio, and creating strategic and contemporized marketing content for practice communities.

Anti-Amnesia distances itself from interventions that indiscriminately and insensitively apply re-branding templates to traditional products. It instead considers how its intervention can aid in capacity building for all stakeholders, and encourages a self-definition of identities, narratives, communication parameters and means to self-actualize. The project utilizes the resulting affordances towards addressing real-world issues wherein the goal is to re-calibrate traditional know-how in light of contemporary challenges.

In sequence, the following section expands upon a series of workshops that were held on the theme of packaging design. Communication is a typically undervalued

aspect of traditional crafts in Portugal, and stands out as an area of concern particularly in the case of Almalaguês due to the otherwise exclusive nature of the practice. The project thus sees the opportunity of generating interknowledge between traditional makers and design students by bringing them together in a learning-based creative dialogue.

2.2 Workshops on Packaging Design

Integrated in the BA degree in Graphic design at the School of Design, Polytechnic Institute of Cávado and Ave, Anti-Amnesia's project-based modules have introduced the historical, material, processual, and human legacies of the traditional practices to a future generation of designers. The five-week modules have been conducted under the theme of Almalaguês and Azulejos in the years 2019 and 2020 respectively. The corresponding curricular premise has been to acknowledge the historical and semantic capital associated with the traditional crafts through making contemporary interpretations of their visual discourse by means of graphic design. The modules have invited practitioners from both crafts to share their insights and experiences directly with the students, in order for them to acclimatize with traditional making, and gain emic perspectives and expert advice regarding challenges before working on potential solutions.

The project, through its ongoing research into the respective craft cultures, has determined the design of related packaging materials as a key area of intervention, since product communication can greatly influence the crafts' perceived value and project their uniqueness to markets and audiences beyond the typical bastions. In conjunction the graphic design students have been required to explore the visual and artistic elements in the introduced crafts' visual narratives in order to develop packaging design concepts for both conventional and innovative products that reflect upon and promote the embedded cultural significance.

From a pedagogical standpoint, such integration of research projects can enhance instruction strategies and methodologies and can help the involved actors reinforce their individual capacities while engaging in teaching-learning dialogues. There is also an element of novelty in introducing unconventional contexts to standard curriculums, which can make academic activities more compelling, and encourage learners to explore, take risks, and establish personal connection with the subject contexts. Experience gained from implementing the modules suggests greater motivation from the students towards project/case based practical work, and towards building a research and experimentation mindset for addressing the challenges at hand.

This is of particular relevance, because modern-day design is holistic, encompassing distinctive areas of investigation that dialogue with each other towards collectively constructing knowledge, artefacts, and realities. Therefore, in order to arrive at a well-founded visual discourse, it is imperative to create pedagogic conditions that are dynamic, inclusive, and stimulate the development of idiographic knowledge

through active learning. In this case, a learning ladder has been perceivably established between understanding, meaning, and action through the integration of active learning methods.

The modules additionally endorse critical exploration of the associated materialities, which is a fundamental methodological component of Anti-Amnesia's design-led restorative actions—and makes a significant contribution to the modeling of the corresponding design pedagogy (McKerman 2008). In sequence, the pedagogic process motivates and opens up to queries from students regarding the surrounding issues, alongside questions on the role of design and the efficacy of the expected learnings in practical situations.

The curricular objectives of implementing the packaging design workshops are therefore:

- to explore the grammars of communication design;
- to identify approaches and methods used in the design environment;
- to adapt the aesthetic objectives of design to the effective possibilities—methodological, technical and productive—of graphic production;
- to develop reasoning and creative stimulation in a project, embodied in the history of visual communication and in the praxis of contemporary graphic design;
- and, to develop the capacity for critical thinking in relation to the different perspectives of design, their role in society and tangencies.

The objectives are aimed at enhancing overall learning, rather than simply developing solutions to specific problems identified in the provided contexts. The workshops invite all involved, including the collaborators and educators to embrace the ensuing volatilities and transformations as learning and capacity-building opportunities. The outcomes from the first year of implementation have reflected this outlook by corresponding to the expected curricular and creative objectives and showcasing the students' inclination and capacity to adapt to atypical media. The same can be evidenced from the heterogeneity of the graphic language, and the variety of the material bases, which explore unorthodox territories of application, and further the discourse on the creative affordances of graphic design.

For the students, such learning-based engagement with *de facto* creative challenges involves two substantive vectors:

- The process of knowledge construction in terms of design practice is formative, contextualized, reflective, and collaborative;
- The overall experience is thus transformative, since a large number of factors and variables require to be articulated with personal skills and knowledge.

For the educators playing a mediating role between the students and the traditional practice communities, the implementation of such activities helps take a reflective stance on learning, wherein the subjective interpretation of the collected data and an analysis of methodological decisions advance research on creative instruction, and can prospectively deliver a best-practice model for pedagogic engagement. Anti-Amnesia argues for classrooms as living laboratories for research, and recognizes their inherent agency to transform, and to be transformed.

The educational resources that have been attained, thus, include critical reflections on the pedagogical activities, unexpected outcomes and learnings, and methodological insights as reference material for the higher education in design community. The approach consequently conforms to the following active pedagogy guidelines:

- It is revealing, as it proposes a proven transformation in specific and contextual narratives, which reinforces the established patrimonial relationship. It rehearses a holistic vision that treats design as a method of narrative content and opens space for dialogue and awareness of its own heritage.
- It is substantive, as it expresses a contextual essence of the place, and the associated community.
- It is participatory, as it believes that the viability of this pedagogy will pass through media interpretation, finding ubiquitous and practical resources in craft-making heritage, that can contribute to the re-emergence and sustenance of such dynamic.

In this way, Anti-Amnesia's research is itself being constantly reformulated, taking into account new questions and answers that emerge from its pedagogical interventions, and accordingly, the project endorses the incorporation of adaptable and exploratory outlooks in standard modes of instruction.

Communication specifically may not be the most pressing area of concern regarding craft heritage preservation, and the project is concurrently working on other restorative fronts with pedagogical implications, such as product design and exploratory reinterpretation. However, the packaging design modules represent the most time- and resource-effective scenario for design to provide meaningful contributions.

The following sections contrarily discuss the advantages of introducing collaborative research surrounding traditional making to design courses, and how such interventions can help sustain the intergenerational transmission of specialized knowledge.

2.3 Presented Pedagogical Affordances

In compliance with Droumeva and Murphy's (2016) approach, the project mobilizes impact-oriented production of new media as "scaffolding and enabling students to explore critical issues in culture and society in ways that supplement and transcend traditional instruction and assessment, opening possibilities to make a direct impact on the social issues they are exploring". It also subscribes to their argument that real-world experiences "create greater motivation and spur more imaginative creations", and that the corresponding productions "take on meaning as legitimate material artifacts in the wider (mediated) world".

Tovey (2015a) considers the introduction of case studies that are grounded in real-world complexities as naturally prompting the application of design methods and approaches, since the contexts are well defined and provide substantial empirical evidence. Design, in this regard, takes precedence as a strategic culmination of a

variety of interdisciplinary actions targeting holistic resolutions to the identified issues, such as outmoded product, communication, or business approaches. It is therefore imperative for educators to focus the discourse on design as a process of knowledge application, in lieu of an aesthetically appealing product (Ejsing-Duun and Skovbjerg 2018), and in order to constructively channel the students' revelations and perplexities emerging from situated learning.

Kolb (2014, as cited in Loh 2018) sees such models of learning as based on conflicts arising between concrete experiences and abstract concepts, wherein students adapt previously gained know-how in their approach to resolving the new challenges, and similarly, they carry forward the learnings from the current engagement to future discourses as reference materials and generative resources (Cattaneo 2017).

Anti-Amnesia's methodology of curricular integration, in this respect, draws from project-based (Barron and Darling Hammond 2008, as cited on Cattaneo 2017) and case-based (Riesbeck 1996) pedagogical theories. In terms of the former, the implemented modules conform to Cattaneo's (2017) classification of essential elements:

1. The exercises are introduced as subject specific coursework with independent outputs;
2. The criticality of the decline of traditional making has been instigated as a driving question;
3. The students are required to conduct further inquiry into the issues at hand, in order to arrive at an aspect which can be addressed through their graphic design based mediation.
4. The students comprehend the issues, since the contexts are a part of their own heritage, and they have liaised with the respective maker communities towards forming workable approximations. Since the exercises are group-based, the students also leverage eventuating phenomenographic advantages.
5. The impact-oriented nature of the exercises has derived particular interest from the students to learn more about the case study contexts and even propose contributions beyond their curricular obligations, thereby demonstrating self-motivation.

Additionally, the workshops adhere to Riesbeck's (1996) five principles of effective case-based learning pedagogy:

1. The learning situations provided are experiential, and whereas a section of the creative process involved may be exploratory, the students rely on incrementally consolidating their knowledge through inquiry, collaboration, and hands-on engagement towards solution-making.
2. The exercises hand out sufficient evidence related to the thematic discourses in order to generate creative impetus, and concomitantly serve as reference material. Anti-Amnesia, in this case, provides access to its own research materials concerning the case studies, and also provides in-situ contextual information to students.

3. The exercises are designed to examine the students' ability to adapt their knowledge and skills to media that isn't necessarily their typical means of creative expression. The requirement to produce physical prototypes, for example, requires a working knowledge of atypical materials and techniques.
4. The criticality of the presented situations, and the tactical yet creative nature of the objectives provide leeway for the students to creatively explore possibilities while being grounded in practicality. This diminishes the fear of failure and encourages the perception of solution-making as a process of developing effective solutions in stages.
5. Academic resources such as reference materials, expert opinions, and technological tools are made available to ensure support if and when required by the students to pursue their conjectured outcomes.

Accordingly, the modules initiate a learning environment that is particularly conducive to self-efficacy (School of Design and Creative Technologies, n.d.), and correspondingly, collaboration. The cumulative approach, integrating case-based and project-based pedagogy, encourages students to employ and build upon prior knowledge, both acquired and accessible, and reflect critically on their actions and observations towards collaboratively formulating potential resolutions (Cattaneo 2017). Wrigley and Straker (2015), in this respect, note that a growing number of universities are similarly embedding design- and creativity-related methods in their curriculum "as a way for students to experience multidisciplinary teamwork that exposes them to skills and knowledge beyond their disciplines in a safe learning environment". The modules' approach also emulates Van de Bogart's (2016) collaborative-learning technique, wherein students divided in groups collectively produce the required answers.

2.4 Learning Through Making

Loh (2018) discerns that learning through making is a critical pedagogy in design; whereas active learning methods effectively increase the engagement factor (Innova Design Group 2017), tacit forms of knowledge are specifically gained through making (Loh 2018) and/or participant observation.

In this regard, Tovey (2015b) finds the bringing together of students and makers/communities of practice as having particular resonance for the pedagogy of design, since the scenario puts natural emphasis on "utilizing members of the relevant professional communities within teaching and learning arrangements", thereby embracing the idea of a community which leads to shared motivation. Tovey also argues that "participation in a community of practice is a key premise to understand learning to practice, including learning the values and appropriating an identity related to that practice", which consequently prepares students for contemporary working life.

Additionally, the case studies introduce aspects and factors of traditional making that are non-conventional and antiquated (including techniques and technologies, processes, aesthetics, and human narratives) to a newer generation who may not necessarily belong to any practice communities, but can help extrapolate the embedded specialized knowledge for creative reinterpretation in further contexts of implementation—and thereby, sustain intergenerational knowledge transfer. Accordingly, Loh (2018) sees such instances of making as a “creative act of gaining knowledge in design, which involves construction and transformation of meaning.”

2.5 *The Role of Contemporary Technology*

Ovando et al. (2003, as cited in Van De Bogart 2016) explain the notion of scaffolding as contextual support extended by educators when implementing active pedagogy; it can include using simplified language, explicatory models and visuals and graphics, as well as creating suitable conditions for cooperative and hands-on modes of learning. Technology, in its modern-day forms and expressions, is often the underlying structure in this regard, hosting, and more importantly, improving the applicability and accessibility aspect of such scaffolds, which according to Van De Bogart (2016), in the present age of information, can make it easier for learners to access data and make meaningful decisions.

Droumeva and Murphy (2016) see the influence of modern technology as instigating a paradigm shift in education overall, noting that:

...how knowledge is acquired, disseminated, and interpreted through digital communication technologies has reached a point where we need to respond as educators in ways that are relevant and useful to students throughout their lives.

Technology also plays a vital role in extending classrooms beyond their typical confines, equipping the new generation of students with tools and knowledge to address challenges which they may face in future society (Innova Design Group 2017). Correspondingly, it allows dedicated classrooms to be constructed in a virtual space, wherein students can be engaged distantly, but equally effectively, in terms of creativity, productivity, and cooperation.

In particular reference to design education, Loh (2018) emphasizes the need to further comprehend the affordances of digital technology towards facilitating a holistic learning process, indicating that by providing probes, prototypes, and toolkits, technology showcases the agency to deliver tacit knowledge, and facilitate critical (and creative) thinking processes.

Anti-Amnesia’s integrated pedagogic approach thus operates on the inference that by leveraging technological advantages that are presently afforded by contemporary media, active learning becomes a mediating interface between the old and the new; and ensures an effective and dignified recovery/reinstatement of facets pertaining to traditional making. Accordingly, it positions digital technology as:

- means for researchers and students to rescue materials, documents, testimonies, and historical facts that may otherwise be lost or forgotten;
- a platform for present and future generation of makers to acknowledge the processes and protagonists of traditional industrial practices as heritage in themselves;
- a medium to communicate the allegorical and historical values that are intrinsic to these contexts, towards arguing for their distinctive uniqueness in present times;
- providing conditions for prototyping exploratory design work based on the hybridization of materials and aesthetics from the various study contexts, towards obtaining new product and market prospects;
- a connecting thread between protagonists of traditional industries, universities and administrative bodies, within a collaborative environment geared towards mutual support and innovation.

Thus, digital technology, in articulation with active pedagogy, finds key relevance as a regenerative agent for traditional making, helping mediate conflicts that are occurring between convention and contemporaneity due to the ongoing disruptive transition in making paradigms.

3 Discussion

School of Design and Creative Technologies (n.d.) refers to the Greek word “Kairos” as “the right moment for the performance of an action or the coming into being of a new state... a time when the conditions are ripe for the fulfillment of a crucial task”. Anti-Amnesia’s research and pedagogical actions mirror this sentiment at a number of levels: from its stance towards the criticality of recovering and/or re-emphasizing the ‘value’ of traditional making in the current period of economic, social, and technological transition; to orienting ‘future makers’ for approaching eventual real-world challenges with responsibility, self-directedness, and critical thought and action.

In this regard, the learning environment that is presented is flexible and collaborative, building upon a critical mass of intrinsic experiences pertaining to traditional makers, researchers and educators, and the students themselves, towards achieving common objectives. Here, the ‘craft’ context that includes artisanal knowledge, material culture and creative legacy, becomes an instrument of teaching, and helps connect students with their shared heritage. The introduction of such contexts also helps unfold to the learners “what it means to be human-centered, and to pay attention to the innate dignity of human beings” (School of Design and Creative Technologies, n.d.).

Pöllänen (2011) views such relation with tradition as future-oriented and renewable, and cites Garber (2002) in stating the importance of “maintaining an educational basis in practicing functional skills for reflection and interpretation of culture, historical understanding, and future orientations”; and how important it is to “understand the human developmental values in learning those subjects”.

Correspondingly, Tovey (2015a) affirms the need for such parallel approaches “to equip future design graduates with the necessary reflexivity to be able to negotiate the increasingly complex world of the knowledge economy,” further suggesting that designers should be “trained to deal with conflicting requirements and opportunities,” and that “the ways of investigating problems, and prototyping ideas, should be aimed at exposing conflict to bring it out into the open”.

Such hands-on creative and critical engagement also emphasizes the interconnectedness of knowledge to the students (Van De Bogart 2016), and encourages expertise-transfer between disciplines and practices (Cattaneo 2017), thus legitimizing the design process as a means of abductive thinking within an academic setting (Ejsing-Duun and Skovbjerg 2018).

These collaborative learning-based intersections of practice-led knowledge are providing a clear evidence of how evolving complementarities between the disciplines are generating semiotic resources that can:

- help past praxis transition to a digital future without marginalizing communities or compromising individuality;
- prepare traditional knowledge systems to inform and find agency in newer manufacturing paradigms;
- and create key intellectual assets for traditional making to sustain in the imminent era of knowledge-based economies.

Anti-Amnesia posits that in order for endangered craft practices to have continued and far reaching relevance in economy, society, and culture, it has become imperative to create provisions for a long-term dialogue with education. It would help craft activities avoid being restrictively classified as regional cultural showpieces, and aid in curtailing situations of cultural appropriation by external entities.

Ligations in this regard can also be mutually meaningful since:

- A wider academic evaluation of crafts and related contexts towards developing activities or research will fundamentally consider direct and relative gains;
- academic evaluation/research also serves as reference material for policy makers, and thus for researchers and educators, it is important to detail the methodological aspects that can promote qualitative values in conjunction with the quantitative values that policy makers expect (Thomas et al. 2011);
- collaboration with art and design education can create grounds for a sustained culture of innovation in crafts, specifically in terms of evolving product and communication strategies;
- traditional craft cultures can gain advantages from technological advancements that can help disseminate their practice to newer markets. “The practical value of new technology can lie in both the positive attribute of original experimentation, through the creative exploration of new potentials with original results and production/design efficiencies” (Woolley 2010);
- the participating students, in turn, can find conditions for applying their skills and knowledge impactfully towards critical real-world contexts, and have access to specialized knowledge that can extend their learning beyond classrooms.

Thomson et al. (2011) also make a particular note of how craft-based education has been reduced in institutions of secondary and higher education, and how this can affect the capacities of current and future generations under the otherwise hegemonic influence of assistive technology. They raise the need for schemes to build capacity, and integrate specialized skills-based training in education, alongside ensuring opportunities for apprenticeship in craft sectors, which was earlier a norm.

Project Anti-Amnesia's design research and intervention agenda is thus to consolidate a structured and replicable pathway for education, especially in art and design, to add value—in and with traditional industries—that can subsequently serve as a preamble for further activation of specialized craft knowledge in the forthcoming era of knowledge economy.

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Graphic Expression and Semantic Analyze on Brand Mark Creation



Cátia Rijo

Abstract This article proposes a methodological map of graphic and semantic analysis to help the development of the expressive code and also to increment the association that exist between semantics and graphic expression in the design practice. It is intended to analyze if the association between graphic and semantics elements improve the synthesis of expressive codes and facilitates the process of creating brand marks. With this problematic in mind was create a tool called Graphic-Semantic Expression Map. This paper brings a case study where this tool was applied in creation a brand mark for the International Week of Lisbon Polytechnic. The work presented is one of the several exercises and workshops that were developed with students to test and evaluate this tool.

Keywords Design teaching · Moodboard · Graphic design · Brand

1 Introduction

In teacher's practice in graphic design field students are always struggling with the process of transposing the first design phase of a project—context research, problem identification and concept—into graphic composition with several basic design elements of visual communication, i.e. students struggle with the process of going from concept to graphic representation.

To help with this problem, concept maps are an effectively tool in design education because they help students to communicate concepts through visualization, communicating through visual metaphors. Usually they are made with collages, cutouts of images, photographs or drawings. They bring a visual and sensory form of communication and inspiration very helpful in design research phase, which could be considered more logical and empathetic within a context than traditional verb-centric approaches, are visual or multisensory means of communication (texture,

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movement, sound) that can be useful in the construction of the communication and design process (Garner et al. 2015).

The creation of a concept map enhances the stimulation of perception and interpretation of more abstract sensations and appreciations such as texture, shape and image (Garner and McDonagh 2002) and is possible to extract references such as shape, color and typography, as well as subjective concepts like emotions.

Established on a conventional conceptual mood board, we created a map of graphic-semantic expression that intends to relate the several elements in a more understandable way. This map proposes crossing the visual compilation made in the design concept, research phase and the elements of inspiration with typography, color and shape. This map was created to help in the synthesis process of the expressive code and to stimulate the bond between semantics and graphic expression and semantics in the practice and design teaching.

In order to correctly evaluate the proposed map, called the Graphic-Semantic Expression Map (MEGS), a series of workshops has been held. In this article we will evaluate the results of the implementation of the MEGS in the creation of a graphic brand for the International Week in 2019, an event that occurs every year at the Lisbon Polytechnic.

2 Development of the Project

The project development took place on DesignLab4u. This is a laboratory designed to immerse students in the field of graphic design in social pedagogical work or in real research contexts, as well as provide a professional design laboratory at the Lisbon Polytechnic School of Education.

As mentioned in previous work (Rijo and Grácio 2018), this laboratory aims to provide students with the opportunity to collaborate in real projects with community projection, generated in an immersed learning context, facilitating and promoting creativity, as well as the development of cultural and social enrichment activities. Therefore, DesignLab4u creates a space for research, action and reflection, which integrates in a multidisciplinary way the several fields covered by design in its main spheres, providing new ideas and ways for future realities to unfold in the area in question. Currently this laboratory characterized by being a research space applied to the practice and teaching of design in a real context and we already have master's students from partner institutions that are making the internship. Students internships gives the opportunities for their integration in the real work contexts, develop their skills in the professional field at the same time that proven relevance that they hold for the development of social skills. In that way the DesignLab filled a gap that existed: the lack of internship that exists for students in the field of design.

Higher education institutions struggle with the problem professional internships since that only few companies or public bodies are available to receive students on an internship basis. According to a study on Employability and Higher Education. These institutions recognize the importance of curricular internships because they

are fundamental sphere to establish the link between the real work and the academic world. There are several advantages of internships for students: the integration into the job market and favoring the development of their professional skills, and the improvement of their social and interpersonal skills (Caires and Almeida 2000).

The absence of internship experience causes a failure in the teaching/learning process since the students are deprived of the experience inherent to the experience in a real context, which is an asset because it gives skills that the teaching does not, leaving the students much more well prepared at the end the degree.

2.1 Briefing

The briefing was given to DesignLab in November of 2018 by the Lisbon Polytechnic and intended to create a brand mark for the Lisbon International Polytechnic Week, the brand would have to be ready in December of 2018 to publicize the event.

International week is an event that takes place every year, between April and May, at the Lisbon Polytechnic Institute and brings together around 100 employees (teachers and non-teachers) from European higher education institutions, in the context of international mobility Erasmus + program. For a week, the participants, in addition to learning about the mission, organization and structure of the Lisbon Polytechnic Institute, will exchange experiences and work practices. It is intended that participants enjoy moments of leisure and coexistence while providing the opportunity to get to know the city of Lisbon.

The Lisbon International Week program includes visits to the organic units of the Lisbon Polytechnic, participant presentations, thematic workshops, socialization activities and a visit to the city of Lisbon. Participants in this event come from various countries, including the Czech Republic, Poland, Turkey, Spain, Romania, Lithuania, Italy, Slovenia, Finland.

The challenge give to Designlab was the creation of a brand that represented this event for the 2019 edition and future editions, since in 2019 was the eighth edition and this event didn't have a brand mark to identify it. This brand should represent Lisbon, but it was a requirement that the brand have some elements that change from year to year.

The work here presented was develop by Inês Marcos, an internship student from the second year of the master's degree in Design and Visual Culture at Iade/Europeia.

2.2 Graphic-Semantic Expression Map

In order to look for alternative forms to the ecological models that are essentially characterized in classroom learning and promoting research in teaching practices in design, in 2017 we developed a tool with the objective of helping students in brand mark creation. It is intended to integrate the practice as a fundamental tool in

research, considering the methodology based on practice-based and practice-oriented as an operational tool.

In design field there is concern for forms, meaning and functions and is by crossing these with the syntactic, semantic and pragmatic dimension that reinsure the symbolic and the practical functions on design project. In Design field, the semantic dimension is the dimension of the object itself and the meaning of the thing, it is the meaning of the product created, an artifact or a graphic expression and which has attributions of meaning and communication through visual expression.

GESM it's a methodological map that help the expressive synthesis process at the same time that increment the association that exist between semantics and graphic expression in the design practice. This tool facilitates the acquisition, transmission, mobilization and implementation of essential stages of a project in graphic design field. This map crosses the compilation made in the research phase, in design concept and inspiration references with typography, color and shape.

2.3 Applying the GSEM

In design teaching before the creation of a design project we encourage students to thinking about the concept inherent to the project to be developed, to research about and to find inspiration that will help to develop a more creative project. The first step to apply the GSEM is create concept boards for these different phases: concept, investigation and inspiration (Fig. 1).

The results that we will show next are about the process developed for the creation of the brand mark for the international week of Lisbon Polytechnic in 2019.

Concept: As requested in the briefing, the brand for the event should represent the traditional elements of Lisbon but without being too obvious. It was also requested that this brand should have some elements that was changeable from year to year.

| | | | | | |
|---------|----------------|---------------|-------------|---------|--------------|
| | | INVESTIGATION | INSPIRATION | CONCEPT | |
| ANALYZE | TYPOGRAPHY | | | | ORGANIZATION |
| | COLOR | | | | |
| | SHAPE (SYMBOL) | | | | |

Fig. 1 Structure of the graphic semantic-expression map. Author's image

With this requirement in mind the concept for the brand inevitable was Lisbon. With this concept we identified three adjacent concepts that help describe better the main concept: people (the fact that we are friendly people), heritage (Lisbon is characterized by a vast architectural heritage) and geography (the city of seven hills and its relationship with the river).

With this concept we apply the Expressive Category Map of Sanches (2017) adapted by the author for the teaching of graphic design, since the original map was created for fashion design (Fig. 2).

Through the application of the Expressive Category Map the reference elements for the representation of our concept are intense, bright and vibrant colors. For typography the guidelines are the use of different typefaces, one heavier complemented with a lighter one. Shapes can be round or straighter but always static.

Investigation: First student start to research about previous brands of these event. The brands that exists were developed by students of third year of the Visual Arts and Technologies degree in the graphic design discipline in previous years. Most of

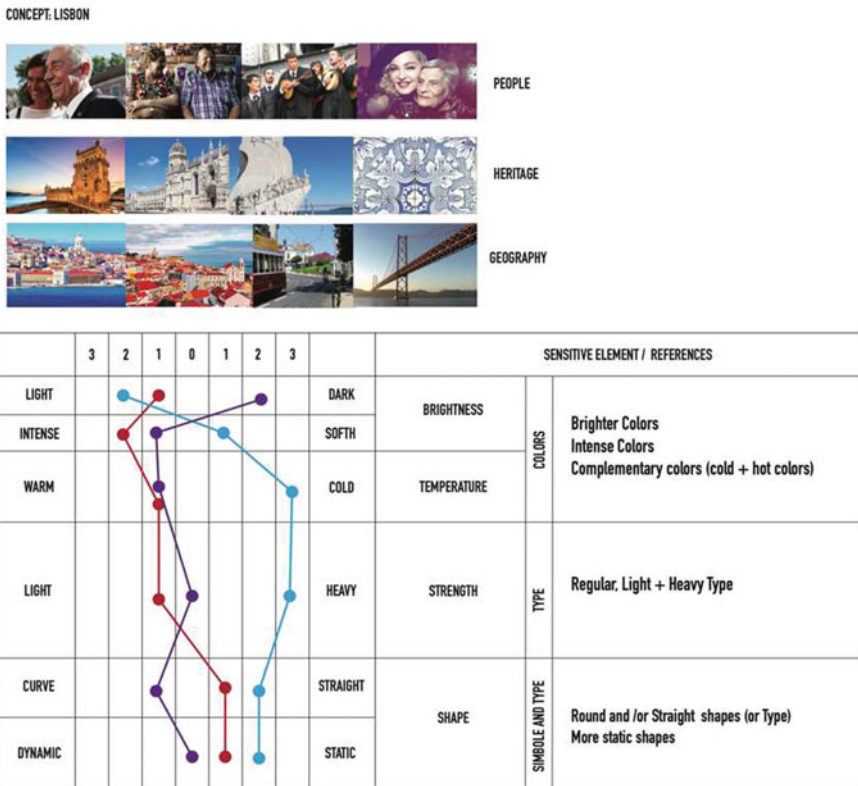


Fig. 2 Application of the expressive category map (Sanches 2017) to the concept of Lisbon. Adaptation of the author

these brands were created using iconic symbols that represent internationally the city of Lisbon such as the river, the bridge and the tiles. Later was researched brands of similar events both national and international (Fig. 3).

Analyzing graphically this concept board we can conclude that most of the brands had sans serif typeface on light, medium or bold form. Blue, yellow, red and orange are the dominant colors. The symbols are mostly circular or oval and many of them represent movement.

Inspiration: As previously mentioned it was a requirement that the brand had some iconic Lisbon elements easily recognizable, the main reason was because the target audience were people who had never been to Portugal and/or in Lisbon.

For this reason, the inspiring elements were not only elements that can represent the capital of our country, but also in ways of graphically representing attractive icons and their color combinations (Fig. 4).



Fig. 3 On left group of previous brands of the event. On right group of brands from similar events. Author's image



Fig. 4 Moodboard with collection of inspiring images. Author's image

| | | INVESTIGATION | INSPIRATION | CONCEPT | |
|---------|----------------|--|--|---|--|
| ANALYZE | TYPOGRAPHY | <i>The quick brown fox jumps over the lazy dog</i> Inter International INTERMATION DANIEL OCHOA | Humanist Sans serif // Bold, Light, Condensed // Straight Stem | Regular, Light = Heavy Type // Round and/or Straight type | Fantasy Type with Humanist Sans serif Bold, Light, Condensed Straight Stem |
| | COLOR | | | Brighter Colors = Intense Colors + Complementary colors (cold + hot colors) | Contrast colors // Intense Colors |
| | SHAPE (SYMBOL) | Circles // Organic Forms // Movement | Geometric Shapes // Organic Forms // More static | Round and/or Straight shapes More static shapes | Geometric and Organics Shapes More estatic composition |

Fig. 5 MEGS application, November of 2018. Author’s image

Through this panel we can identify many of the elements that can iconically represent the city of Lisbon such as: the Portuguese guitar, tiles, train, sardines, among others. The most outstanding colors are blue, orange, green and yellow. The icons representation is more geometric, characterized by a flat design and the compositions are quite static. The few typography existents are characterized by a sans serif typeface with straight stems.

After, we apply the various concept boards created for each one of the steps in MEGS and complete with the conclusions previously obtained (Fig. 5).

Crossing the results measured in the various phases of research, inspiration and concept, it is concluded that for typography the guidelines are the use of a fantasy font together with a humanistic sans serif font, which can be used in variants (bold, light or regular). The predominant colors in the three stages are the darkest blue, orange, yellow and red. For the symbol, the guidelines has organic or geometric shapes, however, the composition between the various elements must be static.

With these results from MEGS, for the graphic brand of the International Week, a typeface was created to designate “Lisbon 2019” and then the Bebas Kai font was used for the descriptive “International Week, Portugal”. For the symbol, we chose to use a symbolic representation of the sardines, the swallow and the pattern of discoveries, all identifying elements of the city of Lisbon. In terms of color, we chose to use yellow, red, two types of blue and orange, looking for a combination that creates contrast with each other (Fig. 6).

In the proposal developed for the following years, some of the icons were changed and two colors were added, but the initial composition to the relationship and recognition of the graphic brand.

For the brand of the year 2020 added the purple color that represents the twilight, this color is not very present in the city of Lisbon, although can be seen in some variations in the facades of Lisbon in a much less saturated and lighter shade (Fig. 7).

The symbols chosen for the brand for the International Week 2020 were the crow, the Portuguese guitar, a decorative element of a tile and the sardine, respectively. Once again, they are iconic elements of the city of Lisbon and there was an aesthetic

Fig. 6 Graphic mark created applying the results of MEGS. Authorship Inês Marcos, November 2018



Fig. 7 Proposed brand for the next events to 2020 and 2021, created applying the results of the MEGS. Authorship Inês Marcos, November 2018



problem in their positioning, there is in this composition a repeated element, the sardine, to reinforce the link with the initial proposal.

In the brand for 2021, the color gray was introduced, as a color that represents one of the most identifying elements of the city of Lisbon: the Portuguese sidewalk. The elements present in this brand are the sardines, a decorative element of the tiles that can be seen in the buildings in Lisbon and the tram. Once again, the sardine element was reinforced with the initial brand mark.

3 Conclusions

In design education exist several tools to help students in the diverse design phases inherent to the development of a design project. The research phase, delimitation of the problem and definition of concept are usually the first steps on the develop of a brand mark, in these stage students gather several visual information through images. Visual thinking is a fundamental tool because it helps students to delineate ideas. The GSEM focuses on making this initial stage of a design project more understandable helping in the association between and concepts into graphic design elements.

After the evaluation of the brand created from the analyses of results in MEGS it is noted that its application resulted in a series of guidelines that were useful in choosing the graphic elements of the brand. From the feedback received by the student who worked on this project, MEGS has essentially helped with the choice of colors and

typography, which are generally the most difficult elements that students have when building a brand.

In this way, it was demonstrated that this tool helps students in the investigation, analysis and systematization of information, using different elements of graphic design useful in brand creation. It is important to clarify that the use of this map is not intended to provide a design recipe but only show different options, helping students to visualize the possibilities of project development. These guidelines are the result of crossing different stages that are developed in a design project in the field of graphic design. With these guidelines, there are several of possibilities, without compromising the creativity or uniqueness of the project.

In the end, we conclude that crossing semantic elements with graphic elements stimulate the merging of the objectives of the project with the synthesis of expressive codes, while helps the interpretation and creation of new graphic products.

This map was been tested and evaluated its results, in order to find whether as an instrument it helps in the development of projects in the field of graphic design teaching. The example we present here is just one of several exercises and workshops that are developed between 2017 and 2019 with students to test and evaluate this tool.

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Research Project Management in Communication Design: Design Methodology Applied to Communication Design Research



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Abstract The present article results from a research project, which, as the objective simplifying the research project management in communication design. This project intends to demonstrate the importance of an application of a research methodology in a professional practice context, to contribute to scientific knowledge, and at last understanding which forms the design methodology applied to research projects can help whether understanding the problem in a holistic view or with a respective solution.

Keyword Design methodologies · Communication design · Research in communication design · Design thinking · Design management

1 Introduction

The triad of design management, project management, and design thinking allied with research, is an asset to strengthen the internal and external results of the organization, as well as the respective research projects. Combining all of these aspects in the triad is a way to efficiently reinforce the results from the organizations, working with the

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existence of more theoretical knowledge and a more significant concern with the design and creative processes in order to understand and satisfy the needs of the public.

Furthermore, design management and project management, when carried out with the appropriate design methodology, allow the development of projects within the time limit, meet the established budget, and achieve the defined objectives. Thus, the main goal of the research project is to simplify the design process of research projects in communication design, highlight the importance of applying research in design in the context of professional practice. Contributing scientific knowledge and, finally, understand how the application of a design methodology can help whether in the holistic understanding of the problem or the respective solution, contributing to innovative communication design projects, with an emphasis on the fundamental needs of human beings. Once that study focuses on design methodology of research projects in communication design were selected, five case studies, developed by RETHINK—Research Group on Design for the Territory.

2 Rethink

The RETHINK—Research Group on Design for the Territory is a group integrated into the Design Center of the CIAUD (Center for Research in Architecture, Urban Design, and Design) of the Faculty of Architecture of the University of Lisbon, based at the School of Applied Arts of the Polytechnic Institute of Castelo Branco.

The Research Group on Design for the Territory integrates members with different formations, understanding the multidisciplinary of the research developed as a factor of differentiation and a guarantor of results for the processes.

The scope of action of the Group covers the different areas of design, but also other disciplines and complementary areas of study, in a logic of valorization of territories, identity, society, and the environment.

The Research Group on Design for the Territory has as a primary objective the development of applied research projects, with a methodological focus in the triad Territory, Design, and Process, promoting and valuing Culture, Material and immaterial Patrimony, Identity, Sustainability, and the Society.

The Group develops research that is geared towards the enhancement of territory and innovation through design, whether concerning a geographical place or through the methodology or processes applied to the projects, using research in design and research for design practice.

3 Theoretical References

Communication design has an essential role as a strategic tool in organizations through disciplines such as design management and project management, which

allow the organizations to be more successful in the market and have a greater recognition by the consumer.

According to Best (2006), “(...) design management engages design thinking in the organizational strategy, identifies opportunities for design, interprets the needs of the organization and its customers, and looks at how design contributes to the business as a whole” (Best 2006, p. 27). In this way, we can observe that the design thinking in an indissociable tool of design management and that it helps in responding to the changes and external challenges of the current world. Through design management and design thinking, it is possible to outline a mental and strategic process that allows the development of innovative, sustainable, and beneficial solutions to improve the user’s quality of life. Therefore, organizations should benefit in economic terms and increase their competitiveness in the market. Besides, design management combined with project management, allows the design process and the creative process to be coordinated and planned in an operational, tactical and strategic way, in order to ensure that the project is developed within the time limit and meets the defined budget.

In this way, design thinking emerges as a methodology used in the design field, with an emphasis on the products and services development, based on principles innovators and centered on the human being, assuming a more prominent highlight in the design process. However, this method is exploratory and experimental, requiring a lot of flexibility and adaptability.

Crucial for thinking and idealization of solutions, that are decisive factors for the innovation of products and services. According to Brenner et al. (2016) the design thinking is guided by the principle “Innovation is made by humans for humans.” (Brenner et al. 2016, p. 8) which makes this method different from the traditional methods of innovation. This methodology relies in the experimentation of several ideas, as well as the development of several prototypes, for those solutions can be previously tested with the user. When testing various prototypes of possible solutions with the public, it is possible to make continuous improvements on the prototypes, making the final solution of the product/service the more suitable as possible to the human being. The successive applications and uses of design thinking have allowed this methodology to assert itself as a catalyst and promoter of innovation. However, design thinking cannot be individualized from other areas of knowledge or considered a competitor to management disciplines.

However, since design thinking is a process that succeeds in research in strategy and innovation, it is closely related to the areas of marketing, engineering, and information technology. Brenner et al. (2016), argues that “Design Thinking offers important potential for research and teaching, along with one fascinating central tenet: with all its strengths and weaknesses, opportunities and threats, Design Thinking is completely interdisciplinary.” (Brenner et al. 2016, p. 20).

Besides that, according to Brown (2009), there are three criteria to consider for the development of successful and innovative ideas in the first phase of the design process. The criteria are feasibility economic and technological on the long-term; viability to integrate a business model, as well as a long-term design strategy; and,

finally, the desirability by the consideration for human needs and respective long-term desires (Brown 2009).

In developing of creative solutions, it is important that designers and the several interdisciplinary teams, go through the “(...) three stages of innovation: Inspiration, ideation and implementation.” (Brown 2009, p. 30). In this way, it is possible making strategic decisions whether for the organization or for the consumer.

The design thinking experience is based on logical and deductive thinking, alternating between divergent and convergent phases. Therefore, divergent thinking allows to create choices, while convergent thinking makes it possible to find solutions, related to consumer behavior, with the offer of alternative products/services, as well as the creation of new interactive experiences, among others (Brown 2009). However, both ways of thinking include the phases of analysis and synthesis. They are equally essential processes since it is essential to analyze all the components and identify the most relevant standards, being essential for the process of creating innovative options and choices.

Regarding to the importance of combining research with the design management, project management and design thinking disciplines, authors as Borja de Mozota (2003), Svengren (1993) and Dilnot (2017), claim that there is positive evidence in the relationship between research and design management in organizations, since “(...) research methods could provide an opportunity for researchers to acquire rich data when following design processes in the strategic works of an organization” (Svengren (1993), p. 448).

Besides that, according to Cross (1984), the application of an appropriate methodology related to knowledge discovered in a certain area, allows to discover specific aspects of reality that can be solved by design (Cross 1984). In addition, Cross (1984) also defends the importance of an intuitive approach in the design process, arguing that it allows reaching a scientific perspective of the discipline. In this way, the design process makes it possible to achieve two types of perspectives: an intangible perspective and an objective perspective. From the conclusions of the previous phase of the design process, the intangible perspective allows obtaining an objective view, while the objective perspective offers a holistic view.

4 Active Research

In order to understand which design methodologies could function in the development of the case studies, the active research phase of the research project began by understanding the various procedural phases of the respective methodologies. With that purpose, the methodology included an information mapping, which culminated in the elaboration of five graphic boards that helped pinpoint the methodological phases as well as the description of the components developed in each case study. Consequently, were made diagrams for each project, in order to synthesize the descriptive tables of the design methodologies. Subsequently, considering the boards and diagrams was elaborated on the synthesis methodology of each project.

Lastly, were developed flowcharts for each case study, which allowed for a holistic understanding of the design process (Fig. 1).

5 Projects—Cases Studies

Within the scope of the research subject, the investigation delimited five case studies. The selected five case studies included areas of agri-food, cosmetic/pharmaceutic development, exportation markets, cultural research and, environmental promotion and valorization. Towards understanding what methodologies applied in each project, the investigation included exploratory interviews with the designers and other professionals involved in projects. The projects realized aimed at the involvement and the valorization of resources and local communities, as well as respective involved regions.

5.1 *Mountain Olive Oil Promotion and Valorization Project*

The Mountain Olive Oil Promotion and Valorization Project aimed to increase the sector productivity and competitiveness through the development of innovative products, quality and added value, and the economic and social development of Beiras and Serra da Estrela sub-regions. To achieve these objectives, the design methodology of the project included the design methodology for project communication and the design methodology for product communication. During of analysis of both design methodologies, it was possible to understand that they included nine parts: Diagnosis, preliminary research, research, analysis, system definition, design, validation, production, and implementation.

However, in the first place was realized the communication of the project. In this way, the diagnosis phase consisted of the study of state-of-the-art and problem identification. Then, in preliminary research was realized a study-related to visual identity, emotional archetypes, and brand personality. The research included the elaboration of a trend board and brand positioning analysis. Followed by the analysis of the brand competitors, through the development of a matrix with several criteria, for this effect, it included a chromatic map of the analysis of brand competitors and analysis of the brand graphic positioning. In third place, the research stage included the communication strategy for the project and the respective marketing strategy. After that, in the analysis phase, was developed an analysis of the collected data until the moment related to diagnosis, preliminary research, and research. However, simultaneously occurred a divergence data process, that afterward culminated in a convergence.

This phase allowed the researchers to achieve the necessary insights into the progression of the project. This phase included the visual identity system that began with the definition of the typographic and chromatic systems, resulting in the visual

identity definition. Afterward, the design component was developed, which started with the production of content and the development of sketches (these two processes co-occurred)—followed by the respective graphic and audiovisual conception.

Occurred a validation process of the previous components developed. If validated, the project continued to the development of communication supports and the development of audiovisual supports. Otherwise, it was realized the necessary adjustments until validation. Once produced the audiovisual and communication supports, a validation phase occurred again, including the verification if changes were needed. If everything is correct, the project continued developing final arts of communication supports and pre-production to the audiovisual supports. Otherwise, were elaborated the needed corrections until validation.

Completed the design stage, were realized a holistic validation of the whole process. If changes were necessary, the design phase would carry out the necessary adjustments until its validation occurred. When everything conformed, the project was continuing to the next stage.

The project included the production of communication and audiovisual supports, and in the last place, the implementation of the project communication implementation.

Accomplished the project communication, was developed the product communication. Thus, in the diagnosis phase of the design methodology, it was realized the problem identification. Regarding the preliminary research stage, were made studies about visual identity, emotional archetypes, and brand personality. The project included a trend board design, supporting the product positioning, and studying the sectors of activities. Furthermore, it occurred a market segment identification. Subsequently, brand competitors were analyzed using a purposely developed matrix for this project, in which several criteria were evaluated and analyzed. It also included a chromatic map, a brand competitor's analysis, and its graphic positioning and the audience map.

In third place, the research stage consisted in the definition of communication and marketing strategies for the product. In the analysis phase, the data collected until the moment, related to diagnosis, preliminary research, and research, were analyzed. However, at the same time, there was a process of data divergence, which culminated in its convergence. In this way, the researchers could achieve the necessary results to advance with the project. Thus, defined as the visual identity system. Firstly, the typographic system was defined, and then the chromatic system, which culminated in the definition of visual product identity. The design process phase included the development of content production and sketches component simultaneously.

The audiovisual and graphic design followed the previous phase. After its completion, a validation phase took place. If the design process developed so far wasn't validated, the project had to include reformulations, in several rounds, until a positive validation. The production of communication and audiovisual supports followed the validation of the previous components. If it also validated the communication and audiovisual supports, the project would continue to the task of developing the final arts and the pre-production of audiovisual supports. Otherwise, the project would

implement the necessary changes to move forward in the design process mentioned above.

Once completed, the design stage, the overall design process validation step took place. If not validated, corrections and reformulations would apply until it was validated. Afterward, the project advanced to the production of communication and audiovisual support, and finally, it followed by the product communication implementation.

5.2 Project to Promote and Enhance PNTI—Tejo Internacional Natural Park

The Project to Promote and Enhance PNTI—Tejo Internacional Natural Park had as main objectives to promote the dissemination, promotion, and enhancement of the territory, in harmony with the fundamental principles of nature conservation and biodiversity. The project portrayed various means to promote and improve conditions of visitation, namely, the development of corporate and visual identity and elaboration of information and orientation system. Thus, the design methodology had a structure organizes into two segments: The design methodology for the visual identity system and the design methodology for the orientation and information system.

The study began by understanding the design methodology of the visual identity system of the project since the orientation and information system comes from the development of visual and identity systems. In this sense, it was possible to verify that the design methodology for both systems (visual identity, orientation, and information) had nine parts: Diagnosis, preliminary research, research, analysis, system definition, design, validation, production, and implementation.

Regarding the diagnosis phase, firstly, the project was first defined; second, the strategy portrayed a survey in the territory. Finally, the identification of problems at the communication strategy level. Relatively to preliminary research, a study and an analysis of the currents, particularly the ICNF nature parks and other inter-national nature parks, was carried out.

Besides, the public, the existing media, and the strategy portrayed a communication positioning, and finally, a state-of-the-art study. Thirdly, during the research phase, the communication strategy was defined. Regarding the parameter analysis, the data collected so far were analyzed, related to the stages of diagnosis, preliminary research, and research. However, a simultaneous process of divergence of data occurred, which subsequently culminated in its convergence.

Through this stage, the researchers could achieve the necessary results for the progression of the project. And define the visual identity system. To better define the Natural Park visual identity, the typographical and chromatic systems were previously outlined, including the emotional archetypes and the brand personality.

Subsequently, aspects were defined, such as Brand positioning, target audience, and the means and supports of communication, such as information brochures,

maps, books, among others. After the definition of the visual identity system, the design process continued. This process began with the development of visual identity sketches and included the production of content as well as its graphic design. A validation phase of the communication content developed took place after carrying out these three components of the design process. If it wasn't validated, the necessary corrections continued until it was approved. After the validation, the project continued to develop the communication media, following a validation phase. If the content developed was following the intended one, the project advanced to the next component. Otherwise, the reformulations continued until the communication media were validated. After validated, the design process continued until the final communication design. After preparing the final arts related to the design process, the project supported the general validation of the process. In this phase of validation, if changes occurred, the processual stage of design repeated. If everything was within the intended results, the project advanced to the communication media production phase. Finally, the visual communication project ended with the implementation of visual identity.

Considering that the elaboration of the orientation and information system resulted from the development of the visual identity system, the diagnostic phase of its design methodology began by the definition of the project. The researchers surveyed the geographical area that identified the spaces to intervene, as well as the analysis of pedestrian routes, rivers, and religious routes. Finally, new routes proposals resulted from that previous study. The preliminary research resulted in circulation plans and existing maps, as the research of other orientation and information systems, as well as research related to legislative considerations at level orientation and information systems.

The legislative considerations at the level of orientation and information systems were a factor that originated some legal limitations regarding the initially intended signage supports. However, despite the legislative limitations at this level, some creative freedom was allowed at the graphic design level. Besides, a study of state-of-the-art also been carried out.

Guidelines definition between the entities (IPCB and ICNF) resulted from the research phase, as well as the conduct of research by direct observation, through visits to other natural parks. Fourthly, at the analysis stage, the data collected so far, relating to diagnostic stages, preliminary research, and research, were analyzed stages.

However, at the same time, there was a process of divergence of data. This step enabled researchers to achieve the necessary results for the continuity of the project.

The definition of orientation and information system included the definition of the pictographic system. In this methodological phase, the orientation system followed a legal ordinance 98/2015 and D.R. 22A/1998, as well as the definition of the information system based on ordinance 98/2015. Once the system was defined, the design process followed the information system definition.

The design process began through a previous study, related to the assumption of signage and the development of sketches. Subsequently, there was a validation phase. If the sketches and supports weren't validated, reformulations had to apply until the

sketches and support validation. After its validation, the project continued to develop circulation plans and to define signage supports. At the end of this phase, a validation step has taken place. If not validated, necessary modifications would continue until there was a positive consent for the project's continuity. After its validation, the graphic design process continued, followed by another validation phase. If a project validation occurred, it would continue to the pre-production phase of the media and prepare the specifications. Otherwise, the necessary changes would apply until the approval.

Concluded the design phase, a general validation occurred, which was need to make changes in the design process or evaluate the phase conformity with the intended objectives. If it required modifications, the designers would go back to the previous stage, and after validated, the project would proceed to the next stage. After being validated, it occurred the subsequent signage and information production. Finally, it occurred the subsequent orientation and information system implementation, as well as the maintenance of both.

5.3 *DERMOBIO—The Development of Dermo-Biotechnological Applications Using Natural Resources in the Beira and Serra Da Estrela Regions*

The development of dermo-biotechnological applications using natural resources in the Beira and Serra da Estrela regions Project consisted of exploring this geographical region. Intending to develop new innovative products for the health sector, settled in the concept of nature territory, through the thermal water use and essential oils.

In this sense, it was possible to verify that the design methodology had two parts: The design methodology for project communication and the design methodology for product communication. Besides, it was possible to observe that both project design methodologies had nine subdivisions: Diagnosis, preliminary research, research, analysis, system definition, design, validation, production, and implementation.

The diagnostic phase supported a state-of-the-art study. The preliminary research consisted of studies related to the visual identity of the area under study, the emotional archetypes, the brand personality, a study of the activity sector, and a survey of its positioning.

Subsequently, at the research stage, the communication strategy for the project was defined. Then, there was the analysis phase, where the data collected so far were analyzed, related to the stages of diagnosis, preliminary research, and research. However, at the same time, there was a process of divergence data, which subsequently culminated in its convergence. This phase made it possible for researchers to obtain the necessary results for the progress of the project. After the analysis phase, the project continued to the definition stage of the visual identity system. This stage defined the typographic and chromatic systems, as well as the visual identity. Then

began the design process. This process involves the development of the production of content (product information), developing sketches, and finally, its graphic design.

After completing these steps of the design process, a validation process took place. If the design component carried out until then was validated, the project continued to the next phase, related to the development of the communication supports; otherwise the necessary changes were made until its validation. After the development of the communication supports, a validation phase of this component of the process took place. If the gap wasn't validated, the necessary reformulations carried out until a consensus.

The validation of solutions preceded the communication supports production. Following the design step, occurred a holistic validation of the respective process. If it wasn't validated, it was necessary to return to the previous phase of the project, and the necessary adjustments proceedings until the approval of the process. However, if everything was following the intended, the project advanced to the production phase of the communication media, and later its implementation took place.

After the communication of the project, the project progressed to the development of product communication. Thus, in the diagnostic phase, the project identification was performed. In the second place, in the preliminary research, studies included: naming, brand personality, emotional archetypes, brand architecture, graphic positioning, as well as visual identity. Besides, the project also included a study of the sector of activity, identifying the market segments, and their positioning. The competitors were then analyzed, and a public map and drawn up a trend board. The research has also focused on the field of cosmetic packaging innovation and packaging. As far as the research stage is concerned, it defined the communication strategy for the product. In the analytical phase, we analyzed the data collected so far, related to the stages of diagnosis, preliminary research, and research. However, at the same time, there was a process of divergence data, which subsequently culminated in its convergence. This phase allowed the researchers to achieve the results necessary for the continuity of the project. Then, the definition of the visual identity system was made, which began with the definition of the typographic and chromatic systems, culminating in the definition of the visual identity. Regarding the design stage, it started with the development of sketches, included the production of contents and their graphic design. After the development of these three components, there was a validation phase of the design process carried out so far.

If positively validated, the project advanced to the development stage of the communication supports—otherwise, the produced changes meant to achieve unanimous positive feedback. After the development of the communication supports, a validation phase took place. If it wasn't validated, the project included the necessary adjustments until the validation of the final results. Otherwise, the project advanced to the prototyping stage. Once performed, the prototyping stage occurred again, a validation phase. If the prototypes were correct, the project progressed to the realization of its final arts. Otherwise, the necessary reformulations carried out until its validation took place. Once the design process phase started, a global validation phase of the entire process as performed, in which it evaluated the necessity of further adjustments were necessary or not. If necessary, to make corrections, the designers

would return to the design stage of the project. Otherwise, the project would advance to the production phase of the communication supports. Finally, the implementation of product communication took place.

5.4 Ordo Christi—Artistic Heritage of the Order of Christ Between the Zêzere and Tejo (Centuries XV and XVI) Project

Through the Ordo Christi—Artistic heritage of the Order of Christ between the Zêzere and Tejo (centuries XV and XVI) Project, had the goal to develop a territorial brand holistic vision. The project promoted the identity reinforcement cohesion and focused the patrimonial property valorization. The project also developed an effort in the interurban routes definition, and the Order of Christ Heritage promotion. The intention wasn't about creating a new brand, but to motivate and to promote synergies existing between the many public, religious and private organizations. The design methodology developed to implement the project had nine parts: Diagnosis, preliminary research, research, analysis, system definition, design, validation, production, and implementation. In this sense, in the diagnostic phase, a state-of-the-art study was included to identify the problem under investigation. Then, in the preliminary research phase, studies related to visual identity, emotional archetypes, and brand personality were carried out. The research included a trend board design with dominant image trends. Subsequently, occurred the buildings and heritage identification. The last phase included a mind map design. In the research phase, marketing and communication strategies for the project and tourism promotion for the territory. Simultaneously with the inventory of existing routes and the definition of new map routes. After the research stage, the analysis phase collected and analyzed data related to diagnosis, preliminary research, and investigation developed in the project. However, at the same time, there was a process of divergence of data, which subsequently culminated in its convergence. This phase allowed researchers to achieve the necessary results to continue the project. Thus, the project proceeded to define the various systems that integrated the project.

Firstly, the project included the typographic and chromatic system's definition, culminating in the description of the visual identity system. Considering the results of the visual identity system, orientation, and information systems, as well as the printed and digital media, were defined. Besides, occurred innovative solutions developed in the context of art history and the definition of touristic itineraries. After the system definition phase, the design process began. This stage, included sketches production, the contents produced, and their graphic and audiovisual design. Subsequently, the project included a validation phase of the developed components. If they weren't validated, the necessary reformulations occurred until their validation took place. After that, the project advanced to the development of communication and audiovisual supports. Once completed this component, occurred another validation phase.

If validated, the final arts of communication media and the pre-production of audio-visual supports were validated. Otherwise, occurred the necessary corrections until a final validation. Completing the project required a holistic validation and the evaluation of the design process as a whole. If validated, the project would continue to the next steps. Otherwise, the designers went back to the initial design process and made the necessary changes until it was validated. The next phase included the production of printed communication supports and digital media (such as a website, videos, digital kiosks, and a mobile application). Besides the development of these means, complementary means were also produced, such as Totem and signage, among others. Finally, the implementation of the project communication took place.

5.5 REINOVA—*Re-industrialization, Entrepreneurship and Innovation in the Traditional Productive Sectors*

The REINOVA—Re-industrialization, Entrepreneurship, and Innovation in the traditional productive sectors. The Project, had the primary goal of developing a business model that stimulated creativity, favoring entrepreneurship, and SMEs of the agri-food sector. The design methodology included two parts: The design methodology for the communication of the Project and the design methodology for the communication of products. In this sense, it was possible to observe that both methodologies included nine parts: Diagnosis, preliminary research, research, analysis, system definition, design, validation, production, and implementation.

The project began with the development of its communication; that is, the design methodology of the project communication first occurred. Thus, in the diagnostic phase, a state-of-the-art study was conducted, and the project was defined. Then, in the preliminary research stage, studies related to visual identity, emotional archetypes, and brand personality were carried out. The research included a trend board development, as well as a study of brand positioning and the agri-food sector. The research phase also defined the communication strategy for the project. In the fourth place, at the analysis stage, the data collected so far relating to diagnosis, preliminary research, and research were analyzed. However, at the same time, there was a process of divergence of data, which subsequently culminated in its convergence.

This step allowed the researchers to achieve the necessary results for the progression of the project. The next step allowed the visual identity system definition through the previous description of the typographic and chromatic systems. Besides, emotional archetypes and brand personality were also defined, and after that, followed by the brand positioning definition, the target audience, and, finally, the communication media definition. The design phase included several sketches. After that, a meeting of project partners allowed a pre-assessment of this design component.

If the project partners didn't approve the drafts, occurred the adjustments considered essential until the project final approbation. After the validation of the sketches,

the project continued with the development of the graphic design. Then, a validation step occurred again. If everything was following what initially intended, the project advanced to the realization of the final arts. Otherwise, the necessary reformulations continued until it was possible to progress with the project. Once completed, the final arts of the design process occurred the validation phase of the entire design process. If validated, the project would continue to the production phase of the communication supports. Otherwise, the necessary changes would continue until it was approved. The final phase dealt with the implementation of the communication of the project.

Once completed the project communication, the project continued to the communication of eight selected products. The design methodology began with the diagnosis phase, this phase portrayed the identification of opportunities, and the product problem definition.

Later, to develop new products, researchers resorted to the method of generating ideas. After that, there was again a phase of ideas. If validated the latest solutions, the project advanced to the validation phase with the help of a focus group; otherwise, the necessary changes would occur until final validation. In the second place, preliminary research consisted of concurrent analysis and laboratory and laboratory analysis of products. Besides, a communication diagnosis methodology (ME.DI.CO.) developed aspects such as emotional archetypes, the consumer journey (through storytelling) used the persona method and defined the brand personality. After this step, a validation phase took place through a focus group. The necessary reformulations continued if the step wasn't validated until all aspects were following the intended one.

Once validated, the project continued into the research phase. At this stage, the research focused the eight products, as well as the study of several markets, namely: Asian market, Latin America and CLPL countries. Agri-food trends were also studied, and the positioning of products was defined. The analysis phase was carried out in third place, starting with a SWOT analysis for each product. A phase followed by the study of the data collected so far in the diagnosis, preliminary research, and research. However, at the same time, there was a process of data divergence that subsequently culminated in its convergence. This phase allowed the researchers to achieve the necessary results for the project's progression and the visual identity definition. This phase began by defining each of the naming of the product and the development of visual identity systems.

The definition of the visual identity system integrated components such as the definition of the typographic system and the chromatic system, which culminated in the definition of visual identity. A phase followed by the product, packaging, and labeling definition. Finally, communication supports were defined. Then, the design phase began with the elaboration of sketches and graphic marks. After performed these compositions occurred a validation phase. If the components mentioned above weren't validated, there were some modifications until a final validation. After its validation, the project advanced to the development of communication supports. After that, there was again a validation phase. If it was validated, packaging entered the phase of production, otherwise, the necessary adjustments continued in the communication supports until final validation.



Fig. 1 Diagrams group of the design methodologies of the five cases studies (Source The Authors)

Once completed the packaging development stage, a validation phase verified that everything was correct. If not validated, the necessary corrections applied until everything was in order. The next step included the development of the final art for both communication supports and product packaging. Once completed the design process, a holistic validation phase applied to the previous step, which had three validation moments: Through the focus group, through the project partners, and finally by the public at trade fairs and/or food exhibitions. In case it isn't validated by these agents, the necessary reformulations continued until the final validation. When approved, the project advanced to the production phase, with the communication supports and packaging of product production. The final stage focused on the implementation of product communication.

6 Pre-results

According to Cross (1984), performing the mapping of research information is of great importance because “(...) it feels necessary for us not only to try to understand scientifically (objectively) what designer do but also to experience subjectively what designing is like”. (Thomas and Carroll *apud* (Cross 1984), p. 223). Thus, this subjective understanding of what design allows a scientific perspective.

In this sense, after an analysis of the design methodologies applied to the projects, we were able to observe the existence of phases of the design process common to

the cases study such as Diagnosis, preliminary research, research, analysis, system definition, design, validation, production, and implementation. The divergent and convergent thinking process, as well as the analysis and synthesis of the various components of the design process, were crucial in discovering the most significant patterns of the procedural phases typical to the design methodology.

Succinctly, Cross (1984) argues that scientific theories can derive from a logical analysis of the facts. Furthermore, it explains that the rationalization of the design process in which the several components of the problem are analyzed and added scientific knowledge during its analysis allows for a synthesis of the holistic view of the problem, which consequently culminates in the development of innovative solutions and suitable for human beings (Cross 1984).

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An Impact-Centred Tool for Developing Design Students' Capacity for Sustainable Transformation



Catarina Lelis 

Abstract At their course's final years, both undergraduate and postgraduate design students are often presented with a pool of topics that they can select from to work on their major/final project. Some students struggle first with making this choice, and then, after the work is submitted, marked and the degree is completed, they have to deal with the frustration of leaving such projects behind and totally inconsequential. This may happen because the student is not oriented towards reflecting on how each of the possible topics to choose from can become a more or less impactful project 1) during the remainder of their studies, 2) for their professional development and future employability, and 3) in terms of supporting/helping a wider community, by solving a problem common to many.

After analysing 35 generative boards/canvases retrieved from a diversity of professional sources, a taxonomy for the design of this kind of visual tools was optimised and a visual board—the Impact Plan—is proposed. It aims at obviating the lack of reflection on the moment of choosing a project, providing students with a matching process between their interpretation of the available or most interesting projects from said pool, and their motivations, capacities, ambitions, levels of altruism and perception of value. A low-fidelity prototype was designed and tested with academics and careers/placements officers. The tool triggered immediate interest, for which reason it is currently being implemented as alternative assessment (due to the recent COVID-19 disruptions) in a postgraduate academic context.

Keywords Impact · Design students · Canvas · Purpose · Project-based learning

1 Introduction

Paying more attention to design students' employability responds to their main motivations for enrolling into Higher Education (HE) courses—motivations which are, supposedly, instructed by a self-understanding of the skills, qualities, culture and

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ideology of an intended job (Jackson 2016). Students increasingly see the need to add value to their academic achievements, in order to gain an advantage in the job market. Hence, by requiring students to find solutions for a real-world problem, a tool that provides them with guidance towards meaningful and impact-led projects may well be a way to help them build their agency and authority in a specific wicked problem of their concern and/or of concern to many. This configures as a design exercise since design is often focused on anticipating a future that does not yet exist, solving problems for multiple stakeholders in a complex changing world.

Therefore, from an educational perspective, it seems relevant to systematically enhance the notion of impact of design projects, reminding students that the more impactful their contribution is, the higher their currency will be, either to become a valuable employee or to embark with confidence into self-employment.

It is HE design lecturers' job, as learning facilitators, to not just provide students with greater awareness in relation to the macro and micro contexts we (and will) live in, but to accompany the design process of their projects in a way that allows them to anticipate not only their career ambitions, but also to prepare, with that in mind, a meaningful, relevant, sustainability-led and transformational output.

The intended outcome of this research is a humanity impact -based/-led tool to connect HE design students' reflective practice with their pre-professional identity, aiming at anticipating (and speculating on) the short, medium and long-term outcomes their design projects will have in their lives (as students and, then, as professionals) and in the lives of others. It aims at providing final years' design students with a structure for reflecting, planning and prioritising their experiences for heightened employability, guiding them through the main contexts in which their design projects can trigger or build on some sort of impact.

2 Literature Review

Personal Development Planning (PDP) draws on two main theoretical grounds: the Experiential Learning Cycle, developed by Kolb (1984), and the constructivist theories of Reflexive Identity Formation, which defend that reflexivity is deeply linked to the reinvention of the self (Giddens 1991; Beck 1992). Although PDP can be approached within a learning frame (which is the most common), the latter theories have been having an increased influence in the field of career development by encouraging people to identify issues, constructs or themes that inform their future actions (Ward and Watts 2009, p. 9), potentially leading to outcomes for self-presentation purposes, such as meaningful and real-life informed portfolios. Hence, supporting PDP is increasingly relevant to students' employability.

According to Jackson (2016), paying more attention to students' employability responds to their main motivations for enrolling into HE courses. The expectation is for the students to have a self-understanding of the skills, qualities, culture and ideology of an intended job, which work as the fuel to pursue their studies, responding

to the need to add value to their academic achievements, in order to gain an advantage in the job market (Leman, 2018; Berger and Wild 2017; Lindley and Machin 2016).

2.1 *Experiential Learning and Reinventing the Self Towards a Career*

According to Kieslinger et al. (2009), motivation is one of the key factors for successful adult involvement in learning and knowledge sharing activities. Duckworth et al. (2007) performed a study on grit, which is defined as perseverance and passion for long-term goals, suggesting that the achievement of difficult objectives associated to complex, wicked problems entails not only talent, but also its application over time and in a sustained and focused manner. Maslow (1943) argues that while individuals have basic needs that must be considered, they also have needs for socialisation, esteem, and self-actualisation; it is quite clear to this author that the goal of each individual is to do their best with their potential in order to be personally fulfilled. Gough (1998) defends that one of the basic human needs is to recognise oneself as a distinct and independent individual. The author argues that it is through learning and education that individuals develop to achieve that.

Experience is as much grounded in constructivist, social, and situational thinking as it is deeply related to humanistic and motivational theories because of its core of social interaction. According to psychologist Carl Rogers (1983), experiential learning (as opposed to memorisation in cognitive learning) meets the learner's needs and includes feelings and emotions. Several studies show that a good learning experience must involve novelty, change and emotions in order to be memorable. Csikszentmihalyi (1990) proposes the Theory of Optimal Experience, well-grounded in the literature on human motivation, arguing that individuals achieve their best performance when they reach a level of excitement considered "optimal", somewhere in between super-stimulation and monotony. Csikszentmihalyi's optimal experience, also known as *flow*, describes a state in which the individual is completely engaged in an activity that must be both challenging and attainable, i.e. the activity provides an optimal level of arousal, being *flow* the perfect match between skills and opportunities.

Thus, experiential learning promotes and is promoted by goal-oriented motivational opportunities that can lead individuals to ideal learning situations where their abilities can confront, in a balanced manner, the challenge they face. And while Csikszentmihalyi's theory of flow may seem somewhat individualistic and egocentric, in design education the learning contexts in which students can achieve ideal experiences always provide social interactions and moments, especially in classes in which students are involved in meaningful experiences strongly related to the societal problems they identify, they (re)define, they research, develop, prototype and test, towards an ethically sound and sustainable solution.

Solution-oriented behaviours are central to this kind of methodology, extensively explored in the context of Design Thinking (DT) and, lately, by the educational community in general. Being the main motto its human-centeredness, DT explores the development of active listening skills, agile thinking and design skills, in a continuous fail-and-learn-fast style (Curedale 2013). DT has obvious links to Problem-Based Learning (PBL) and to the Real World Classroom teaching model which is based on decision-theory learning (Choi and Lee 2008), where students are encouraged to work in teams to solve complex and real problems, assuming that learning is an active and constructive process, permeable to social and situational conditions (Barrows 1996; Gijsselaers 1996). The opportunity to address and solve perverse and/or complex dilemmas that arise in wicked real-life problems helps students develop contextual knowledge and content, as well as reasoning, communication, and self-assessment skills. Thus, such a practical approach allows them to maintain levels of interest and motivation because they easily understand the transferability of these skills into any other real situation they may encounter in their future area of expertise.

Under the umbrella of Reflexive Identity Formation, reflexivity provides a framework to explicate how students negotiate ethical decision-making throughout the course of the design process (Corple et al. 2018), providing them with an augmented level of agency. Reflexivity includes moments in which the individual understands "...something that is already in plain view" (Wittgenstein, 1953, p. 89) and, consequently, the impact such new understanding can bring to ones' lives (Cunliffe 2002, p. 57). It should be noted that reflexivity differs from reflection: according to Rennie (1992), reflection involves self-awareness, while reflexivity involves reflection plus agency within such self-awareness. Thus, as suggested by Savickas (2016), "reflexivity fosters a self-awareness that flows into intention" (p. 84).

2.2 Speculation Tools and Humanity-Centred Design Students

By requiring students to find solutions for a real-world problem, a designerly tool that provides them with guidance towards self-awareness and the subsequent construction of design career intentions—that could guide meaningful and impact-led projects—may well be a way to help them build their agency and authority in a specific wicked problem of their concern and/or of concern to many.

This configures as a speculative design exercise, when design is a field inherently interdisciplinary, often focused on anticipating a future that does not yet exist, solving problems for multiple stakeholders in a complex changing world (Tharp and Tharp 2018). Design Fiction is a design method based on narrative (storytelling, predictions, prototypes, etc.) which aims at challenging normality and the status quo with speculative designs that outline and provoke ideas and conceptualisations for the development of new products, processes, systems, principles and services. According

to Spacey (2018), most design fiction narratives operate at the *design concept* level, "... a foundational idea that gives a design its depth, meaning and direction". The author lists 14 design concepts as the most common: functions, features, quality, form, style, emotions, usability, technical, nature, experience, community, culture, risk and sustainability.

Hence, design courses should be guiding students toward the design of solutions that, as designer and Artefact's co-founder Rob Girling (2020) mentions, "have minimum negative impact, create and sustain equity, and build on technological advances without disrupting the foundations of society. We have the responsibility to evolve from human-centered design thinkers to humanity-centered designers by changing our perspective, our timeline and our methodology". He adds that constructs such as authentic corporate social responsibility and triple bottom line are gaining mindshare, making all kinds of large, medium and even small organisations declaring their commitment towards sustainable positive social impact. Design students need the experiential and reflexivity-led tools that allow them to develop and prepare as humanity-centered designers, without underestimating their fundamental wellbeing, essential to achieving such *Self-Other* high level of commitment.

This leads to the insight that all designers should actually be altruism-aware individuals. Zwick and Fletcher (2011) suggest eight levels of altruism that they group into two main areas: the predominantly biological realm, and the predominantly cultural realm. At the bottom of their scale, the first level of pre-altruism is *Self-Interest*, explained as "The foundation of action for others is action for oneself", whilst at the top the authors suggest the levels *Life Altruism* and *Being Altruism*, which look into biospheric sustainability and looking after all sorts of existence (living and non-living) in the planet. At the middle of this scale one would find *Group Altruism* defined as "group solidarity—is very important in human society, and occurs at multiple levels, ranging from small groups, organisations, communities, ethnic groups, nations, followers of the same religion, etc.". Hence, the two main groups seem to relate with, respectively, the Self and its networks, and the Other. The latter is a greater group that would include not only other human beings, but also all remaining living and non-living beings that are part of our planet-wide ecosystem.

However, no literature nor tool was found on the anticipation of impact of students' projects or its practical relationship with 1) employability and 2) humanity and sustainability in general. Nonetheless, in order to better define action plans and clarify processes for work, a variety of tools and visual artifacts has been developed in the last few years to support such kinds of activities (Lundmark et al. 2017). In the past couple of decades, several design and innovation canvas-based tools have been created, and most have been made freely available on the web; only a few allow reflexivity at design fiction level and no tool was identified establishing the link between reflexivity and speculation with HE students' careers and its implications at heart.

In a moment when many design students increasingly develop research skills that are being more and more requested by the creative industries where, expectedly, they will find their future jobs, and also when academics are being asked for clear statements on the influence of their research, it seems relevant to systematically

enhance the notion of *impact*, reminding design students that the more impactful their contribution is, the higher their currency will be, either to become a valuable employee or to embark with confidence into self-employment. Furthermore, having students concerned with the impact of their projects will work as a pull mechanism for lecturers, leading them to better relate the curriculum to the practice world beyond HE (ERiC 2010; QAA 2009).

3 Methodological Approach

This research is rooted in Hermeneutics and the Theory of Change, and its qualitative nature is being greatly informed by inductive and abductive reasoning.

After a literature review and a benchmark exercise on the existing employability-led tools and the canvas-based activities to support design and innovation, decision-making, speculation and impact-centred thinking, a conceptual model was conceived, leading to the design of a low-fidelity prototype representing a draft version of a designerly tool which was discussed via informal unstructured interviews with two design academics, two careers/placements officers and one HE pedagogy specialist. This approach resulted in collecting the data that allowed answering the question that guides this research:

How can design students' final projects be guided by humanity- and impact-centred thinking?

The benchmark exercise developed from a selection of 35 project-related tools out of 312 canvases, boards, diagrams and other generative activities, collected from seven different sources and retrieved from either agencies/practitioners' online publications (official websites, blogs, wikis), monographies and scientifically developed resources, published in academic journals. The selection criteria were the presence of elements that would frame the activity under design and innovation, decision-making, speculation and impact-centred thinking, and the presence of triggers, actions or components that would relate to categories "personal and professional development", "project outcomes or effects" and "sustainable future".

The analysis resorted on an optimised framework for analysis of generative tools which was crafted for this project (Lelis 2020) by combining some of the dimensions of the meta-taxonomy for diagram research by Blackwell and Engelhardt (2002) and the categories for Design Space of Innovation Canvases suggested by Thoring et al. (2019).

4 Benchmark of Project-Related Tools

As Thoring et al. (2019) suggest, a designerly (innovation) tool guides its users towards the creation of something new, is presented and framed in a graphical way, usually decomposing a complex topic or task into simplified activities, and facilitates

interactions with different stakeholders. Canvases, games and diagrams are usually among the most popular tools of such kind. The same authors define a canvas “as a two-dimensional, poster-based tool that (...) provides blank areas to be filled by the users, in order to invite co-creation activities and teamwork” (p. 594).

Most of the analysed visual tools are presented as an offline “... one-page, poster-based canvas with several graphical boxes and prompts to be filled with specific information...” (idem, p. 594). The majority is structured as a map or suggesting a linear process, relying on literal verbal elements as prompts for activities that can be executed in writing or sketching, with instructions attached to the tool, normally overleaf. Very few include other sorts of board features and interaction—such as cards, in which case they tend to look and feel like gamified activities. The analysed tools are mostly intended for collaborative teamwork (only three are supposed to be completed individually), instilling cognitive processes such as judging and problem-solving through definition or assessment-based activities. Only two of the analysed tools are designed to include speculative exercises.

Out of the 35 selected tools/canvases, 10 were highlighted as significantly relevant and influential on the definition of a humanity and impact-centred tool: Theory of Change, Networking Canvas, Research to Impact Canvas, Life Model Canvas, Future Scan, Social Impact Wheel, Future Impact Wheel, Personal Performance Model, Value Design Canvas and The Thing from the Future. Three other tools contained interesting features (mostly evaluation-related) that were also considered: Problem Definition Canvas, Evaluation Criteria and How-Now-Wow Matrix.

In summary, no tool/canvas was identified as a resource that would support design students in choosing their projects (proposed briefs or self-negotiated ones) by speculatively creating outcome scenarios associated to said possible activities and assessing their impact at a pre-altruistic stage, and then at a group/community and life altruistic levels.

5 Conceptual Model

According to Kronsbein and Mueller (2019), “the abductive reasoning pattern is going from the aspired result (Value) back to the possible reasons (Artifacts). Dorst (2011) explains abduction as a process of reasoning that can be broken down into two forms: Abduction-1, in which both the working principle and the value/purpose are known but not the solution, and Abduction-2, in which both HOW and WHAT are unknown: only the value/purpose, represented by outcomes and impact one wants to achieve, is clear. The latter is the level of abductive reasoning that the intended tool answering the proposed research question will instil in design students, following an ontology based on speculation. In addition to that, and inspired by the approach followed by Kronsbein and Mueller (2019), the development of the tool considers two design principles:

- *Principle 1*—To the student, the Value is the best-known variable. Hence, it needs to be represented to the best extent, in order to, subsequently, inform both the HOW and the WHAT.
- *Principle 2*—The Value describes the purpose (the intended impact), informs the rationale for taking up the project/activity, and must be at the centre of the student's speculative process.

5.1 Defining the Conceptual Model

Under this methodological framework, Value will be broken down into three types, linked to different stages of outcomes (short, medium and long-term), and considering the most common values to human nature and to the requirements of societal and professional functioning (Persson et al. 2001; Schwartz 2006):

- *Self- and instant reward.* This value dimension focuses on immediate rewards (short-term outcomes) that are inherent in the experience of performing a certain activity. In a self- and instant-reward task the student chooses certain aspects regarding the completion of a project (e.g. self-negotiated brief, method to be implemented, paths to creativity and exploration, etc.) because he or she enjoys them. Thus, according to Persson et al. (2001), enjoyment is an essential characteristic of this dimension and, in some cases, when the activity provides an intense challenge to the student while matching his or her skills, the student can enter Csikszentmihalyi's state of flow (1990).
 - This would be understood as a level of impact on the Self that would relate to the students' academic projects and, considering Maslow's hierarchy of needs, would be at a motivational level oriented by the achievement of certain competencies and establishing/maintaining wellbeing thresholds.
- *Independence outcome.* This dimension is about the concrete features of a student's career intentions. It is characterised by a medium-term looking ahead, anticipating the impact that the design activity/project may have on improving or acquiring capacities and skills the student will need in order to follow a specific career path. Such reflexive exercise will allow students to become aware of their future situation and needs, possibly nudging them towards understanding their interests, preferences, passions, and also the problems they face and would like to solve.
 - This level of impact would relate to the students' careers and professional ambitions and would be driven by motivational grounds related to achieving expertise recognition.
- *Humanity-centred impact.* Grounded on Universalism values that contribute to positive social relations, this long-term outcome is driven by the others and by the planet, with sustainability at its core and as defined by the 2030 Agenda commitment in achieving development in sustainability's three dimensions: economic,

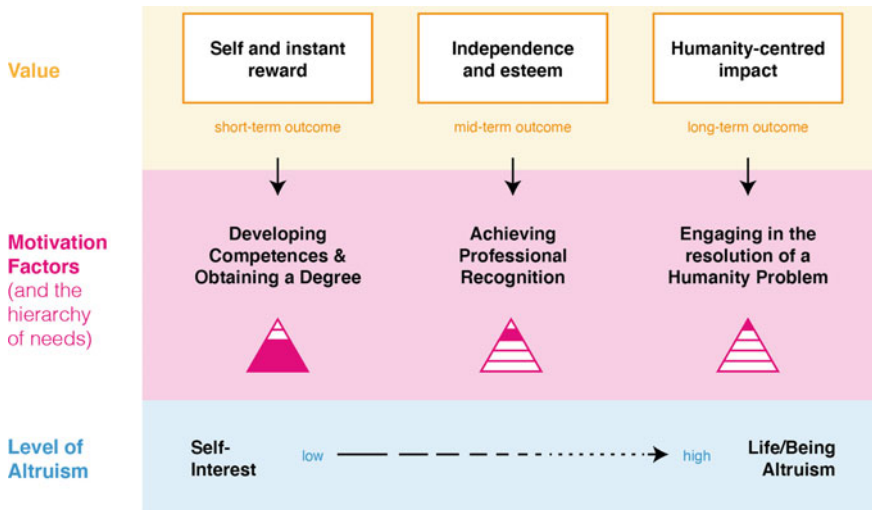


Fig. 1 Conceptual model for the development of an impact-led tool

social and environmental. Hence, as a design concept, sustainability does not have a mere environmental focus, as in Spacey’s design fiction narratives (2018), but is the foundational and meta design concept that underpins any of the other 13 design concepts for speculative design exercises. The student will, this way, realise that his or her performance and engagement with the design project will potentially lead to a concrete solution that is of value not just to them but also to someone else.

- This would be seen as a level of impact on humanity and planet sustainability by influence of the students’ academic projects and career expectations and would be inspired by higher level altruistic motivations related to achieving a solution to a wider problem.

Hence, Value is the nucleus of the proposition, ranging from short to long-term outcomes, and defined by both different levels of motivation and altruism (Fig. 1).

6 The Impact Plan

The prototype followed a low-fidelity approach, based on rapid sketches in standard A4 sheets of paper (but with larger scales in mind). It was crafted following the optimised taxonomy developed for this research (Lelis 2020), which defined the prototype’s particular features and conditions (Fig. 2). Structured as a map of Value, it will resort on a printable board/canvas and a deck of cards with several prompts for speculation and rationale-led narratives to emerge. The context of use would promote

1
Graphic Design

| Typology | Features |
|----------------------|-----------------------------------|
| Structure | map |
| Coding | mixed (line, shape, colour) |
| Hierarchy | areas, highlights and positioning |
| Level of Abstraction | verbal and figurative elements |

2
Meaning

| Typology | Features |
|-------------------------|-------------------------------|
| Represented information | components and action/prompts |
| Explanation | instructions outside |
| Interpretation | literal and iconic |

3
Media

| Typology | Features |
|----------------------|----------------------|
| Board | writing and cards |
| Technology-mediation | offline asynchronous |

4
Context of Use

| Typology | Features |
|-------------------|-----------------------------|
| Task & Function | speculation and assessment |
| Interaction | write/edit |
| Cognitive Process | judging and problem-solving |
| Users | individual |

Fig. 2 Features and conditions considered for the design of the Impact Plan

the cognitive process of judging contexts (personal, professional, social, economic, environmental) that may influence the solving of a problem associated to a brief the student is considering as part of their coursework. The tool has been designed to reduce possible levels of abstraction, by organising its components in a logic manner and by using verbal and figurative elements when necessary, associated to literal and iconic interpretation. It has the student, as a reflective individual, as its user in mind.

The cards, which are framed within the three levels of outcome and Value, would allow students to assess the anticipated impact of a project they might consider as part of their course activities, using a scale ranging from -2 (for Negative Impact) to 2 (for Positive Impact). The board would be used to register, primarily, quantitative final scores that would be the sum of partial impact scores brought from the relevant cards (relevant to each student and to each project). It would also allow students to note down the impact prompts they assessed in the cards in order to draw and visualise the possible interconnections between the three levels of impact. Rapidly and informally, the adopted name for the tool was *Impact Plan*.

There is no specific order on how the canvas ought to be used. Ultimately, it is meant to be a scoring device to, firstly, back up the student in choosing the most impactful and personally relevant project/activity (in case he or she needs to choose one from a pool of many, either proposed by teachers or self-negotiated). For that, the student will have to, necessarily and informally, engage in a speculative exercise about future scenarios 1) in which he/she would be involved given the particularities of each project, 2) that would have implications on his/her live and, 3) ultimately, in the lives of many other.

By anticipating and speculating on the Value of each project/activity while, simultaneously, acknowledging his/her own preferences, capacities, limitations, needs and wills, the student will be able to identify the set of cards that will prompt him/her towards scoring the impact each possible project/activity may have at three different impact stages and Value levels (Fig. 3):

- **STUDIES**—At this stage the student will anticipate the impact the project (each possible project under consideration) will have on their academic journey at two

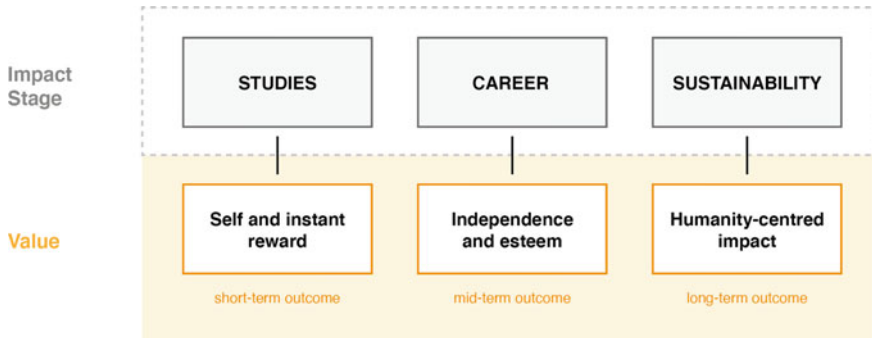


Fig. 3 Aligning impact stages with value levels

distinct life categories: Developmental and Wellbeing. Hence, on the former, the student scores the competencies/skills that he/she expects to be influenced (positively or negatively) by choosing and responding to the brief. Examples of developmental categories are Creativity, Information Literacy, Strategic Thinking, among others. On the latter, the student scores the aspects related to the state of being comfortable, healthy or happy that he/she expects to be influenced (positively or negatively) by choosing and responding to the brief, looking into the wellbeing categories Loved Ones & Privacy, Personal Activities and Expenses & Risks.

- **CAREER**—On this component the student will anticipate the impact each project is expected to have on their future career intentions and, as in Studies, the scoring process may occur at the two categories Developmental and Wellbeing. Similarly, under Developmental, the student scores the competencies/skills that he/she expects to be influenced (positively or negatively) by choosing and responding to each one of the briefs. Examples of developmental categories are Entrepreneurship, Influence & Legitimacy, Promotion & Salary, among others. Under Wellbeing the student scores the aspects related to being comfortable, healthy or happy as a professional and that he/she expects to be influenced (positively or negatively) by finding design solutions for the different available briefs; in this case, the assessment takes place via looking mostly into Self & Loved Ones.
- **SUSTAINABILITY**—Broken down into Social, Environmental and Economic, the student will anticipate the impact each available project may have on the future of humanity and planet Earth. For this impact stage to be fully anticipated, it is relevant the student is aware of who the main target of each project is expected to be.

The low fidelity prototype evolved through different iterations and the final version (Fig. 4), despite notoriously crafty, was used to collect initial feedback.

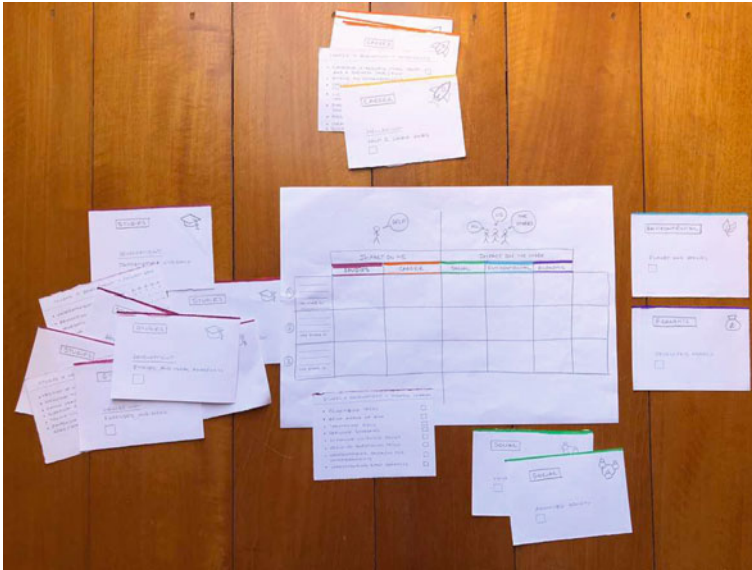


Fig. 4 The Impact Plan, low-fidelity prototype

6.1 Feedback on the Low-Fidelity Prototype

The prototype was presented and discussed via informal unstructured interviews with two design academics, two careers/placements officers and one HE pedagogy specialist. All individuals reacted very positively to the tool. Both academics (at professorship level) and the HE specialist evidenced some genuine enthusiasm, asking when would it be possible to have the tool ready for implementation:

... a really interesting area—reflective learning and how much of what has been taught/learnt has stuck with the student. Do keep me posted. Have you managed to get your Quality & Enhancement team to approve it yet? It's probable that, in the current circumstances [COVID-19 outbreak], they will be championing your approach! [Research Professor in Design, Falmouth University, UK]

I was wondering—for the courses in my school—if one started from the premise of an assessment evidence, mapping the Impact could be the grand unified holistic assessment proposition across the whole Design courses delivery. [Invited Professor in Design for Science, University of the Arts London and Invited Research Professor at the London School of Economics, UK]

The current COVID-19 outbreak is a context that has greatly mobilised the design community worldwide and which may justify the fact that both professors were so interested in learning more about the tool. The careers/placement officers had a much more instrumental reaction; despite acknowledging the potential of the tool, for them it was not fully clear the need to make the students focus on the WHY

(Value-Purpose-Impact) if not simultaneously on the HOW and WHAT. One of them verbalised:

I think this is great, but it misses the pointers on how to achieve each stage's descriptors. So, if a student, in assessing Expenses & Risks (under Studies), allocates a high impact score to "Attending Complementary Workshops or Trainings", how can we, as an institution, help them on achieving that? Maybe via the Students Union Societies or through our volunteering scheme. But the student needs these pointers, for each and every line of impact on this tool [Careers Officer, University of West London, UK]

When the fundamental stance of stimulating speculative narratives that would abductively start with the WHY (Sinek et al. 2017) and only then allowing room for the exploration of HOWs and WHATs was explained to the latter participants, both became more interested, nevertheless insisting in pragmatic queries such as "How long would a student need to complete this impact assessment?" or "When you say *several iterations*, how many could we be talking about?".

7 Discussion

This paper provides a craft and ongoing version of a visual canvas following a reflexivity and speculation-based ontology. The Impact Plan has not been fully tested (namely with the main target, the students), but its low-fidelity prototype seems to have been helpful in confirming its basic premises, via qualitative interviews with the professionals that would most likely be involved in supporting the students using the tool.

Since a discursive design agenda is centred on reflexivity and its instrumentality is communicative, the proposed tool is of potential benefit for students at the final years of their courses, where major projects need to be carefully selected, as these may open avenues for success after the completion of their degrees. The Impact Plan helps students to sharpen their perspective on the challenges they may face and to come up with a more holistic view on how relevant and impactful their solutions may be at Self-Now, Self-Tomorrow and Other levels.

Although the careers/placements officers were the most resistant participants, interviewing them was of great value since it enacted a clearer image that this tool seems to be just the beginning of something bigger: a great deal of further developments, namely in transforming it into a less bidimensional canvas and more into a multidimensional multi-layered map, for other sorts of reasoning to happen—therefore leading to HOW and WHAT related cognitive processes. This would help students in crafting a reflexive project workbook where *purpose* plays a vital role.

8 Limitations

The COVID-19 outbreak brought huge constraints across the world and this research was equally impacted by it. If on one hand, from a methodological perspective, the continuation of this project has been negatively affected by the pandemic (the next steps would involve participatory design workshops with students from final years of both UG and PG provision, which could no longer happen), on the other, the course leadership teams have been asked to identify alternative assessments completely remote-based and this tool was found as a complementary element of alternative assessment in the context of a Media and Design School in the UK. The design research approach had to be redefined into a much more experimental one and a mid-fidelity prototype will have to be designed in the very short-term, before the end of the online taught academic year.

Moreover, one of the common limitations that needs to be addressed is the subjective bias of the researcher and in this project a large part of the analysis is based on the researcher's interpretation and observations.

9 Future Work

The Impact Plan works not only as a selective device for users to choose from different projectual topics (when more than one is available), but also as a triggering instrument for subsequent reflective practice, speculation, definition, ideation, planning, prototyping, testing and decision-making— activities that are expected to happen in the course of a selected project. It is suitable to be used as the very first board or tool, before any of the many other visual canvases available and that have been designed to support the aforementioned other stages of problem-solving. This canvas will orient users towards picking the most purposeful and meaningful (motivation-oriented and value-led) project/activity in order to, successfully, concretise an impactful outcome.

Given the current physical distancing limitation brought by the pandemic and since the tool is ready to be tested by its actual users, a digital prototype will soon be developed in order to mitigate the printing constraints which may be greatly imposed by a remote-based approach and its associated challenges.

However, in order to create a sound experience by which students can go beyond the purpose (WHY) of actively engaging with a certain project, further auxiliary materials/accessories need to be developed so users can move on onto the working principle (HOW) and the ideation and development of possible outputs or solutions (WHAT), all interconnected. It is anticipated that such complex exercise would most successfully be achieved with the visual collaboration powered by AI technology that, algorithmically, gauges and matches the student's preferences, needs, passions, limitations, competencies and ambitions with his/her inputs in all the impact scoring on the canvas and cards. For that, the Impact Plan would have to be conceived as a completely digital and interactive tool, potentially integrating gamification aspects,

versions of iterations and extending the matching process into the integration of data, not just about one individual but from a few that could, in this context, constitute a creative team of students with similar interests—and, from that point of view, less prone to conflict.

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Education in a Technology-Shaped World: Which Learning Model Helps Preparing for the Knowledge-Based Societies?



Sara Antunes

Abstract To prepare students to face a technology-shaped world, education must become creative and innovative. In fact, we live in a fast-changing world, where technological advances have been causing a great disruption in our lives, jobs and societies; job automation and knowledge-based economies require our students to get ready for jobs that do not yet exist, for technology that has not yet been invented. This study contributes to the understanding of which learning approach is more likely to provide learners with the skills for the 21st century, to include critical thinking, problem-solving, collaboration and social-emotional skills. Building on existing research on how technology impacts the way we teach and learn, it asks: which learning model optimizes student's preparation for the knowledge-based societies? In this context, the outlined learning methods are traditional learning (learning in the physical classroom); e-learning (learning through online learning programs); and blended learning (a mix of face-to-face and e-learning). This paper is based on a review of literature on different learning approaches and respective advantages and disadvantages, both from the student's and the teacher's perspectives. This analysis shows that education must change, that the change includes using technology and implies challenges for students, teachers and institutions. The results indicate that to provide students with the crucial skills for an uncertain future, instead of the traditional classroom-based or the fully online learning-based model a blended or mixed approach would be preferable, as it takes advantages of the benefits of both.

Keywords Education · Technology · Learning models · 21st century skills

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1 Introduction

“Technology is enabling multi-modal teaching, changing curricula and spawning rich forms of online research and collaboration” (Glenn and D’Agostino 2008).

A few decades ago we would pack some books, notepads, pens and pencils in a heavy briefcase and go to school, where our teachers, pacing between their desk and the blackboard, would lecture us with written and spoken words of wisdom, that we would try to transform into useful notes; today’s students might still do some of this, but they are now mostly using much lighter, but nonetheless more powerful tools, that carry unlimited sources of information. Most books and other learning tools of the past are now carried in digital format, in laptops, tablets or smartphones. Furthermore, using the power brought by the Internet, there is really no need to carry those downloaded digital versions, as they are available online, almost anywhere and anytime. Perhaps this was a much-needed moving force, essential to the transformation of conventional education into pedagogy that enables acquisition of the competencies and skills needed to tackle the global challenges of this century’s societies. “Current societies and economies are based on a vast and deep knowledge foundation, mainly because of the unlimited access to information brought by constant and unstoppable advances in technology” (Antunes and Almendra 2020).

Technology has been changing our lives, our jobs and inevitably, our ways of teaching and learning; the profound disruption caused by a never-ending technological breakthrough has had mainly a positive effect, although some disadvantages may also be pointed out.

One of the positive sides or advantages of the impact of technology in education is related to whom is the access of learning is granted to; perhaps it is worth going back a few hundred years to remind ourselves that there was a time when education was a privilege of kings, nobles and church members. Such as, back then, that limited access to knowledge was overcome by technological advances—in that case it was the invention of the press—nowadays, the much broader access to all kinds of information is possible mostly because of the appearance and evolution of the Information and Communication Technologies (ICT). This broader access to knowledge paved the way to learning with no borders (anytime, anywhere) and contributed to rethinking the pedagogy that is needed for the complexities and uncertainties of the 21st century.

2 Terminology

ICT has brought a big improvement in what is broadly known as distance learning—in the sense that the student may access learning materials without the need to be present in the physical classroom; since this much easier access has been made possible through technology, an amalgamation of terms have been in use. The most common three are listed below, along with a review of their meanings.

2.1 Traditional Learning

Traditional Learning is assumed to be the conventional learning environment where teachers and students meet every day in the physical classroom, and the former give lectures to the latter, with or without different learning tools. Some authors refer to it as “teacher-centered and static” (Titthasiri 2013) and Rashty, cited in Titthasiri, states that “the instructor conducts the lesson according to the study program and curriculum. [...] dictates the structure of the lesson and the division of time” (Titthasiri 2013). While most authors would then define it as face-to-face instruction, Curtis Newbold, an associate professor of communication at Westminster College, in Utah, curiously refers that it includes “either brick-and-mortar instruction or asynchronous online learning” (Newbold 2018).

Since asynchronous online learning is, in its very nature, online, and usually seen as a type of e-learning environment that does not enable immediate feedback, as we will describe next, we do not agree that it is a kind of traditional learning; in fact, we prefer the understanding that traditional learning is exclusively the classical learning, occurring in a formal and classroom-related environment.

2.2 E-Learning or Online Learning

E-Learning or Online Learning commonly refers to an environment where the student uses computers as the educational medium to access learning content, that may be available in multiple formats and either stored locally or somewhere away from the learner’s location; its main advantages include allowing the learner to choose his own pace and the amount and formats of available information. It could be simply defined as “the use of digital technologies to deliver complete learning programs.” (Liimatainen 2020) or “... a computer based educational tool or system that enables you to learn anywhere and at any time” (Zogg 2017). Sometimes also described as a Learning Management System (LMS), although this term usually refers to specific online learning platforms or applications, such as iSpring Learn, Docebo or Adobe Captivate Prime (Monson 2017), e-learning may be synchronous or asynchronous; when there is real-time interaction between student and teacher, using chat, instant messaging or video conferencing tools to ask and answer questions, it is called synchronous; if there is no such type of interaction or if the existing interaction does not happen in real-time, it is called asynchronous (Mindflash 2020).

A broader concept that may also be found in online learning related literature is distance learning; Kaplan and Haenlein (2016) say that it encompasses not only current computer-based distant education, but also previous formats such as television courses or even printed materials sent by mail. In that sense, distance learning “... first appeared in 1728 when the Boston Gazette featured an advertisement for a distance stenography course through weekly classes sent by mail” (Kaplan and Haenlein 2016). In the same line, Liyanagunawardena et al. (2013) argue that, having started

with correspondence courses using postal services for the exchange of study materials and submission/return of assignments, for every new technology invented (such as radio, TV, video recorders or home computers), an associated development in distance education has appeared.

2.3 Blended Learning (B-Learning) or Hybrid Learning

Blended Learning or Hybrid Learning is, for most of the reviewed authors, an educational model that in essence combines e-learning with face-to-face learning; as such, it implies some physical presence of the student in the classical brick-and-mortar classroom, where he might get involved in group activities, lab work, lectures or simply question and answer sessions. He manages the rest of his study time using web-assisted instruction.

In this paper, we follow the concept of blended learning described above; nonetheless, we must refer that there are authors who have a more restrict view about what is blended learning, as they do not consider the classical classroom to be part of it, but instead the virtual classroom in its place. That is the case of Jared Carman, who refers to blended learning as “a mix of modalities and methods of learning” (Carman 2005) and then describes what he considers to be the five key ingredients of that mix, all of them being actually variations or components of online learning: live events (virtual classroom), online content (independent online study), collaboration (online discussions), assessment (online pre and post evaluations) and reference materials (download study guides and other training materials). Some authors such as Elliot Masie, Allison Rosset, Zemke and Julian & Boone, cited in Carman, (2005) consider all of us as blended learners and that the optimum or adequate blend or mix of these ingredients is situation or context related. As said, we prefer a broader definition of blended learning, that includes the classical classroom and online modalities, but we agree with Carman’s idea of a ‘situational’ instructional design model, in the sense that the adequate blend of traditional and online learning methods depend on each learning situation.

Blended learning has paved the way to another approach to the teaching methodology: while the traditional method is based on the teacher presenting new knowledge or information in the classroom, complemented by homework review, in this new approach there is an inversion of that procedure; the student uses online learning to study new materials at his own pace, saving for the physical classroom the practical aspects such as problem-solving or lab applications of what he has studied at home, or also to discuss and clarify doubts with the teacher. The concept is known as ‘flipped classroom’ and as described by Ramos (2016), “combines classroom tasks and activities held by the use of digital information and communication technologies. It proposes that the students, before class, should study a specific theme, in order to prepare themselves and come to class with questions and concerns that will be the starting point for discussions in the classroom with peers and teacher”.

3 Which Model Is Better to Improve Education?

“Education must be a priority in order to prepare our future generations to not only succeed, but to survive” (Grabar-Kitarović 2019).

Speaking about education in the 2019 Estoril Conference on ‘Global Challenges, Local Answers’, at the Nova School of Business in Portugal, Grabar-Kitarović, the President of Croatia (Grabar-Kitarović 2019) was worried about our future generations capability to succeed and survive. This fear is legitimate as although we cannot predict the future, recent MGI reports (McKinsey Global Institute 2017a, b, c) show how automation and Artificial Intelligence (AI) are disrupting our lives and our jobs; they also indicate trends on what kind of jobs we may expect in the next decade; in order to adapt people to the effects of this disruption, education needs to change, and that change must be a priority, as stressed by Grabar-Kitarović. To prepare today’s students for the challenges of a complex and uncertain future, we then need to choose the learning model that is more likely to provide them with the adequate skills.

Every approach or learning model has advantages and disadvantages, both from the students and from the teachers or facilitators perspective.

Traditional learning privileges real face-to-face interaction, not only between teachers and students, but also peer-to-peer collaboration among students themselves. According to Tayebinik and Puteh (2013), “face-to-face interaction communicates a lot of facial expressions, body language, tone of voice, and eye contact. [...] the brain needs and expects these more significant channels of information”. It also fosters a sense of community, described by Mc-Millan & Chavis, cited in Tayebinik & Puteh, as “a feeling that members matter to one another and to the group, meaning a feeling of mutual commitment and belonging, and ‘a shared faith that members’ needs will be met through their commitment to be together” (Tayebinik and Puteh 2013).

However, in order to promote that kind of interaction, it implies the physical presence of teachers and students in the so called brick-and-mortar classroom, as well as it requires all of them to follow a preset schedule, a common learning pace and basically limits students to only receive the knowledge that the teacher has to offer. Furthermore, and not less important, as stressed by Scott (2015), “traditional approaches emphasizing memorization or the application of simple procedures will not advance learners’ critical thinking skills or autonomy”.

A pure e-learning environment will, of course, make available an incredible amount of information, in several formats, on almost everything, and this may be accessible nearly anytime and anywhere, with incredible speed; the learner is able to choose what, when and where he wants to access, as far as he has a connected device, that may be a simple smartphone. If it is a synchronous e-learning environment, as described, he may even interact in real-time, with other learners and teachers, regardless of their location, provided they are also connected and available.

But, at least with current technology, even using social networks, chat and video conferencing tools, he won’t be able to interact in the same way as in the above described face-to-face contact, especially in what concerns the sense of community:

“...learning takes place while the teacher and learner are separated [...] engagement in e-learning and virtual classes hinders e-learners from community interaction” (Tayebnik and Puteh 2013). These authors also mention that the lack of real interaction might cause feelings of frustration and isolation, while Laurillard and Kennedy (2017) alert for another important consequence: a partial loss of the social and emotional value of the face-to-face: “The lack of classroom presence means that ‘wholly online’ courses lose some of the social and emotional value of the face-to-face...”.

A blended learning environment represents, in our opinion, a successful attempt to take advantage of the best characteristics of both the classical classroom and online learning, in a harmonious equilibrium that should be context related: short-term learning experiences, such as business training sessions to improve company productivity, will probably require a mix of learning models different than a leadership program or a long-lasting university course.

“...blended learning is significant, because it uses digital activities to supplement teacher-supported classroom work. The blend is optimal because it combines the value of face-to-face interaction with teacher and peers, which is constrained in time and place, with the online environment, which is self-paced and less time-constrained” (Laurillard and Kennedy 2017). In fact, empowered by the ability to quickly access limitless and varied amounts of information, interact with other learners and teachers, and even collaborate with other unknown people with similar interests, the blended approach takes advantage of the faster and cheaper education, that are characteristics of e-learning; simultaneously, by maintaining an adequate level of the traditional face-to-face interaction, it will promote motivation, foster self-discipline, and prevent the described lack of sense of community and feelings of isolation and frustration. It will, indeed, require the time and travelling arrangements for some physical presence, in scheduled occasions, that may vary in number and duration, depending on each situation, thus posing some difficulties for those who work and/or are at a distant location.

Regardless of the learning experience type or situation, we must keep in mind that we need pedagogies that enable us to acquire skills and competencies needed in a complex and uncertain future. As Cynthia Scott states “...formal education must be transformed to enable new forms of learning that are needed to tackle complex global changes” (Scott 2015). The Organization for Economic Cooperation and Development (OECD) (2018), has launched ‘The Future of Education and Skills 2030’ project in 2018, with the aim of designing an instructional system to help countries in facing the social, economic and environmental challenges driven by globalization. That project alerts for the need for broader education goals, namely the individual and collective well-being and states that “Education has a vital role to play in developing the knowledge, skills, attitudes and values that enable people to contribute to and to benefit from an inclusive and sustainable future” (OECD 2018).

The United Nations (UN), through its cultural and educational branch – UNESCO (UN Educational, Scientific and Cultural Organization)—have also been stating the importance of broadening and improving education, as the ‘Sustainable Development Goal 4’ (SDG 4) clearly pledges to reach universal primary and secondary education

Table 1 Advantages of different learning models

| | Traditional learning | E-learning (online) | B-learning (hybrid) |
|------------|--|---|--|
| Advantages | Permits face-to-face communication | Learning is student-centric (student sets the learning pace, path and schedule), personalized and focused on the individual learner | Supports different learning styles and preferences; allows for deeper understanding of topics by using web resources and class interaction |
| | Promotes socialization, in-person peer-to-peer collaboration | Learning may take place at literally any time and any where | Combines the versatility of e-learning with the advantages of face-to-face experience and peer-to-peer collaboration |
| | The setup and rules of the system have been in place and working for a long time, the path of least resistance is easier to follow | Almost unlimited sources of information are available, providing an endless variety and diversity of topics | Provides dynamics and dialogic learning spaces that reframe the roles of students, teachers and learning process |
| | Strong student commitment | Access to learning (a simple smartphone is needed) is possible to everyone (including people with disabilities) | Brings back some of the student commitment lost in pure online learning |
| | Strong competition feeling | Faster learning at a reduced cost (for students) | Brings back the competition feeling |
| | Retains social and emotional value of face-to-face interaction | Interaction (collaboration) between people geo-graphically separated | Retains some social and emotional value of face-to-face interaction |

by 2030, demanding a “seismic shift in the provision and quality of education and teachers” (UNESCO 2016).

Blended or hybrid learning seems to point to the appropriate path; Davies, Fidler and Gorbis, cited in Scott (2015), referred that “technology alone cannot ensure a successful learning experience” probably meaning that traditional methods have their value and must not be discarded. But technology cannot be ignored either, not only because it has improved the way we learn, but also because the technology itself must be learnt: “In the era of digital transformation and with the advent of big data, digital literacy and data literacy are becoming increasingly essential, as are physical health and mental well-being” (OECD 2018).

Pursuing the quest of finding the adequate approach to fulfill the needs of today’s and tomorrow’s education systems, we present the following comparison table, where we try to summarize both the negative and positive aspects of each learning model;

Table 2 Disadvantages of different learning models

| | Traditional learning | E-learning (online) | B-learning (hybrid) |
|---------------|---|--|--|
| Disadvantages | Teacher-centric (the teacher or the school has full control) | Lack of face-to-face communication | Requires institutions and teachers to adapt to their new roles, functions and instructional methods |
| | All students need to adapt to the same learning pace, dictated by the teacher | Technology-dependent, needs fully working equipment | Totally different interaction between teachers and students require a great deal of adaptation from teachers |
| | Limited to take place in the physical classroom (place-constrained) | Inhibits real socialization | Part of it needs to take place in the physical classroom (relatively place-constrained) |
| | Limited to a schedule set up by the institution/teacher (time-constrained) | May separate students from reality, causing lack of context | Some of it is limited to a schedule set up by the institution/teacher (relatively time-constrained) |
| | Learning only what is offered | High cost investment on technology (for learning institutions) | |
| | | Requires a considerable amount of motivation and self-discipline | |

one must have in mind though, that some advantages or disadvantages may apply differently, depending on the perspective (teacher's or student's): Tables 1 and 2.

4 Successful Initiatives

If nothing else, broadening the access to knowledge would be a very strong reason to say the influence of technology in education has been positive; the possibility of attending a variety of courses through online learning, sometimes even a college degree, is real and most of the times for a very reduced cost; Massive Open Online Courses (MOOC) and Small Private Online Courses (SPOC) exist in many digital platforms (such as Coursera or edX) since as early as the 2000s and have been a great success.

Liyanagunawardena, Adams & Williams refer to a course first offered in 2008 by the University of Manitoba, Canada, called 'Connectivism and Connective Knowledge', as being the first MOOC (Liyanagunawardena et al. 2013). Kaplan and Haenlein (2016) have the same opinion but go further, indicating that although "The term MOOC was coined in 2008 by Dave Cormier from the University of Prince

Edward Island in Canada with regard to a course called *Connectivism and Connective Knowledge...*”, the University of Phoenix, USA, launched its online campus in 1989, offering both bachelor’s and master’s degrees online. Twenty years before that, in 1969, the Open University had made its appearance in the UK, using television and mail to provide distance learning (Kaplan and Haenlein 2016).

This type of online education, which has started initially in Europe and in the Americas, where was offered by almost 150 high education institutions in 2015, and is now spread in Africa and Asia; the number of African college students was around 200 million in 2015 and forecasted to be about 400 million in 2045, because of the easy access provided by online learning; for example, most of the 23 universities of South Africa provide this learning model (Kaplan and Haenlein 2016; University of Oxford 2015). “...the supply of digital educational offerings is growing at an exponential rate. In Africa, for example, sales of cloud-based e-learning products are increasing at nearly 40% a year, albeit from a low base. Worldwide, the growth rate is 7.6%...” says Pfeffermann (2013), founder and CEO of the Global Business School Network (GBSN), in a 2013 article on Technology, Education and the Developing World. Pfeffermann (2013) also states the demand for online offerings will keep growing as the access to technology spreads, and that more than 80% of the GBSN member schools believe technology is changing the way they educate, according to a recent survey. Technology has brought an important characteristic to online learning, which is an extraordinary flexibility, especially because it frees the occurrence of the learning process from the bound to a specific time or place; in an analysis of the implementation aspects of MOOCs in Sweden, Ulf Olsson, from the Stockholm University, states: “The flexible format [of MOOCs], without its bounds to a classroom, makes it possible to be anywhere in the world as long as the teacher keep track of time” (Olsson 2020).

A specific success case of the blended learning model is the masters of strategic communication (MSC) that the Salt Lake City Westminster college started in 2013: associate professor of communication Newbold (2018), who is co-chairing the course, comments in a 2018 article: “without question, it’s one of the most distinctive and innovative educational structures I’ve observed, and I’ve felt fortunate to have fallen into its development process.” Newbold describes the program¹ as having a hybrid format (students need to be in campus a full day per semester, interacting with each other, with teachers and with the clients of their projects—business, non-profit, or government organizations, a curriculum with five broad subject areas, no grade evaluation, and a flexible schedule. “Creativity, adaptability, critical awareness, project management and writing skills are reviewed from semester to semester, and a clear indication of significant improvement has been observed through ‘competency’ assessment and rubrics over five semesters”, says professor Newbold (2018), as he refers to the undeniable success of the learning outcomes.

¹For a detailed description of the MSC, consult the reference.

5 Transitioning from Physical to Virtual Classrooms

Studies show trends that indicate the learning institutions want to transition from the traditional environment to an online educational format, as a strategy to stay competitive; one example is a white paper by the Center for Educational Innovation of the University of Buffalo (n.d.), USA, that also refers that “Various external and internal forces have brought about the expansion and growth of online learning... [...] External forces such as decreased state funding, tuition increases, technology costs and depressed economies have led to internal pressures to reduce costs and increase revenue...”.

Whether education institutions want to transition to e-learning or blended environments or not, the change is actually inevitable; back in 2011, a report of the Pew Research Center (Parker et al. 2011), USA, was already indicating a solid growth in student preference for online courses: “Over the past decade, enrollment in online courses at colleges and universities around the country has grown at a greater rate than overall higher education enrollment” (Parker et al. 2011); a late 2017 study by the EDUCAUSE Center for Analysis and Research (ECAR) (CAE Team 2019), also concludes that the student’s preference for blended learning has been increasing, when comparing the number of those that choose that learning model over face-to-face. According to the study, the reasons are related to the flexibility of the online access to learning (to include variety of resources and ability to control their own schedules), and the relationship with technology that new generations possesses; from the previously included comparison of advantages and disadvantages of each learning model, we could add other reasons, such as the lower cost or the possibility of interaction/collaboration between students (or between students and teachers) geographically displaced.

Many authors and sources support the idea that the transition will occur sooner or later in every institution, some even stating that “Technology is not an educational option—The blackboard is dead, replaced by an online whiteboard that students and teachers write on [with] mice and track balls” (Hogan and Kedrayate n.d.). We wouldn’t be so radical, as we value the importance of ‘real’ face-to-face interaction, although we agree that nowadays, even in the physical classroom, the blackboard itself is nearly not used. Anyway, “...eLearning is here to stay...” (Hogan and Kedrayate n.d) and we also agree that this transition is not only good, but also certain. Another indication of the increasing tendency in using online learning is the creation of mobile versions of some of the digital study platforms (meaning versions that are optimized for mobile devices such as smartphones): “It’s clear that an impressive number of organizations, mostly nonprofits, are already developing educational programs via mobile phones” (Pfeffermann 2013).

We also believe the transition will gradually occur, eventually leading to a learning model strongly supported by technology, thus, more online-based than supported by physical classroom; but although the trend is to use more and more connected devices, we still believe that the role of teachers, either in the physical classroom environment

or designing and supporting online learning, remains essential, as stated by UNESCO (2016): “Every education system is only as good as the teachers who provide the hands-on schooling”.

6 Transitioning Challenges for Students, Educators and Institutions

The new generations of learners seem to have a natural appetite to absorb technology, perhaps because they are surrounded by it since the day they were born; using connected mobile devices and interacting through connected applications is part of their daily lives.

They are actually the main reason for the increasing need for transformation and adaptation that both the classical educators and traditional learning institutions have been facing; studies show that students prefer the blended or online approaches to education, as they take control of their learning, learn faster and cheaper while managing their time better (CAE Team 2019; Parker et al. 2011). Nonetheless, pure online learning seems to have the danger of not fostering enough motivation, and if not properly guided, young students might not have the adequate level of self-discipline to remain focused in the learning objectives.

Educators, on the other hand, need to break out with their traditional teaching habits, mainly with the habit of being in control. While this is gradually happening, it's not an easy adaptation: “The greatest obstacle, it seems, is adapting to instructional methods far different from the way we were both trained and educated ourselves”, says professor Newbold (2018), when relating the difficulties felt by himself and other faculty in the initial years of implementation of the MSC; “Most college educators, myself included, were not trained to understand formalized education as an environment where students take the reins, where deadlines are flexible, where projects and assignments are highly customized and diverse, where they assess in collaboration with coaches, and where grades are not the epitome of assessment” (Newbold 2018).

Besides the educators ‘pedagogical culture’ adaptation referred by Newbold, they also need to understand their new roles and the technological tools they will be using when guiding and interacting with students. The ideal path might be having future online and blended learning educators going through a training program before starting their jobs, and also spend some time of on-job training (mentored by fully trained colleagues) after that program. This is the method used by the School of Education of University of South Australia (Best and MacGregor 2015), where a previously classroom-based pre-service teacher Design and Technology Education course has successfully transitioned to an online learning environment.

For learning institutions, the main challenges include the difficulty to leave the path of least resistance (maintain the established traditional model) and face the need to find a new approach to hire, prepare and support teachers; “Improving education quality requires far more than just having enough teachers in the education system;

teachers need to be trained, supported through professional development, motivated and willing to continually improve their teaching practices” (UNESCO 2016); administrators must not fear the costs caused by the workload and occupational dynamics that come with the change and must understand that the benefits will not arrive immediately. Understanding how online pedagogy works may provide high quality interactive learning, if supported by faculty equipped with new roles and professional attitudes.

7 The Importance of the New Roles of Teachers and Other Educators

The 2018 Global Teacher Prize winner Andria Zafirakou stated, in the World Economic Forum, that “We need children to be the problem-solving generation, and unless we teach them problem-solving skills, which come from the creative subjects, it won’t happen” (Gray 2019).

Although she was commenting on the lack of understanding for the creative arts, she mentioned one of the skills for the 21st century, along with critical-thinking, digital skills, collaboration and social-emotional skills (World Economic Forum 2016). As outlined in a 2018 Microsoft, McKinsey and Company’s Education Practice joint report (Microsoft, McKinsey Global Institute (MGI), Company’s Education Practice (CEP) 2018), “Unprecedented opportunities for collaboration, the progressive automation of lower-skilled jobs, employer’s demands for workers with more well-rounded skills, and students’ desire and expectations to operate with autonomy and choice all indicate that our education system needs to prepare students for the future in a very different way than it has in the past”.

In order to help students acquiring such set of skills, educators need to understand the new roles they have to play in this ‘very different way’ of teaching: in fact, they will be mentors and coaches instead of teachers, and as such, their role should be to leave the reins and encourage students to take control of their learning, engage them and motivate them, foster collaboration and communication with their peers, guide them into work together with respect, negotiate, make decisions and resolve conflict; furthermore, as they have to play these roles in a technology-based environment, they must also learn how to use technology, and continually update their technology-based knowledge. Being constantly updated allows them to correctly “use their expertise to embed their support in a digital method that supports independent learning” (Laurillard and Kennedy 2017).

To provide this help, both on campus and online, educators must promote teamwork, and discussion groups; learning should be personalized and based on experiences, projects and challenges. “Twenty-first century education will require more personalized learning with an emphasis on supporting rather than stifling creativity” (Scott 2015). As referred by Picciano, cited in Laurillard and Kennedy (2017) “blended approaches to learning have been making a resurgence”. Also cited in

Laurillard and Kennedy (2017), Bruff, Fisher, McEwen & Smith further reinforce the value of blended learning: “A blended learning approach to ‘wrapping’ face-to-face support around the MOOC content may be the most effective and sustainable model” (Laurillard and Kennedy 2017).

8 Conclusions and Future Steps

The impact of technology in our daily lives in our jobs, and in societies and economies as well, caused a need for a profound change in education, in order to prepare students to a world of complexity and uncertainties; the traditional learning model, based on conventional classroom face-to-face seems to be, by itself, inadequate or insufficient to empower students with the skills for modern knowledge-based societies and economies, such as critical thinking, collaboration, problem-solving and social-emotional skills.

Technological advances have also impacted education, and caused the emergence of other learning models, either based on pure online learning or on a blend of that and traditional methods. Which one is better suited to help preparing students for a fast-changing world? This paper reviews and compares the traditional, the online (e-learning) and the blended models, summarizing advantages and disadvantages of each one. It concludes that the blended approach takes advantage of the best characteristics of the traditional and pure online models, being the method that is more likely to help proving learners with the skills they need now and in the near future. The new roles of educators, and also the challenges implied by a transition to a different learning environment are also reviewed.

This study is part of a broader PhD research, focused on improving Design Education, where other related matters are also approached; nonetheless, on this particular field, further investigation is necessary, especially focused on the efficiency and feasibility of applying the blended model in a sustainable education environment.

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Learning to Communicate: Notes on the Technological Empowerment of Communication Designers



Gabriel Andrade Godoi and Teresa Olazabal Cabral

Abstract Communication Design is a disciplinary territory that is intrinsically linked to technology. The completion of communication design objects depends on proper linkages between project and production technologies. This adequacy has always been important, from the first printed books to the advent of industrialization. One cannot project simply according to the technologies that exist, but it is not possible to project without being aware of their virtualities and limits. This article reviews some consequences of the changes in workflows used in communication design projects as a result of technological changes that have taken place over the last 30 years, namely those resulting from the inclusion of designers in the production chain. Literature review, semi-structured interviews with technical managers of certain production companies and close observation were the methods used to achieve the intended results. They show that technical knowledge allows designers to participate in decision-making and project with full awareness of important aspects of the technologies used to complete projects, and helps them communicate with the actors involved in this process. The ongoing research project, of which this article forms part, intends, on the one hand, to show that technology influences ways of seeing and making, that is, it builds a culture that neither looms large, nor submits itself to the project culture; on the other hand, it seeks to provide scientific support to the professional experience of those who teach, because teaching what we know is clearly limited.

Keywords Communication Design · Workflow · Graphic technologies · Final artwork · Graphic industry

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“What is Design? Doing things right ... for people’s happiness. How? As appropriate in each case ... the magnificent Charles Eames said it: Does Design have principles? No, it has constraints and responds to constraints” (Chaves 2019).

1 Introduction

Graphic design, understood as a “communication service that happens when this communication cannot be satisfactorily performed spontaneously” (Chaves 2001, p. 134), must deal with a set of constraints in its process, and the designer must be well aware of what these are like so that his or her project meets the previously established requirements. These constraints relate to the time foreseen for execution of a project—from ideation to production—and the financial constraints set, or negotiated, with the client. We note that a lack of technical knowledge among designers and a lack of training in graphic production technologies contribute to a general inability to manage those constraints, with highly adverse effects on production workflows.

We do not advocate a fanciful vision (because it would be mystifying) of a technological knowledge that can alone solve all design problems, as some designers, or aspiring designers, repeatedly state, praising technology in the initial conception of design projects. Instead, we have a clear notion that technology has no intrinsic value, and always depends on how and for what purpose it is used (Flusser 2020). Instead, we intend to draw attention to the importance of knowledge of technologies downstream in projects, so that designers are not held hostage by an inability to predict the consequences of production technology in the project: for a designer who projects with full awareness of the limits mentioned, now, as a hundred years ago, “the priority point of view will be the quality of the final product” (Chaves 2001, p. 124).

2 Today’s Communication Design Workflows: Insertion of the Designer in the Production Chain

Between 1984 and 1985, the arrival of the Macintosh computer by Apple Computer, the PageMaker program by Aldus and the *PostScript* language by Adobe Systems, marked the beginning of a digital revolution that would completely take communication design (Meggs and Purvis 2012). For communication designers, one of the most relevant features of this technological change is its capacity for simulation, in a preview of the final product. It is the universalization of a technology that began to be developed from the end of the 1970s, which creates a direct relationship between what is displayed on the screen and the final appearance of the graphic object, once printed on paper. In other words, the visualized and printed models that designers

present to their clients are very similar to what the final graphic object will look like after production.

This visualization capability, which was dubbed, years later, WYSIWYG (What you see is what you get), appeared for the first time in the first word processor for the personal computer, developed by Charles Simonyi and Butler Lampson Alto for Xerox in 1974, but it would be about 15 years before it became available to most designers (Markoff 2007).

From the beginning of the 1990s, in a process that developed differently in different countries, personal computers, as well as the first desktop publishing programs, such as *Page Maker*, first became accessible to all designers, then quickly became essential tools that profoundly altered communication design workflows. In addition to changing ways of working, in the internal project space, technological changes modified the external relationship with production companies, as we will see below. Around the year 2000, graphic production companies started to demand receiving “closed” files, and widely adopted the PDF format as the industry standard, gradually starting to avoid files produced in “native” programs, as had been common practice until a very short time before. This meant, without designers having had time to develop a clear awareness of this process, that much of what we call prepress was no longer the responsibility of technicians at production companies, and this put enormous pressure on the designers since the responsibility for possible errors and non-conformities in production was transferred to “their shoulders” (Gatter 2005).

This process was also influenced downstream from the act of projecting—with the evolution of peripheral devices such as desktop scanners, digital cameras and other capture devices, which not only allowed clients to send texts, but also images in digital files—and upstream, with the emergence of technologies linked exclusively to the production space, such as CTF (Computer to Film) or CTP (Computer to Plate), thus eliminating numerous intermediate steps and bringing production and project significantly closer.

In fact, in a little more than a decade, between the beginning of the 1990s and the 2000s, several workflow processes were eliminated. A direct consequence of this was that the professionals who established the link between the project and production disappeared, namely the *photocomposer*, the *photographer* (who did the color separation and image treatment), the *paste-up person/stripper*, the *final artworker* even the *proof reader* (because the texts are now supplied to designers, their customers and/or their authors, in digital format). Many of these professionals tried to react to the changes, becoming desktop publishing operators, sharing their applied technical knowledge with designers, who tried to adapt to the new reality in a process that inadvertently contributed to accelerating the disappearance of their own jobs. Thus, when comparing the workflow of a generic project just before the widespread adoption of computer and desktop publishing programs, as described by Alan Pipes (2009), and a generic workflow adopted today, we notice that the passage of the tasks performed by those professionals into the hands of designers has been entrenched, as we will see below.

These technical-productive tasks, which seemed to have simply disappeared, are today fully integrated into communication designers’ work, as demanded by the best

practices used by the industry. This means that designers have become part of the production chain. It remains to be seen whether most designers are prepared for this twist. It will also be important to extract indispensable lessons from these profound changes in the teaching/learning of project work.

3 Learning from Mistakes

In order to make what we have just described clear—specifically, to develop a clear understanding of the interaction process between the designers who project and companies responsible for their production—we have selected some examples of non-conformities occurred at three different graphic production companies. Interviews with those responsible for these companies—Lidergraf, Ocyan and Maiadouro—complement the empirical observation and substantiate the main argument of our article. These three companies cover the main types of printed communication objects (books, brochures, packaging, exhibitors), which allowed us to identify a very diverse set of projects to critically observe. The criteria for choosing the selected companies also included their ability to offer various production techniques. The inclusion of this criterion allowed us to observe the way in which decisions are made to choose the most appropriate technique(s) for the production of a given project. The semi-structured interviews and/or questionnaires for the heads of each company were precious complements for a deeper and more comprehensive understanding of the problems that arise in the production process, namely about the difficulties in dialogue between designers and graphic production companies, as we will see. For space reasons, we have reserved the interview transcripts for the doctoral thesis of the first author of this article, so we present a synthesis of the fundamental points for our argument.

3.1 Project 1

The production of the first two projects we followed took place at Lidergraf, a company located in Vila do Conde, specializing in the production of books and magazines. It has web-fed and sheet-fed offset printing machines and ISO 9001: 2015 and ISO 14001: 2015 certifications, in addition to FSC (Forest Stewardship Council) and PEFC (Program for the Endorsement of Forest Certification) certificates, validating the company as having technical expertise and up-to-date workflows.

The project we observed consisted of printing and producing a relatively sophisticated publication, with text and images displayed over 196 pages, in a 30×20 cm format. The project used sheet-fed machines and CMYK printing on an uncoated paper, over which a thickened ultraviolet varnish was applied in the final stage. The company had already used this type of finish, but not on uncoated paper, which shows, from the outset, a common situation in communication design projects—enormous

customization—which also presupposes great flexibility and capacity for adaptation in the printing industry. Contrary to what one might think, there is rarely one project like another in terms of production.

In this, as in other projects whose production we will observe in this article, the first moment in the workflow consists of the following: the designer sends the producing company a description of all the technical characteristics for budgeting; only after the budget has been approved by the customer can it go into production. In other words, at this stage, the client will have already approved the (digital or physical) models, but only once the costs involved have been approved will he or she give the final approval so the project can proceed to actual production. Thus, it is possible to perceive the enormous relevance of the ability for previewing in the production processes by the designer, right in the initial phase of each project, complemented by a strong command of technical language, so that he or she can make a request for an accurate budget. After the budget has been approved by the client, it is up to the designer to check that it complies with the characteristics of the project in question.

This first phase prior to production consists of a permanent dialogue between the designer responsible for the project and the technicians who are in charge of production. This dialogue particularly takes place in writing, via e-mail. Although the description of a project can be supported by diagrams and/or models, the mastery of technical language and production processes is essential for effective communication.

In the second phase, after the budget has been approved, the designer prepares the files for production in PDFX1A format—the format required by Lidergraf in compliance with its certifications—and the company checks the technical compliance of the files received. Lidergraf officials report two types of errors in some of the images: the color system adopted, with some images in RGB and not in CMYK, as they should be, and a resolution that was in some cases below the recommended 300 dpi. In these cases, Lidergraf sends the designer a report, in which it explains the non-conformities, and the designer sends new files for the requested pages. Having to correct errors normally means it is impossible to meet the agreed delivery deadlines.

In a third phase, in a project of this nature, it is essential to use color proofs. We open here an aside to observation of this example to mention that it is essential that the designer has graphic software with color profiles adjusted according to the color profiles used by the production company, in order to avoid non-conformities in the subsequent chromatic results. In the production of the project under analysis, the color proofs were fully approved at first, by both designer and client, but some color mismatch problems arose in the printing phase, resolved by the designer monitoring the ongoing printing process, as we were able to see *in loco*. It was found that it was not possible to obtain the same color intensities shown in the approved color proofs because of the type of paper chosen to carry out the work.

In reality, any experienced designer knows that color proofing is just a simulation of the final result. It is certainly the best simulation available on the market, but it is still only a simulation, since color proofs cannot predict the result of inks on all papers available on the market: from matte to glossy, from coated to uncoated, there are countless variations. It is thus a possible and useful approximation, but only an approximation, of the final result. In this example, faced with a result that seemed

very far from what was intended, the designer decided to increase the ink levels above those recommended (by the company) and checked by measuring instruments (spectrophotometers). The designer was responsible for this decision, since it could affect the work flow and compromise proper drying of the ink and originate the “repainting” (*set-off*) of the paper during the finishing process. (*Set-off* is the unwanted transfer of ink between the pages of a publication, just through contact, commonly derived from finishing processes such as cutting and folding, where the media are subject to strong pressure when cutting, or dragging, or even handling.) The thickened ultraviolet varnish was performed in outsourcing, the result then presented to the designer and deemed satisfactory.

The example we chose highlighted the importance of the designer monitoring the production process, as he or she is responsible for adapting and/or changing project specifications to production constraints.

3.2 *Project 2*

This project, like the previous one, was commissioned from Lidergraf and envisaged the production of a low complexity brochure: a publication with 24 pages, in A4 format and CMYK printed on coated paper. Seeming to be a conceptually simple object, it was, in the end, quite complex from a production point of view, due to very tight deadlines. Large-scale production was planned, with subsequent distribution to many points of sale across the country, and any short delay could have had financially disastrous consequences and inexorably affect the distribution chain.

It became essential, in addition to cost planning, to establish a strict plan for production times, to be submitted to the end client for approval. In order to save time, it was decided that the publication would be produced using web-fed offset machines, with finishing (folding and gluing signatures) automated and executed in line; production costs and times were then calculated and approved by the end client.

The files were sent to the company in PDFX1A format as planned, but some problems were detected, namely: some text elements, which appeared on the screen in white over colored backgrounds when opening the file, disappeared in the RIP process, which is required before printing plates are exposed. The reason was an overprint, a very common non-conformity later confirmed in an interview with the production director. This is a recurring problem due to the fact that designers take what they see on their computer screen as true, based on the Adobe suite programs, but the configuration does not always correspond to the final appearance of the printed work.

Lidergraf therefore submitted a technical report, explaining the problems detected. The designer sent new files in PDF format, duly corrected.

Solving this problem, detected by the company’s diligence (because the automatic file checking systems do not detect these types of non-conformity), resulted in an increase in total production time. In order to avoid production being delayed any more, color proofs were not submitted for the designers’ approval, since it was

considered that there was a margin for small deviations, and was validated only by the production company. The printing process revealed, once again, the differences between a color proof and a printed image. The chosen paper, which had a very low grammage (56 grs/m²), and its low opacity caused the color density to be lost in relation to the color tests. However, this non-conformity was predicted by the designers from the beginning, and so the result was considered satisfactory.

Observation of the production of this project shows the importance of proper technical training for designers in relation to production of final artwork. If Lidergraf had not detected the overprint of that particular element—which, as we mentioned, was not the company's responsibility—the costs of reprinting and the delay in finalizing the work would have fallen to the author (or authors) of the project.

3.3 *Questionnaire for Lidergraf's Production Director*

To complement the direct observation of the two projects, we prepared a questionnaire that was sent to Lidergraf's production director, Daniel Furet. We wanted to find out about the recurrence of the problems identified, among others that hinder or paralyze the production process, namely those that result from communication difficulties between project teams and those responsible for graphic production. It was particularly evident that there was a need for the budget drawn up based on the characteristics communicated in writing to the company (by the designer at the beginning of the production process) to correspond with the files sent. If the information contained in both documents does not correspond exactly, it is impossible for production to start. At Lidergraf, when they receive a file for production, an automatic check (*preflight*) is performed to detect any non-conformities between the project specifications and the production system. When non-conformities are detected, the files are characterized as non-standard and must be remade by the designer, with a consequent increase in production time.

Among the most frequent non-conformities are those we observed in point 3.1.1—documents for printing with RGB colors and image resolution below 300 dpi—and in point 3.1.2—undesired elements in *overprint*, among other poorly resolved technical issues (spot colors poorly converted, non-embedded typefaces and transparencies). In addition to these, even in files considered to be standardized, there are often other non-conformities that can jeopardize the final result, as they are not detected automatically and can go unnoticed by the production operator. The consequences are very damaging for the designers, the producing company and the end client.

Regarding standardized files, the most common problems are the following: no bleeds; deficient construction of the black color, since this color is composed of 100% of each of the CMYK colors, which creates an enormous ink overload. The severity of this is accentuated in web offset printing, in which the ink coverage rate cannot exceed 260% on the total of the two sides of the paper—and spreads (double pages) incompatible with the imposition programs (arrangement of the pages of a publication in a printing plan).

3.4 *Project 3*

The Ocyan group is made up of several companies based in Lisbon. Together, they provide several printing and graphic production solutions, such as sheet-fed offset, digital offset and large format digital printing. They have several certifications, such as FSC (Forest Stewardship Council), ISO 9001 and PEFC (Program for the Endorsement of Forest Certification), and are a reference in the sector. At this company, we observed the production process for a magazine in A4 format composed of 40 inside pages and covers with a high complexity technical finish. The cover mockup, previously approved by the client and presented to Ocyan by the designers, consisted of a 3D digital simulation, with sophisticated light and shadow effects that gave the image a shiny effect that is difficult to achieve in a non-digital medium. It was a huge challenge for Ocyan, showing, once again, the demands arising from customization of many communication design projects, which requires good dialogue and effective cooperation between designers and production companies, as happened in the project under consideration. A dry relief and two varnishes were applied to the four-color offset printing, seeking to obtain the effect sought by the designers through the refraction of light on this relief, accentuated by application of the varnishes. The budget was prepared based on this decision. In fact, Ocyan had never produced an object with this combination of raw materials and processes, making it impossible to accurately predict the final result. There was therefore a risk that was taken on by the designers and the company, and production commenced as soon as the client approved the budget. The files in PDF format were sent and the magazine's inside pages were printed without any difficulty, based on the previously approved color proofs.

Regarding the cover, the production process began satisfactorily. It was printed and the varnishes were applied, achieving the expected result, with the predicted shine appearing when exposed to light. However, when the relief was applied, something unexpected happened: the relief design was not the same as the digital model. In fact, the PDF file used for the cliché, which would give rise to the relief, contained shapes not visible on the screen but existing in the original file, made in Illustrator. They were closed vector shapes, filled in white, used to cover a part of the visual element that was intended to be eliminated. In other words, they were not visible on the screen, in normal viewing mode, or in the company's checking processes, but, in fact, they appeared in the conversion of the PDF file to the cliché.

In this project, the final artwork had to be remade, as well as a new cliché. The result ended up achieving what was expected, but time and materials were wasted and production costs increased, which had to be met by the designer.

3.5 Interview with Ocyan's Production Director

In order to complement direct observation, we conducted an open interview with the company's production director, Amílcar Capitão, who preferred to talk to us rather than responding in writing. According to his statements, designers' almost general lack of knowledge of production times makes setting deadlines into problem of communication with the end client. Although technological advances enable shorter production times than a few years ago, the lack of knowledge of production technologies, combined with time lost to correcting or reformulating design errors, makes the relationship with designers very difficult. Aware of these difficulties, despite the fact that it is up to the designers to supply the correct final artwork, Ocyan accepts files in open formats: InDesign or Illustrator, among others. It sometimes requests them to fix book spines, for example. The production director gave us some figures that demonstrate the lack of technical training among many designers for the production of final artwork. Thus, in digital printing, about 30% of works arrive at the company with problems in the final artwork; in offset printing, about 10% of the files do not have the necessary characteristics to proceed with production. From the conversation with Amílcar Capitão, it became clear that designers' training did not accompany the technological changes that involved transferring a series of tasks that 30 years ago were the exclusive responsibility of graphic production companies and their technicians to designers. As an example, he mentioned the difficulties many designers had in generating files in PDF format or in placing bleed marks. His testimony also reveals other, no less worrying problems: knowledge that was part of project culture in communication design is clearly being lost. This culture's roots go back to the production of the first printed books, or the early days of the activity of graphic design, and examples of this loss include not respecting the margins next to book spines, inadequate framing, and the image processing without the necessary care. These problems are not new. In 2004, Frascara considered the requirement that communication designers become responsible for the accuracy and rigor of electronic files to be sent to be one of their great challenges (Frascara 2004). As we have seen, this challenge remains to be met. Our interviewee concluded his assessment by discussing the discrepancy between current technological possibilities, which allow for a rigor and a diversity of design solutions that did not exist in the past, and the skills of designers, whose training did not accompany this technical situation. It is as if the "school" where you learned to work well has disappeared.

3.6 Gráfica Maiadouro, a Case of National Excellence with International Resonance

Gráfica Maiadouro, based in Maia (Porto), is a company with about 60 years of experience operating in the national and international markets. It is recognized for the quality of the work it produces for the cultural sector. It has small format digital

and sheet-fed offset machines. It was the first company in the Iberian Peninsula to have PSO ISO 12647-2 Certification, awarded by UGRA Switzerland and APCER Portuguesa. It holds the FSC (Forest Stewardship Council) and PEFC (Program for the Endorsement of Forest Certification) Chain of Custody Certificates.

It was not possible to monitor the production of a specific graphic object. However, we spent a whole day at the company, watching the production of various projects, in the company of technical manager Gil Oliveira. Later, he gave us a semi-structured interview so we could learn more about the various phases of the company's workflow and how communication between designers and production technicians takes place.

This interview shows that there is a big difference between the projects of national clients and the projects of foreign clients, with regard to the final artwork provided by designers. According to Gil Oliveira, for foreign projects, with which this company has had a commercial and technical relationship for many years, non-conformities detected in files received are very few. In contrast, there are flaws in national projects, similar to those mentioned in the previous cases, in about 70% of the projects: lack of bleeds, blacks in four colors and incorrect color profiles. He also mentions the lack of trapping, that is, the lack of color overlap, which helps to avoid errors in color registration during printing. This company focuses on strict control, carried out by its prepress department, of all files received for printing. These files are analyzed to detect technical non-conformities and to ensure that everything complies with the characteristics described in the budget.

According to Gil Oliveira, technological evolution, with the gradual shift from analogue to digital workflows, started by solving the difficulties of the former—because they required technical knowledge that involved, for example, avoiding moirés (patterns obtained by overlapping wefts), or use layers correctly—but when the execution of the final files became designers' responsibility, their limited technical skills were exposed.

4 Final Considerations

The examples we have presented and the testimonies we have collected allow us to draw very significant conclusions. Productive techniques are an inseparable part of the design process. Without adequate training for designers on technological characteristics and conditions, it is not possible to obtain high-quality results. The mastery of technical language is, from the outset, a necessary skill so that designers can communicate with the production company in order to obtain rigorous and adequate assessments for the various resources involved. Then, it is essential that designers are able to execute the files necessary for the technical communication of their projects in order to include all the characteristics required by the company, respecting its standards and other production constraints, and meet the costs budgeted for and approved by the client. Finally, it is necessary for designers to have the skills to suitably monitor the production phase and, if necessary, actively participate in decision-making on some aspects that cannot be anticipated by the simulation instruments

available (which are always, as we saw, only approximations of the final result). Designers, with appropriate technical training, have the capacity—together with the heads of production companies—to be flexible and imaginative in the development of project statements, transforming ideas into final products to be delivered to their customers.

Thus, learning related to the final production of objects will have significant implications for the quality of projects in communication design, from ideation to production, and broadens the spectrum of knowledge beyond software literacy, an area in which designers tend to invest. Such knowledge enables the designer to design with full awareness of the characteristics and potential of the technologies necessary for the realization of the project, in accordance with the increasing standardization of the productive processes, and anticipate problems and solutions. It also allows them to dialogue with the professionals directly involved, communicating the technical characteristics of the project and, if necessary, seeking the best alternatives, depending on the workflows of the production companies and the technical parameters of the production chain.

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Printing Laboratories Practices: The i.E. Magazine Case Study



Miguel Sanches 

Abstract Successive technological advances and the overwhelming presence of digital tools in our daily lives necessarily have an impact on design practice, and there is a growing preference for immediate and ephemeral communication channels, instead of manual and traditional craft practices. This paper aims to address issues related to independent publishing and explore traditional production techniques in a workshop context, namely through the extracurricular project—i.E Magazine—that students of the Degree in Design and Graphic Arts Technology at the Polytechnic Institute of Tomar have developed to contribute to exploration and learning outside of the classroom and to encourage the use of equipment and materials provided by the printing laboratories at this institution. i.E. Magazine is owned, edited, designed and produced by students and acts as a platform for exploring the polytechnic laboratories at Tomar and as a way to express their ideas, without committing to a specific training, agenda or problem in the context of the classroom. In each edition of the magazine, the students are responsible for the choice of content, the writing or external solicitation of articles, the production of images and illustrations, the design and layout, the choice of materials, and final production. In recent editions, the students or alumni of the Design Degree or Master of Editorial Design have even designed unique type fonts to use in their projects.

Keywords Independent publishing · Printing laboratory · Hands-on production

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1 Research

1.1 *Independent Publishing*

Today, professional graphic designers have different roles detached from the foundational principles passed on through generations in lessons on the history of design, and they often turn out to be the role of producer, content editor and/or solution provider. This feature was explored by Lupton (2012) and Margolin (2002) and labelled ‘*designer as authorpreneur*’ by Heller (2002). This role find its peak when we talk of self-publishing, independent publishing, author edition and fanzines, channels increasingly used by designers, illustrators and photographers to share their work or state a conviction or orientation towards a particular and restricted set of readers.

The origin of self-published publications—often produced as a *do-it-yourself* approach and distributed through underground circuits that can be traced back to the 1920s and 30s with the arrival of the first fanzines (Triggs 2010). These publications were basic handcrafted, low-cost, with limited distribution and circuit-restricted objects, popular within science fiction fans. Later, in the 1950s and 60s, this sort of publication reached its peak when it became the main vehicle for dissemination of punk and comic scenes (Atton 2002). However, independent publications have reduced production and distribution over the years.

Today, also in Portugal, a growing interest in this print media is evident in the number of unique publications and the number of events and exhibitions devoted to self-publishing and the amount of research devoted to it. With the emergence of the internet and easy access to desktop publishing tools, many of these publications take the form of online editions that complement, or not, a print edition and increase the reach and distribution of these titles to previously limited groups of people (Quintela and Borges 2015). These technological innovations greet a new generation of ‘*publishers*’ who will produce new content and design and print the publication without the need for great technical knowledge. Concepts such as *print-on-demand* or *web-to-print* further enhance the ease and scope of producing self-edited and/or independent publications without the burden of high printing costs (Borges 2013).

Despite this increase in the use of new desktop technologies in the context of self-publishing, there is also a growing commitment to return to the craft, the underground, or the *do-it-yourself* approach, mainly born out of creative circles where many titles flourish with a high aesthetic sensibility either in design or choice of printing materials and techniques. Bártolo (2012) stated that this growing ‘*enthusiasm for publishing*’ is reflected in the spread of spaces dedicated to the distribution, sale and diffusion of self-published material, as well as events and exhibitions dedicated to self-publishing.

However, as opposed to the producers of fanzines of the 1920s and 30s ‘*by definition, self-taught amateurs without specific graphic or editorial learning*’ (Quintela and Borges 2015), now the publisher’s profile requires high level skill in graphic and editorial design. Thus, fanzines becomes increasingly bold graphically and selective in materials and reproduction techniques utilised, frequently turning zines into

hybrid objects or so-called ‘big books’. This evolution occurred because design, as a discipline, is no longer dependent exclusively on an external customer, but becomes a self-conscious discipline with a specific audience (Moura 2011).

1.2 Production in Hands-on Context

As described earlier, the designer integrated into a mainstream universe follows a different path from the designer who puts himself at the centre of the creative and productive process of a given project when stimulated by the desire to create and publish his or her own content. In this case, motivation may depend on social or political context, but familiarity with production spaces, as in the project presented below, can increase skills to solve problems. School, as a place of learning and a space for experimen0074al production, will decisively enhance the creativity of the future designer. In laboratories or workshops, school is intended ‘to show the importance of teaching graphic design in the use of experimentation methods in which students are led to “get their hands dirty”’ (Silva 2016) (Figs. 1 and 2).

This laboratories, dedicated to the practical exploration of different printing technologies, have a particular profile when implemented in an academic context. Their users do not have a specific or definitive role, instead the students must be prepared to adapt to unforeseen events during the printing process; they should also be willing to cooperate and share their experience with other users. ‘The workshop is an active space, with bridges to other contexts, industrial and traditional, collaborative in essence with congenital predisposition to the spread, in which we participate. This is the nature of the impression and the workshop, to make an idea multiply and spread through contact’ (Machado 2012) (Figs. 3 and 4).

This is how designers can most easily become authors and producers, not merely projecting themselves as someone who solves a communication problem, but as the

Fig. 1 Example of the workshop space, equipment and materials available at the Polytechnic letterpress lab



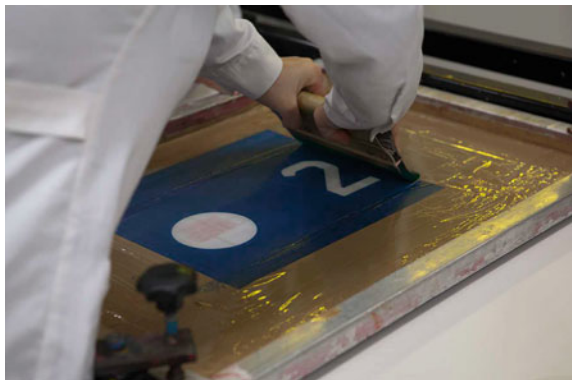
Fig. 2 Example of the workshop space, equipment and materials available at the Polytechnic letterpress lab



Fig. 3 Example of the workshop space, equipment and materials available at the Polytechnic offset and screen printing lab



Fig. 4 Example of the workshop space, equipment and materials available at the Polytechnic offset and screen printing lab



author of that problem and the producer of the final solution. Lupton (2012) describes this new professional as a *'maker of content and shaper of experiences,'* a designer willing to get his or her hands dirty, face production problems that occur while undertaking a project, and, above all, find solutions and complete the final product. The collaborative and experimental character of these spaces in an educational context allows the student to explore their ability to design solutions that meet existing workshop conditions and prepare them for the possibility that the end result might not be the one originally intended. It is thus possible to explore the materiality of the end product as well, sometimes by taking advantage of chance or trial and error, as well as combining production resources to create new solutions to traditional problems.

Student exposure to different laboratories and different printing technologies allows them to respond in different ways when faced with a problem to solve. Practice in *hands-on* spaces can successfully contribute to young designer culture and help him or her in the future.

2 i.E. Magazine Case Study

The act of publishing something is understood by many publishers as making an idea, opinion or point of view made known to the public. *'To publish is to put yourself out there, by proclaiming that you have content that is worth sharing with other people. ... Most publishing ventures, however, are not so much motivated by profit as by the universal human desire to share ideas through permanent, reproducible, exchangeable media'* (Lupton 2008). It was in this context of willingness to share that in 1998 a group of students came together to create a magazine whose content, design and production was entirely their own initiative and responsibility, using only the tools and resources provided by the printing laboratories at the school at Tomar.

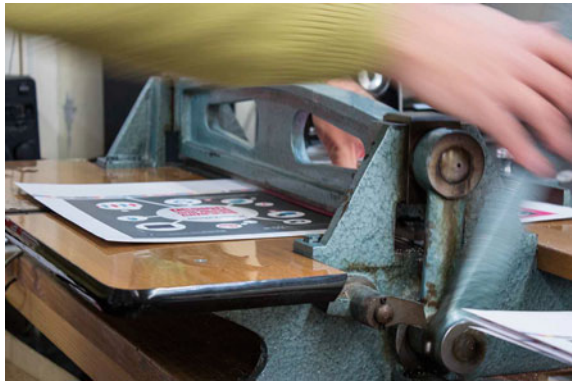
Thus arose the i.E. Magazine as a vehicle for learning, experimentation and dissemination of what can be produced by students in a workshop context, independently, without having to answer to a teacher or customer. In 1998 and 1999, numbers 0 and 1 were edited, but the fact that this was a project exclusively produced by these students dictated its non-continuity. However, this experience was not forgotten and the teachers themselves used this publication as an example of good practice. Thus, in 2013, a new group of students emerged willing to give life to this publication again. To ensure the continuity of the project, the publication now has an editor (a professor) that will bridge the gap between students from different years in the Design Degree as well as Master students. Since then, eight more issues have been edited (Figs. 5 and 6).

For each edition of the magazine, the editor usually creates a set of technical or financial limitations within which the students must solve, resulting in different solutions presented in each edition. Therefore, in recent editions of the magazine, we can find a variety of printing technologies, types of inks used and/or finishing methods. Overall the students have used letterpress, offset and screen printing; CMYK, Pantone®, metallic and fluorescent inks; varnish, debossed, laser cut and special cut

Fig. 5 Example of the workshop space, equipment and materials available at the Polytechnic letterpress and finishing lab



Fig. 6 Example of the workshop space, equipment and materials available at the Polytechnic letterpress and finishing lab



finishing; saddle stitch, double saddle stitch, inlay and jacket application; and coated, uncoated and fine papers. The magazine has a total of 36 pages and a 500 copy print run.

In addition to the fact that the magazine's production reflects the exploration of different materials, technologies and equipment available in our laboratories, this project also encourages creative typeface design. All typefaces used in the magazine are designed by students or alumni, and in issue number 5, the magazine was launched in partnership with Adobe and a typeface design competition whose results were published in edition number 6 (Table 1, Figs. 7 and 8).

Table 1 Summary of the different solutions for each issue of the i.E. Magazine

| Number | Colours | Print technologies | Special features |
|---------|---------|---|--|
| 2 | 4/4 | Offset and screen printing | Matt lamination, gloss varnish and debossed |
| 3 | 4/4 | Offset and screen printing | Cover with poster folding with silver ink |
| 4 | 2/2 | Offset printing | Cover with laser cut and fluorescent ink |
| 5 | 2/2 | Offset printing | Cover with translucent jacket and special cut |
| 6 | 4/4 | Offset, letterpress and screen printing | Cover with hot stamping |
| 7 and 8 | 1/1 | Offset and screen printing | Printed with white ink, binding 2 magazines together |
| 9 | 2/2 | Offset printing | Cover with jacket and chemical relief |

Fig. 7 Foldable cover of the i.E. Magazine number 3

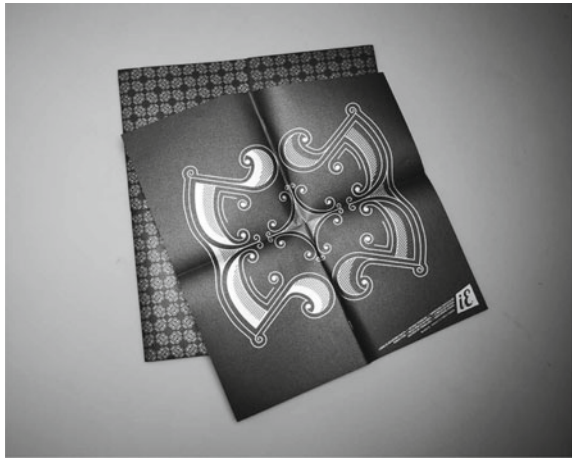


Fig. 8 Laser cut cover of the i.E. Magazine number 4



Fig. 9 i.E. Magazine number 6 with 500 different covers



3 Conclusion

In current graphic production, the *do-it-yourself* practice has gained increasing relevance, revealing the products as privileged spaces of expression and artistic and personal experimentation. Indeed, if this kind of magazine was previously known only in restricted media, now there is a growing consumer interest in this kind of self-produced, independent and rudimentary product.

In the specific case presented—i.E. Magazine—it is essential that the practice in the laboratories, in class or outside, where traditional letterpress, offset printing or screen printing can be experienced, make the students aware of a much broader reality beyond what they find on the computer with digital tools or even within a traditional classroom. Access to experimental learning methods, allows us to amplify the student's creative vision and thus improve the learning process. The collaborative methodologies used in the context of a workshop are relevant in graphic design and editorial practices, placing the designer as author, collaborator and producer, able to dictate content and practical solutions of high value. Improvements in the creative processes and the tools used enables the designer as author to become an informed and conscious professional, inspiring innovative approaches to technology and contributing to their recognition and applicability in a professional context.

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The Rise of the First Design Course at the School of Fine Arts of Porto



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Abstract This paper analyses the context and circumstances under which the course of Design (Graphic Art) was introduced at the School of Fine Arts of Porto, consequently becoming the first higher education course in the field in Northern Portugal. In accordance, the paper outlines a set of pedagogic initiatives and academic experiences in the area of design that preceded the creation of the course, and were instrumental in its formulation. The study is based on literature review and ethnographic research conducted with a group of artists/designers who played a key contextual role, both as professors and as students. Correspondingly, the study infers that a close relationship can be observed between the Design (Graphic Art) and the Fine Arts courses (within which the first Graphic Arts subject arises) due to the orientation of the school itself, in addition to the profiles of the professors, who originally received training in fine arts, but later migrated to the area of design. This relationship determines the specificity of the course, which was essentially associated with image and visual communication, alongside the applicable theoretical, methodological and practical approaches.

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1 Introduction

Degree courses in Design first appeared in Portugal in the period after the Carnation Revolution of 1974, at a time when design as a profession was already recognized in the country, and was primarily undertaken by painters, sculptors, and architects, whose experience had been acquired mainly through practice, and through know-how exchange with peers and technicians from the graphic arts industry.

Sebastião Rodrigues, Vittor Palla, Daciano da Costa, Maria Keil and Armando Alves are some of the eminent 20th Century Portuguese artists/designers who exemplify such early discourses, which are referred to by Maria Keil (cited in Fragoso 2012) as “the great school”, where knowledge was often exchanged “one with another” (p. 55) over tertulias (social gatherings) held in cafés that were regularly visited by these artists, among other meeting occasions.

The paper thereby outlines the history behind the formation of the first Design course in Porto—the Design (Graphic Art) course at the School of Fine Arts of Porto (ESBAP). Respectively, an analysis of certain antecedent academic initiatives developed in Lisbon and Porto, is made. The paper also describes the circumstances under which Graphic Arts as a subject first appeared in ESBAP’s Painting course at the undergraduate level in 1962, a subject that would eventually lead to the establishment of the Design course at the school.

This study was carried out within the framework of the *Wisdom Transfer project: towards the scientific inscription of individual legacies in contexts of retirement from art and design higher education and research* (POCI-01-0145-FEDER-029038), which stems from the evidence that there is insufficient inscription of individual knowledge and experience of retired professors and researchers in art and design.

2 Methodology

The study collected emic data through ethnographic methods including personal interviews that were conducted with distinguished art and design professionals who attended ESBAP between the 1960s and 1980s as students, and in several cases, served as professors. Between December 2018 and December 2019, 32 interview sessions were held, mainly involving individuals who were students of Painting and Sculpture, and those who attended the first years of the Design (Graphic Art) course at ESBAP (Table 1). The interviews used scripts with open-ended questions (Quivy and Campenhoudt 2008) and were filmed, recorded, and complemented with contextual photographs, towards creating a bank of resources for further scrutiny (Tinkler 2013). The participants were respectively asked for permission to collect the required audiovisual material through means of an informed consent form (Banks and Zeitlyn 2015) provided at the beginning of each interview.

Table 1 List of interviewees, course and period in which they attended ESBAP, date of interview

| Name | Course | Start | End | Date of the interview |
|--------------------------|----------------------------------|-------|------|-----------------------|
| Ana Campos | Communication Design/Graphic Art | 1976 | 1981 | 27th June 2019 |
| Antero Pinto | Communication Design | 1979 | 1987 | 10th January 2019 |
| António Mendanha | Painting | 1979 | 1986 | 10th January 2019 |
| António Quadros Ferreira | Painting | 1966 | 1971 | 12th April 2019 |
| Armando Alves | Painting | 1957 | 1962 | 5th December 2018 |
| Carlos Barreira | Sculpture | 1968 | 1973 | 8th January 2019 |
| Carlos Carreiro | Painting | 1967 | 1972 | 16th January 2019 |
| Carlos Marques | Painting | 1967 | 1975 | 11th December 2018 |
| Elvira Leite | Painting | 1957 | 1962 | 15th January 2019 |
| Graça Morais | Painting | 1966 | 1971 | 31st January 2019 |
| Haydée De=Francesco | Sculpture | 1956 | 1961 | 21st January 2019 |
| Helena Abreu e Lima | Painting | 1963 | 1968 | 23rd January 2019 |
| Helena Almeida Santos | Painting | 1961 | 1966 | 7th January 2019 |
| Isabel Cabral | Painting | 1967 | 1973 | 20th December 2018 |
| João Machado | Sculpture | 1963 | 1968 | 1st March 2019 |
| João Nunes | Communication Design/Graphic Art | 1976 | 1981 | 26th February 2019 |
| Jorge Pinheiro | Painting | 1955 | 1963 | 16th April 2019 |
| José Paiva | Painting | 1968 | 1986 | 19th December 2018 |
| Leonilde Santos | Painting | 1981 | 1986 | 14th December 2018 |
| Lima de Carvalho | Painting | 1967 | 1972 | 31st January 2019 |
| Lúcia Matos ^a | – | – | | 24th January 2019 |
| Manuela Bronze | Painting | 1975 | 1981 | 4th January 2019 |
| Maria José Aguiar | Painting | 1967 | 1972 | 14th January 2019 |
| Maria José Valente | Painting | 1968 | 1977 | 22nd January 2019 |
| Mário Américo | Painting | 1962 | 1972 | 25th January 2019 |
| Mário Moura | Architecture | 1961 | 1967 | 5th November 2019 |
| Paula Soares | Painting | 1973 | 1978 | 8th April 2019 |
| Pedro Rocha | Painting | 1967 | 1972 | 30th January 2019 |
| Purificação Fontes | Sculpture | 1964 | 1972 | 22nd January 2019 |
| Rodrigo Cabral | Painting | 1968 | 1973 | 28th December 2018 |
| Sobral Centeno | Painting | 1969 | 1978 | 20th December 2018 |
| Zulmiro de Carvalho | Sculpture | 1963 | 1968 | 7th January 2019 |

^aAlthough she did not attend ESBAP, Lúcia Matos was interviewed because she is the current director of the Faculty of Fine Arts of the University of Porto (formerly ESBAP) and also because she has developed various studies on artists graduating from this school

The corresponding analysis was also supported by literature review which allowed cross-referencing and contextualization of the reported facts, towards determining the circumstantial background of the development of the Design course.

3 Results

3.1 *A Brief History of Higher Education in Design in Portugal*

In the mid-1900's, there were a number of initiatives in Lisbon that sought to offer academic training in the field of Design, but there was an absence of academic provenance in the field, and designers with relevant higher education were rare. There was also a lack of a clear definition of the concept of design applicable to the Portuguese context, and the same was reflected in the emergence of wide-ranging programmes of the various specificities of design without having a formal theoretical base and/or a clear definition of the practical domains associable to the discipline (Brandão 2001).

In the early 1960s, Daciano da Costa, a Portuguese architect, painter, and designer, created a Basic Design course in his studio, which for about two decades, had served as his atelier for works in architecture, interior design, and industrial design (Sena da Silva 2001, p. 17). According to Brandão (2001), it was in this studio where da Costa also developed the first graphic identity manuals for Portuguese companies “in a consistent and systematic way” (p. 32). Following the Bauhausian principles and an aesthetic of purification of forms, Daciano da Costa had the support of Lagoa Henriques (sculptor), Frederico George (architect and painter) and Roberto Araújo (painter and designer) who collaborated with him in this course (Fragoso 2012). Among the students of this pioneering project were Cristina Reis, João Segurado and José Brandão, designers who would later on acquire higher education degrees in Design in the United Kingdom.

José Brandão, who enrolled in da Costa's Basic Design course in October 1963 states that:

At the time, the limits of specialization, at least between us, were not very clear. All areas of the project were addressed, from interior to industrial design, furniture, and graphic design. Basically, it was about putting into practice the ‘new idea’ of intervening culturally and functionally in society (Brandão 2001, p. 31).

Da Costa subsequently developed with his students experimental projects in the areas of industrial design and graphic design, and as iterated earlier, created the first works on corporate identity in which Brandão also participated.

At the time, informative resources on design were scarce, and existing publications such as the British *Design* magazine, launched in 1963, were awaited with great anxiety and expectation, and constituted “the centre of discussions on design” (Brandão 2001, p. 32).

In the 1960s, a small number of artists supported by scholarships from the Calouste Gulbenkian Foundation managed to acquire a higher education degree in Design at the Ravensbourne College of Art and Design in London. Among them were Alda Rosa, Carlos Rocha, Cristina Reis, João George, José Brandão, Jorge Pacheco, and João Segurado (Bártolo 2015; Fragoso 2012).

In this same decade, in Lisbon, a set of initiatives were undertaken that sought to introduce Graphic Arts and Design into academic training. In 1965, the Artistic Training Course (CFAD) was created, promoted by the National Society of Fine Arts, and covering the area of Graphic Arts under the tutelage of Sena da Silva, alongside the area of Design, which was supervised by Manuel Tainha, Conceição Silva, and Daciano da Costa (Manaças 2005, p. 223), and included courses on industrial and interior design (Fragoso 2012, p. 65). In 1969, the establishing of the Institute of Art and Decoration (IADE) was also a significant milestone in the teaching of design in the country, and offered courses in Interior and Product Design. In 1973 the Centre for Art and Visual Communication (AR.CO) was founded, offering a Basic Training Course in design which included subjects such as Graphic Communication, Two-dimensional and Three-dimensional Design, and Color Theory, which according to Manuel Costa Cabral (cited in Manaças 2005), were aimed at preparing students for “the future course of Design (which would effectively open in October 1974, but was immediately abandoned, in the post-revolutionary heat, for lack of students)” (p. 224).

In Porto, the area of graphic arts in higher education also dates back to the early 1960s, commencing under the Painting course in 1962, and supervised by Armando Alves, himself an alumni of the school who had graduated in Painting. Alves had a deep interest in the graphic arts from an early age, having made his first professional graphic works while still a student, at the behest of Carlos Ramos, the then director of ESBAP. Around this time, two major exhibitions had been organized at the school, the Magna Exhibition, an exposition of student works developed in-school that were selected by professors; and the Extra-School Exhibition, which showcased works by students made in private/off-campus studios around the city, which were extracurricular in nature. These exhibitions proved to be of great importance for the school and for the city of Porto. Armando Alves at the time was given the charge of designing the event posters and catalogues.

Upon completing the Painting course, Alves continued in ESBAP as a professor, tutoring the subject of “Decorative Painting”, a nomenclature that dated back to the 19th century. The subject was of little interest to Alves, in light of its antiquity as opposed to the prevailing artistic reality of the time. A year into his professorate, Alves thus proposed Graphic Arts as an alternative subject, being an area of his interest and expertise. This was the beginning of the first ESBAP discipline related to design. In consideration of the absence of a theoretical background in this area, the pedagogic approach of the subject had to be thought out and structured on the basis of Alves’s own practical experience and on work done by other renowned individuals such as Sebastião Rodrigues. Most references were restricted to the national context, since there was limited accessibility to information from international sources. The approach was also highly experimental, based on craftsmanship, and utilized

reference materials such as *Marie Claire* or *Paris Match* magazines, which, according to Armando Alves, were publications “of great importance and great graphic quality” (personal communication, December 5, 2018). These publications were graphically analyzed in the classroom and also served as working materials: their graphic content would be cut out and archived for reuse in new graphic compositions in a “cut and paste” process. With these materials, which included clippings of letters, titles, texts, and photographs, projects such as fictional record covers and book covers were composed.

At the end of the year, a selection of the discipline’s outcomes was exhibited at the Magna Exhibition and was well appreciated. Graphic Arts, initiated as a subject on an experimental basis, was thus established in the Painting curriculum, within the Decorative Painting discipline, maintaining a similar approach in the subsequent years, incorporating the analysis of existing graphic works and renowned publications—occasionally from abroad and oriented towards design, such as *Graphis*—and a practice through experimentation and manuality.

This approach laid the groundwork for developing further projects at the school which were similarly experimental in nature, and blurred the boundaries between art and design. Rodrigo Cabral, for example, recalled a set of posters developed under Graphic Arts subject, that were composed of removable parts, which he called “sculptural objects” (personal communication, December 28, 2018).

Given the growing interest and relevance of the subject of Graphic Arts, it was eventually addressed at both levels of the discipline of Decorative Painting (taught in the 3rd and 4th years of the Painting course), with Year 1 taught by Armando Alves and Year 2 by Amândio Silva. Also with a degree in Painting from ESBAP, Amândio Silva specialized in graphic arts through self-taught learning, and had experience working as lithographer, designer, and illustrator. Thus, as a consequence of their professional experience outside the school, the two painters were able to bring more specific concerns related to design into their narratives as professors.

According to students of this time, while Armando Alves’ approach was characterized by the analysis of graphic works and practical projects in class, Amândio Silva’s approach occasionally included real proposals to clients and visits to print-making studios, bringing real-life perspectives and knowledge to the instruction of Graphic Arts and printing technologies.

3.2 The Formation of a Higher Education Course in Design at ESBAP: The Course of Design (Graphic Art)

After the Carnation Revolution of 1974, there were major reformulations brought to the teaching of arts in higher education in general, and Design courses were formally introduced. Thus, the year 1975 saw the introduction of the Communication and Product Design course at the School of Fine Arts of Lisbon (Fragoso 2012), and in the

following year, the Design (Graphic Art)¹ course was initiated under the tutelage of professors such as Amândio Silva, Domingos Pinho, Dario Alves, and João Machado who were professionals in the field but had no formal education specific to design.

Domingos Pinho, who graduated in Painting, had acquired experience in the area of graphic arts working with artist Hernâni Tavares (Almeida 2004), and took charge of the subject at the school when Armando Alves left, becoming an essential figure connected to the formation of the Design course. As a professor of graphic arts in the previous years, Pinho already had relevant pedagogical experience, such as pertaining to the development of posters, comics, and animation, and the use of respective techniques and technology. In his personal capacity, Pinho also had envisaged a curricular structure and course contents for a prospective Design/Graphic Art program at the school, which consequently became the basis of instruction for all professors who initiated the Design course in 1976.

Dario Alves, was also graduated in Painting, and began his career in design in 1959, collaborating with several companies in the graphic arts area such as *Estúdio Atenas*, *Tipografia Carvalhido* and *Simão Guimarães Filho*. He began his teaching career at ESBAP in 1976, overseeing various disciplines in graphic arts, including Graphic Design, Specialized Graphics and Editorial Design.

João Machado was hired as a lecturer at ESBAP in 1976/77, specifically for the course of Design (Graphic Art). He had always aspired to be in the Design field, but the absence of a Design specific course led him to graduate in Sculpture instead at ESBAP. Machado thus had to rely on autonomous learning of graphic arts through the visual analysis of existing works, and through contact with other designers and technicians working in the graphics industry. At the beginning of his career, he also acquired design experience through working for RTP (Portuguese state television), where he created illustrations for Portuguese and French subjects taught at *Tele-Escola (TV School)*. It was with this work portfolio that he applied for professorship at ESBAP.

Among the students of the first year of the Design (Graphic Art) course were João Nunes, Ana Campos, Jorge Afonso, Augusto da Eira and Graça Martins. When João Nunes joined ESBAP as a student, he already had professional experience in the area of Design, having worked at the communication office of the army in Angola. As he stated,

When I arrived at Fine Arts [School], the design course was just beginning, without much equipment, and with professors migrating from the areas of painting, sculpture, architecture, as it happened all over the world. The first and second year of the course were common to the different areas (Nunes, personal communication, February 26, 2019).

In particular reference to the course, Modesto (2016), who would enter the following school year, adds that there was an “awareness of extension, of applying art

¹Given the instability caused by the Revolution, the school year was suspended and the first classes did not begin until April 1976 (Mendonça 2007). In the 1980/1981 school year, the name of the course was changed to Communication Design (Graphic Art), privileging the concept of design and communication. But only on January 22, 1983, these courses—Design (Graphic Art) and Communication Design (Graphic Art)—were recognized by the Portuguese Government in *Diário da República*.

to everyday life”, which corresponds with Brandão’s (2001) observation on Daciano da Costa’s Basic Design course, that “it was a matter of putting into practice the ‘new idea’ of intervening culturally and functionally in society” (p. 31).

In the pre-digital era, the approach to projects remained primarily artisanal, varying between the techniques of drawing, collage and gouache painting. The most common instruments were graphite, ruling pen, compass, ruler, and set-square, with only João Machado as a professor, and João Nunes as a student familiarized with airbrushing, as a result of their professional experiences outside the school.

In these first years of the Design (Graphic Art) course, Calvet de Magalhães, the director of ESBAP between 1977 and 1978, played an important role in the formatting of the course and in instituting the photography and video laboratories. Graduated in Drawing, Calvet de Magalhães was dedicated to Graphic Arts since the 1940’s, obtaining several academic degrees in the field from England.² In addition to having done extensive graphic work in the area of advertising and editorial design, he was also the technical director of several companies in the graphics sector (among them, *Empresa do Bolhão*, *Litografia Vasco da Gama*, *La Artística* and *Consórcio Industrial del Miño*), and had authored books such as the *Manual Profissional de Artes Gráficas* (Professional Handbook of Graphic Arts),³ *T.V.P.—Técnica de Vendas e Publicidade* (Commercial and Advertising Technique)⁴ and *Técnicas de Impressão* (Print Techniques),⁵ among others (Silva 2017). Although his period of direction was brief, as reported by students from the time, de Magalhães’s contribution to improving the school’s resources was significant. In addition to the aforementioned institution of the video and photography laboratories, he also acquired facilities and equipment for other laboratories, and bibliographic resources for the library, that offered greater depth and thematic variety. These resources included a (very limited) number of design publications. According to Modesto (2016), the only publications in this area that could be consulted were the *Graphis* magazines, “in the end, thumbnails’ annuals”, which, although were not bad, could not be compared to “a scholar’s understanding of an image”.

António Quadros Ferreira, a Painting graduate from 1971, joined the faculty of the Design (Graphic Art) course in its initial years of its existence, teaching the subject of Introduction to Visual Arts and Design. According to him, even though the first professors of the course were from the Fine Arts area, there was a shared understanding among them that they were in a learning process, wherein Design was birthing within Fine Arts: “it was a very contaminated design, very conditioned, one of author’s vision” (personal communication, April 12, 2019). Quadros Ferreira thus approached the subject, using a dialectic that could determine how design could

²1st year of Master of Arts at Goldsmiths College—London (GB); postgraduate and PhD in Art and Design Education at De Montfort University in Leicester (Silva 2017).

³*Manual Profissional de Artes Gráficas*. Porto: Domingos Barreira Editor, 1956.

⁴*T.V.P.—Técnica de Vendas e Publicidade*, work published in collaboration with Fernando Carvalho Costa and Manuel Calvet de Magalhães. Porto: Manuel Barreira Editor, 1.ª ed., 1958 and Didáctica Editora, 10.ª ed., 1982.

⁵*Técnicas de Impressão*. Porto: Edição da Associação de Estudantes da 2.ª Secção da ESBAP, 1964 and 1978.

create its own space within the arts, leading him to contemplate the affordances of design and its applicable frameworks.

Looking at the history of ESBAP in the decades before the April 25 Revolution and the years that followed, José Paiva, the director of the school between 2014 and 2018, also observed that design brought the awareness to ESBAP that this was not a typical 19th century art school anymore, but a contemporary institution with social responsibilities, because “design forces us to understand this” (personal communication, December 19, 2018).

At ESBAP, the concept of design emerged as a descendant of the Graphic Arts subject taught under Decorative Painting discipline—the very name of the course was suggestive of it: the Design (Graphic Art) course. And, while in Lisbon there was a relatively swift diversification of the subject of design into various sub-disciplines, such as industrial/product design, communication design, and interior design, at ESBAP, for many years the training remained limited to communication design.

In terms of the approach to the course and its close relationship with the visual arts, Quadros Ferreira also observed that only later, when the first generation of design professors with higher education in the area began to appear at ESBAP, Design started to be thought of in a different manner, tending to detach itself from the visual arts. Even so, the derivations that emerged in design were always connected with the problem of image, and the concept of design, as Industrial Design or Product Design never really took hold in Porto.

4 Conclusion

The study has shown that, although there were a number of initiatives that offered academic training in the area of graphic arts within the official Portuguese education system, the creation of design related higher education courses in Portugal only took place in the post-Revolution period, following the reformulation of the arts teaching at the Schools of Fine Arts in Lisbon and Porto. In the specific case of Porto, at ESBAP, the course emerged in the context of Visual Arts, and was marked by the methodologies and practices applied in the Painting and Sculpture courses. Although not necessarily fortuitous, this relationship between visual arts and communication design can still be observed in the current faculty. Hence, the Design course assumed a character that was more related to the graphic image and visual communication, and not as much on the principles of product or industrial design, unlike at the Faculty of Fine Arts of the University of Lisbon. The fact that the first professors of the course came from the Fine Arts area also contributed to the predominance of this design specificity in Porto’s academic discourse. This group of teachers, whose learning of design was self-taught through experimental practice and observation of works by other professionals, defined their pedagogical practices in ESBAP, initially in a highly empirical manner, that determined a particular orientation of teaching art and design for decades to follow.

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Digital Quarantine—A Case Study on How CoViD-19 Accelerated Digital Transformation at Our School of Arts and Design



Jan Eckert

Abstract Despite the fact that the so-called digital transformation is being seen as one of the megatrends of the past and ongoing decades, there does not seem to be a common picture of how schools of art and design should address this phenomenon or even actively shape the digital shift. The case study discussed in this paper, therefore, sets out to identify the main areas that schools of arts and design could engage with in order to become active players in digital transformation. It does so by conducting both, a series of qualitative interviews as well as an online survey that reached out to representants of the design and arts community at Lucerne School of Applied Sciences and across Europe. Initially, this sample was meant to be compared to a sample originating from the computer science community. Due to the lockdown of European Universities caused by the CoVid-19 crisis, this second part of the study had to be postponed. Instead, the paper completes the findings of the qualitative study conducted in the design and arts community with a series of observations made during the sudden shift to remote and e-learning at our own university of Applied Sciences and Arts. As a result, the emerging topics from the study get critically reflected with the fact that our school of arts and design suddenly became a “remote” school that had to shift exclusively to the use of digital tools and media.

Keywords Digital transformation · Design education · Digital shift · CoViD-19

1 Introduction – Keeping up with the Pioneers

The ultimate goal of all art is the building! Its ornamentation was once the noblest function of the fine arts; and they were considered indispensable parts of the great art of building. Today, they exist in complacent isolation, from which they can only be salvaged by the conscious and cooperative efforts of all artisans. Architects, painters, and sculptors must recognize anew and learn how to grasp the multi-faceted Gestalt of the building both as an entity and

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in its separate parts. Only then will their work be imbued with the architectonic spirit which it has lost as “salon art.” (Gropius 1919)

In his first paragraph of the “Bauhaus Manifesto”, the founder of the Staatliche Bauhaus Walter Gropius argues for an orientation of the arts towards a common goal—a goal, which he considers to be the art of building. In the following paragraphs of his manifesto he criticizes the “old schools” that according to him have not pursued this goal of creating unity between the different disciplines and, instead, kept raising an arrogant barrier between craftsmanship and arts (Gropius 1919). One hundred and one years later, one might wonder, which common goal should be put first in arts and design in order to unfold the same unity and power that once drove the Bauhaus to become the most relevant design school of its time.

On September 14th 2003, the former director of the Ulm School of Design, Thomás Maldonado, asks a similar question when giving a talk in occasion of the Ulm School’s 50th anniversary. In his speech he first emphasizes that it would be outdated to pursue the Ulm School’s quest in the 50ies and 60ies—especially, during its first period when former Bauhaus student Maxi Bill was trying to position the Ulm School as successor of the original Bauhaus. A critique that is not new, given that Maldonado already started this argument in 1955, when he published his article “La Escuela superior de diseño de Ulm” (Maldonado 1955; Maldonado 1974; Maldonado 2019) in the journal “Nueva Visión”:

“Not all of the theses supported by the Bauhaus pioneers continue to have the same validity for our generation. We live today with problems that they didn’t even know about then, or that they barely imagined. On the other hand, problems that were fundamental to them for us today are no longer topical.”¹

Instead, Maldonado puts his questions into the context of the advent of the third millenium. He does so by examining questions „that deal directly or indirectly with the spread of digital technologies, questions that examine the relationships between the natural and the artificial, the material and immaterial, between the digital world and the real-life world, between information flood and our effective knowledge, between individual freedom and social control, between the rich, who are continuously becoming richer and the poor, who are getting poorer, between the enormous extension of mass-production and the decrease of our natural resources.”² (Maldonado 2003).

¹Original Italian Text as published in 2019: *Non tutte le tesi sostenute dai pionieri del Bauhaus continuano ad avere la stessa validità per la nostra generazione. Viviamo oggi dei problemi che essi, allora, non conoscevano neppure, o che intuivano appena. D'altra parte, dei problemi che erano per loro fondamentali per noi oggi non hanno più attualità.*

²Original German Text: *Es handelt sich um solche (Fragen), die direkt oder indirekt mit dem Aufkommen der digitalen Technologien zu tun haben, Fragen, die direkt auf die Beziehung zwischen dem Natürlichen und dem Artifiziellem eingehen, auf die zwischen Materiellem und Immateriellem, zwischen Digitalwelt und Lebenswelt, zwischen Informationsflut und effektivem Wissen, zwischen individueller Freiheit und sozialer Kontrolle, zwischen den Reichen, die immer reicher, und den Armen die immer ärmer werden, zwischen der gewaltigen Ausweitung der Güterproduktion und dem Schrumpfen der Umweltreserven.*

With his words, Maldonado outlines what appears to be a massive increase in complexity compared to Gropius' focus on the built environment. However, within this complexity, Maldonado also provides a key—or better the phenomenon behind the reason why the relationships that he is talking about need to be re-negotiated by arts and design: the spread of digital technologies. If one reviews Maldonado's writings, his examination of the relationship between technology, humanity and design appears to be a continuous thread (Maldonado 1997). And when ten years back, I had the honour to assist Maldonado's visit to our PhD class at IUAV University in Venice, it impressed me that even though, at the time, Thomás Maldonado claimed to dedicate most of his attention to his artistic practice, he started examining the appearance of the iPad that has been presented by Steve Jobs just one week before our encounter in 2010. Given Maldonado's sharp attention towards identifying those areas of arts and design that are about to shape our future, it doesn't come as a surprise that, a decade later, the so-called digital transformation is one of the main megatrends that are currently shaping our society not just by turning analogue processes into digital ones but by permeating a variety of relationships that Maldonado was talking about back in 2003 (Maldonado 2003). And in this context, again, it doesn't come as a surprise that in his anniversary speech, Maldonado points out new technologies as main areas for investigation and starting-points for design—namely: computer sciences, robotics, bio-technologies and genetics (Maldonado 2003), while the latter becoming more and more tied up to the first ones, today.

Turning back to the initial question about which might be the common goal or area that schools of arts and design should address, today, it appears quite evident to me that it should be the transformations that are being shaped by (digital) technologies. Interestingly, there are, yet, few design schools that call themselves “School of the Digital”. When I set out to a desktop research to find some, I could identify just a few European Schools: the Macromedia Hochschule in Berlin, Germany that in its mission statement claims itself as “The University for Digital Transformation”; the University of Coimbra, Portugal where Design and Multimedia courses are taught together in their Department of Computer Engineering; the Technical University Vilnius Gediminas, Lithuania with its Department of Graphics Systems, and their programmes such as Multimedia Design or Communication of Innovation and Technology, the Hochschule Bremen, Germany and its “Fakultät 4 für Elektrotechnik und Informatik”, our own Lucerne University of Applied Sciences and Arts that started offering both, BA and MA programmes combining Computer Sciences and Design or last but not least the TU Delft, Netherlands that is internationally known for being the world's leading design research University where design is strongly embedded into the context of engineering and technology. There is, for sure, many more that teach and research at the intersection between technologies and design. Certainly, there is a lot of schools advertising the digital transformation on their website or learning goals of their programs. However, in most cases the question remains if this thinking really pierces through the entire didactical concept of these schools, or if these are just first attempts to extend into a more holistic approach of dealing with the digital shift in arts and design education. The observation of just few schools dealing with the digital shift on a larger scale and the fact that many of them are schools or

universities of engineering, computer sciences or technology, became starting point for the research discussed in this paper. At a first glance there does not seem to be a common picture of how schools of art and design should address digital transformation from an arts and design perspective. Therefore, I set out to ask both main players involved in this question: people from an arts and design background as well as people from computer sciences.

When I wrote the initial paragraphs of this paper back in January 2020, I had no idea what was about to come. And now, four months later, the spread of the coronavirus disease forced all universities and schools across our country—and pretty much all across Europe—to change their way of teaching towards forms and formats of remote learning and teaching as well as most faculty and staff members are forced to working remotely from home. Under these circumstances, the shift towards the digital, instantly gained higher relevance. In many cases, schools and universities, just as our own university of Applied Sciences and Arts, had few days to transition from conventional learning based upon class instruction towards distance learning.

This situation had mainly two impacts on this paper: The first consequence is that part of the interviews with members of our computer science department had not been conducted due to the fact that all faculty members were completely working to capacity in order to deal with our shift towards remote teaching. Therefore, in this paper only the data gathered amongst members of the arts and design community will be evaluated and discussed. The second impact is that during the upcoming weeks of distance learning, we were already able to gather many insights into what it means to teach and learn remotely. Some of these insights might contradict the findings that are based upon the interviews conducted in December 2019 and will, therefore, be critically discussed and reported in the second part of this paper.

Before diving into the research design, the results and further discussion of the study, I would like to anticipate that due to the rather small sample of participants that mostly originate from our own University, at its current state, the study is rather to be considered as a case study analysis of how members of the department of design & arts at Lucerne University of Applied Sciences and Arts imagine to deal with digital transformation from an arts and design point of view.

2 Research Design and Methodology

The study discussed in this paper started out following a three-folded approach: One is a series of qualitative Interviews ($n = 9$) with educators, learners and practitioners from our department of arts and design. The second is an online survey that reached out to a second sample ($n = 10$) of people from the same backgrounds but with a larger geographical spread (Europe, UK). The third one was meant to conduct the same study (qualitative interviews and online survey) with a sample of people from the computer sciences community. As mentioned above, due to the lockdown of universities caused by the CoViD-19 crisis, these people could not or only hardly be reached at the present time.

3 Conducting the Interviews

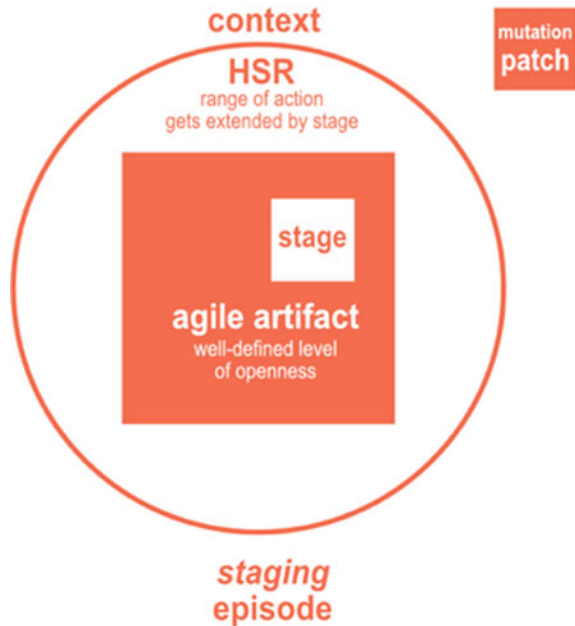
A first exploratory interview with an expert in art history and contemporary art started with the question: “Try to describe the most important fields of the so-called digital transformation that could be actively shaped by universities of design, film and arts”. This first interview led to three main areas and leading questions that became the foundation for the questionnaire (Fig. 1) that has been developed.

Before starting each interview, interviewees have been shown an introductory power point presentation that outlined the main questions as well as a reference to the model of the “Agile Artifact” (Eckert and Eckert 2018). The model proposes artifacts, mentefacts or institutions (e.g. in this case schools and their programmes) that are configured to adapt to their context and shape the context itself in the process of this adaption (Fig. 2). Especially the latter—shaping the context—was meant to become a conversation starter for the interviews by focusing on perspectives on how our own and other schools of arts and design could actively shape the use and spread of digital technologies instead of asking the question of how to deal with the novelties provided by the tech industry. Based upon this procedure and in addition to the first

| Creating values through content and access to knowledge | The future of education and working together | The future of being human in the context of digital transformation |
|--|---|---|
| <i>How can we shape the way society deals with (digital) content and access to knowledge in a way that creates added value for all people?</i> | <i>How can we shape the way people learn and work together?</i> | <i>How to shape «being human» in the area of friction between digital and analogue artefacts as well as natural entities?</i> |
| Which are the most critical areas in content-creating and knowledge transfer that artists, filmmakers and designers should engage with? | How do you imagine learning in a future that is dominated by digital media and technologies? | Where do you see humanity's biggest responsibility within the digital shift? |
| Which role do you think play art & design schools in the process of re-visiting these areas? | How would you describe the learners of the future? | How should we as artists, filmmakers and designers deal with this responsibility? |
| Digital Literacy: What Skills and competences in the field of the «digital» would you expect to learn/teach at a future arts & design school? | How should we engage with the topic of learning as artists, filmmakers and designers in order to shape its future? | How would you describe the role of art & design schools within this challenge? |
| | If you imagine a future without work (e.g. intelligent systems and machines took over most of it) – what would be our contribution to society as artists, filmmakers and designers? | |
| What must we not lose sight of? | What must we not lose sight of? | What must we not lose sight of? |
| What would be a revolutionary approach? | What would be a revolutionary approach? | What would be a revolutionary approach? |
| Which situations from my everyday life could represent a starting point? | Which situations from my everyday life could represent a starting point? | Which situations from my everyday life could represent a starting point? |

Fig. 1 Main subjects of the interviews and survey, author’s illustration, 2020

Fig. 2 The Agile Artifact,
Eckert and Eckert 2018



exploratory interview a total of 9 interviews³ have been conducted—each of them about one-hour length.

Each of the interviews has been transcribed to an “interview map” (Fig. 3) that summarises the interviewee’s answers with regards to the three main areas of the interview as mentioned above. In a secondary step, all answers have been analysed and coded by highlighting the most significant keywords and topics as well as such that would be named repetitively during one interview or mentioned by more than one independent interviewee.

4 What the Interviews Said

The examination of the interview transcripts has unveiled first arrays that would emerge from the interviewee’s answers. Some of them relating to just one of the

³1 art historian, Bologna, Italy

2 students in design & arts, Lucerne, Switzerland

1 design alumna, Lucerne, Switzerland

1 head of a design study program, Lucerne, Switzerland

1 Business Ethic teacher at a design program, Berlin, Germany

1 junior researcher in design, Lucerne, Switzerland

1 head of internal communication at a design school, Lucerne, Switzerland

1 head of continuous education at a design school, Lucerne, Switzerland.

| Field of action | Creating values through content and access to knowledge How can we shape the way society deals with (digital) content and access to knowledge in a way that creates added value for all people? | The future of education and working together How can we shape the way people learn and work together? | The future of being human in the context of digital transformation How to shape "being human" in the area of friction between digital and analogue artefacts as well as natural entities? |
|--|---|--|--|
| <p>Perspective stakeholder group MA Design Alumni</p> <p>Guide ENA What must we not lose sight of?</p> <p>Carep What would be a revolutionary approach?</p> <p>Episodes Which situations from my everyday life could represent a starting point?</p> | <p>Which are the most critical areas in content creating and knowledge transfer that artists, filmmakers and designers should engage with?</p> <ul style="list-style-type: none"> – there is a certain sense of responsibility, whatever you are creating content (especially digital) that is available to many people who have a certain influence on people's mind. That is a huge responsibility! – we need to engage in the field of ethics. <p>Which role do you think play art & design schools in the process of re-vitalizing these areas?</p> <p>– I would say they are the special places where future creators of content are being educated in that sense arts & design schools shape these people both in a professional and human way.</p> <ul style="list-style-type: none"> – Art & Design schools should be aware that they are currently "shaping the future creation" – schools should be places of dialogue and critique, too <p>Digital literacy: What skills and competences in the field of the «digital» would you expect to learn/teach at a future arts & design school?</p> <p>– I would avoid (if not not becoming a writer, in most of the contexts that we work today, this is a language that we need to be able to understand and possibly speak – speaking this language intelligently is much better into any creative process.</p> <ul style="list-style-type: none"> – so you need to know your «dialect» (ending included), before you start to create. <p>there is also risks of going digital: we need to keep track of them!</p> <p>We should not forget about our main properties of being human.</p> <p>Finding the sweet spot between the physical, human and the digital.</p> <ul style="list-style-type: none"> – definitely the future way humans interact with machines. | <p>How do you imagine learning in a future that is dominated by digital media and technologies?</p> <ul style="list-style-type: none"> – something that is great is access to information that is physically not available (e.g. connecting and collaborating with people around the world). – but this puts also a lot of pressure on everyone suddenly we are connecting with the whole world – when working on a future that is dominated by digital technologies, you are mostly solving problems that are about to appear in a future. This affects learning in a drastic way – therefore, foresight and planning are topics we should engage with in learning. <p>How would you describe the learners of the future?</p> <ul style="list-style-type: none"> – learners will (not?) become monotonous – people who are building the future and therefore need to learn constantly in order to avoid building also the problems of the future. <p>How should we engage with the topic of learning as artists, filmmakers and designers in order to shape its future?</p> <ul style="list-style-type: none"> – the more I reflect on the topic of future learning, the more a sense of teamwork and community comes into my mind. – rather being an «ambassador» the main goal might have been «making a better chair than James». Nowadays instead, most of our problems cannot be solved from just one perspective. – part of our job is to foster a collaborative conversation. <p>If you imagine a future without work (e.g. intelligent systems and machines took over most of it) – what would be our contribution to society as artists, filmmakers and designers?</p> <ul style="list-style-type: none"> – how human the way our perceptive issues and problems is not the way machines are able to do it (e.g. empathy). This will matter stand out even in a future dominated by systems and machines. – anything that can be done digitally, will be done digitally. If any work exists at all, it must arise when it's grounded on empathy: so our task is to ensure that this multi-layered perspective is included into any work. <p>Ensure a healthy relationship between human beings and machines.</p> <p>Almost 70% of the planet's population is still struggling with having access to electricity: we should not forget about these people!</p> <ul style="list-style-type: none"> – predicting the future in terms of a «message of humanity» – that's something interesting to explore. | <p>Where do you see humanity's biggest responsibility within the digital shift?</p> <ul style="list-style-type: none"> – not to isolate but to integrate – there is an immense increase of mental problems that people are struggling with. Some of them are strongly related to digitalization. – most of today's technologies are in the hands of such naive minds: this is absolutely dangerous and a huge responsibility emerges from there. <p>How should we as artists, filmmakers and designers deal with this responsibility?</p> <ul style="list-style-type: none"> – being critical, even as designers we often create superficial artefacts or solutions. Many of them are not solving any problem though. So we need to be extremely HONEST about the fact that we are here to solve real problems. – at the same time it is also important and vital to admit that we might not be able to solve (part of) a problem. Only when we are also aware of what has not been solved, given as the necessary credibility. <p>How would you describe the role of art & design schools within this challenge?</p> <ul style="list-style-type: none"> – one thing I am missing in the entire discussion about digital transformation is the value of human relationships and dialogue, and there is the lack of exploring this – especially, education need to be aware that «being a mentor» (not a lecturer) is essential to bring this human equipment and empathy back to education and any learning process. <p>While chasing the «ideal future» it's important to accept that there is no such thing as «ideal».</p> <p>Human relationships and empathy.</p> <ul style="list-style-type: none"> – looking back at the past might seem a very obvious thing to do but often gets forgotten. <p>– in the history of India we have a very specific, student-teacher relationship (even myths and stories are telling about this relation where: teachers are as mountains and you parents. This connection between entire topic back to the importance of empathy and human relationships.</p> <ul style="list-style-type: none"> – there is a part of the world that is still fighting their way to human rights (religious, cultural, territorial rights) so there is a lot to learn before transitioning into a global digital world. |

Fig. 3 Map summarizing the interview, example, author's illustration, 2020

interview's main topics, others that would be mentioned across the entire conversation. A very first insight of this listing was that most interviewees would bring up topics and perspectives that are focusing the human and social component of digital transformation.

For instance, most interviewees reflected that the phenomenon, which we use to call *digital transformation*, only refers to a small part of the world's population and many communities are facing completely different challenges that are driven by digital technologies than the ones that we are dealing with in the *western* or *first* world. A second focus that catches the eye is the demand for a human counterpart of the digital—or in other words: a healthy relationship between the human and the artificial. In this context, interviewees specified that they still see the human component (e.g. face to face teaching and learning) as something that cannot or should not be substituted by digital technologies. Another topic that emerged in many answers is the preservation of acquiring analogue techniques and skills (e.g. crafts) at schools of arts and design. Furthermore, many interviewees emphasized the role of design schools as places of critique and critical analysis of social, technological or economic phenomena. According to most interviewees, also phenomena related to the digital transformation should be examined critically at schools of arts and design. Based upon the first analysis of the interview transcripts four clusters have been derived (Fig. 4). These clusters summarize the most mentioned topics during the interviews and sort out all topics that have been mentioned less than nine times (number of interviewees was 9).

| Human Relationships | 21 | Technologies and Humans | 18 |
|---|----|---|----|
| Human relationships | | Balance between humanity and AI | |
| Conversation | | Emancipation from the digital | |
| Interactions with real people | | Being human in a digital future | |
| Teamwork | | Healthy relationship between | |
| Community | | humans and machines | |
| Collaborations | | Appreciation of «being human» | |
| Mentorship in education | | Humankind has to decide | |
| | | on the digital future | |
| | | “we must not delegate this | |
| | | responsibility” | |
| | | Humanising Technology | |
| | | Human Machine Interaction | |
| | | Human Centeredness | |
| | | “We need to change the face | |
| | | - the appearance of technology” | |
| Inclusiveness | 13 | Critical Thinking/Critique | 13 |
| What we call the «Digital Trans- formation» only applies to a small part of the world's population. | | Critical Thinking | |
| All people and communities should be included. | | Schools of Arts and Design as Places of Critique | |
| We need to deal with the inequality that still exists amongst the world's population. | | | |
| We need to act inclusive | | | |
| Co-Creation and participation as inclusive approaches | | | |
| Social Impact | | | |
| Accessibility / Inclusiveness | | | |

Fig. 4 First clusters after examining the interview transcriptions, author's illustration, 2020

5 Crossing the Interview Data with the Online Survey

During the same period of time of the interviews (5 days), an online survey reached out to a sample of 10 students, educators and practitioners that work in the design and arts domain, all across Europe. The questionnaire allowed participants to formulate their answers without any limit regarding number of characters and was based upon the same set of topics and questions as the interviews (Fig. 1).

Again, the participant's answers have been analysed by using the same codes (topics/keywords) that have been identified in the interview's transcriptions by adding new ones as well. Based upon this analysis the clustered results from the interviews have been crossed with the analysis of the online survey. This comparison led to an updated set of clusters (Fig. 5) that included all keywords that have been mentioned more than 19 times (n interviews = 9 + n online survey = 10).

| | |
|--|---|
| <p>Inclusiveness, Social Responsibility 34</p> <p>What we call the «Digital Transformation» only applies to a small part of the world's population. All people and communities should be included. Social Responsibility We need to deal with the inequality that still exists amongst the world's population. We need to act inclusive Co-Creation and participation as inclusive approaches Social Impact Accessibility and inclusiveness Ethics Diversity Caring for each other Schools of Design, Film and Arts need to inform the global society and include everyone.</p> | <p>The Future of Learning 32</p> <p>Fast learning: adopting to change Dynamic learning Technology could speed up learning Learning how to learn Transformative learning Personal development Informal Learning Lifelong learning Trans-generational learning Real world experiences and practice-oriented learning Experiential Learning Immersive Learning Didactical approaches re-thinking teaching Digital learning must not become a disadvantage for learners. The digital also creates distraction. Acquiring basic knowledge; even such that at first seems useless.</p> |
| <p>Politics of Digital, Critical Thinking 31</p> <p>Critical Thinking Critique Digital Anarchy: a lot of the «good things» we expected from digital media got out of control Most of today's technologies are in the hands of such naive minds. Abuse of power on the Internet. Regulating the Internet Data security Politics of the Digital Flatten Hierarchies through the digital</p> | <p>Technology and Humans 25</p> <p>Balance between humanity and AI Emancipation from the digital Being human in a digital future Healthy relationship between humans and machines Appreciation of «being human» Humankind has to decide on the digital future – we must not delegate this responsibility Humanising Technology Human Machine Interaction Human Centeredness “We need to change the face - the appearance of technology”</p> |
| <p>Human relationships 24</p> <p>Conversation Interactions with real people Teamwork Community Collaborations Mentorship in education</p> | |

Fig. 5 Interview results crossed with evaluation of online survey, author’s illustration, 2020

It is obvious that due to the rather low number of participants of both, the interviews and the online survey, we cannot speak of a representative study. However, the qualitative approach and examination of the data has unveiled five thematic clusters that have been brought up by nearly every participant. These clusters can be seen

as first evidence of areas that schools of art and design should address in order to become active participants and “shapers” of the context of today’s digital shift.

6 Discussion of Results

6.1 Inclusiveness and Social Responsibility

The first cluster proposes schools of arts and design as places that should promote and support inclusiveness and responsibility in the context of digital transformation. Most of the comments made in this array of topics relate to the observation that the phenomenon, which is called “digital transformation” only refers to a small part of the society compared to the global population. Therefore, a need for inclusive strategies emerges that could integrate communities and people that—so far—have been sideliners when it comes to the introduction and use of digital technologies. Participants of the study stated that if schools of arts and design want to actively shape the future of the digital, they need to take responsibility for an inclusive approach to the spread and access to digital technologies.

This includes the active participation and launch of a discussion about ethics of the digital and the digital transformation. It also includes participatory approaches and strategies of co-creation when designing our digital future. And first and foremost, it urges schools of arts and design to inform the global society about the multiple aspects of the digital shift—especially by identifying those factors that might have a major impact of our global and local communities.

6.2 The Future of Learning

The area of learning and its future appeared to be the second most discussed topic amongst both, interviewees and participants of the survey. Within this topic, mainly two observations or discussions emerged: the fact that education and learning as we know it today, is going to change and this change might be accelerated by digital technologies. Together with the fact that digital technologies are already being applied in learning (e.g. e-learning, blended learning) and these emerging forms need to be negotiated and shaped by schools of arts and design.

Covering the entire question of how our current approach towards learning and education need to be addressed by schools of arts and design would exceed this paper by far. However, the results of this qualitative study have shown that participants see an urgent demand for schools of arts and design to address questions about the needs of our future learners. And they see many of these needs being triggered or shaped by digital transformation (e.g. the diminishing half-life of knowledge and skills).

In this context, participants suggested that our future learners will confront schools with an increasing demand for lifelong learning approaches, trans-generational learning and learning that goes beyond institutional borders (Jewitt, 2008). The latter including experiential or immersive learning as well as transformative learning that focuses our learner's personal development. Summarized, participants predict a fundamental change regarding our institutions. A change that might question both, our current didactical approaches to learning and the way learning biographies get subdivided into gets multiple-year degrees, postgraduate courses or continuous education.

The second topic that emerged in the cluster of the future of learning is the one of the existing and future use of digital technologies in the area of learning and teaching. Participants of the study seem to agree that while some approaches of including digital technologies in learning might increase its efficiency (e.g. faster access to information speeds up learning), others might prevent learners to acquire skills and knowledge that are only receivable through analogue means. Furthermore, an exclusive focus on learning based upon digital means might also exclude learners that might not have access to suitable technologies. The resulting question is how arts and design schools could explore and establish new forms of learning that blend the digital with the analogue in a way that a) digital learning doesn't become a disadvantage for learners and b) connects to the physical and analogue world in an integrative way.

6.3 Politics of the Digital and Critical Thinking

The third amongst the most discussed areas of the interviews and survey spots the political dimension of the digital shift. Many participants emphasized the fact that most of the drivers of the digital transformation emerge from the tech economy and its actors. They also pointed out that they perceive a loss of trust towards most tech companies that do not know how to subdue their power when it comes to questions about internet security, privacy issues or the spread of untrusted information. Participants also mentioned that they consider the people behind the tech economy as "naive minds", who are not prepared to deal with the challenges that come when pushing digital technologies into the market and into society.

As a consequence, the participants of this study see schools of arts and design as entities that should actively participate in the negotiation of the politics of the digital and engage with policy making with regards to the development, spread and use of such technologies—a task that even starts by scrutinising the way universities themselves deal with these technologies (e.g. pre-recorded lessons that might lead to a future decrease in lecturer's hours/salary).

6.4 The Relationship Between Technology and Humans

In addition to the third topic about the politics of our digital transformation, participants identified an opportunity to participate in the active configuration and design of a healthy relationship between emerging technologies (e.g. artificial intelligence) and human beings. According to their feedbacks, especially, art and design schools should use their creative potential of exploring, prototyping and evaluating approaches that emancipate humans from the digital in a way that appreciates and celebrates the fact of “being human” in a future that might be dominated by artificial entities. This comes with responsibility, though, and has been pointed out by participants. A responsibility that ties back to the third area about the politics and policy making for the digital transformation. One observation and comment that stood out in that area was the remark that as artists or designers we should give digital technologies “a face” by re-thinking its appearance that, nowadays, in most cases is limited to what people would consume on the screens of their mobile devices.

6.5 Human Relationships

The fifth of the most discussed clusters focuses the importance of human relationships and the interaction between human beings. Pretty much all interviewees and participants of the survey underlined that even in a future dominated by digital technologies, they see a high demand for interaction with real people. This interaction may result in synchronous ways of collaboration and teamwork, face to face teaching or mentorship—all of these being strong elements in art and design education. Especially, when talking about teaching and learning, most participants did not believe in design and art education that would be entirely based upon the means of e-learning or remote teaching.

Perhaps, this focus of the study represents the most contradictory outcome with regards to the current situation at universities all across the world that emerged due to the CoViD-19 crisis. Together with other observations this will be discussed in the following section of this paper.

7 From Conventional to Remote Learning in 7 Days—A Case Study

The crisis caused by the corona disease caused nationwide lockdowns of universities in numerous countries around the world. Many of them had just few weeks or even days to transition from conventional ways of teaching and learning to distance learning and remote teaching. For most of the art and design schools this also meant to abandon their studios, workshops and labs that are so essential for craft-based

arts or some parts of design education. All in all, it led to a rapid increase of the use of digital technologies and e-learning platforms. From many points of view, this increase questions some results of the study discussed in this paper. Especially, the fifth emphasis on the importance of human interactions stands in contradiction to the current situation that most arts and design schools had to adapt to. Therefore, this section dives into a series of observations made during the first three weeks of distance learning at our own university in Lucerne, Switzerland.

On March 13th, the Swiss Federal Council decided to close down all schools and campuses. No forms of teaching that included the physical presence of both, learners and educators, were allowed anymore. Due to this severe restriction, our university based in Lucerne decided to stop all teaching activities (remote ones included), for seven days, in order to establish new strategies and frameworks for distance learning. During these days, all faculty and staff members were invited to re-configure their courses and—in some cases—entire study programs. In the following paragraphs, I would like to point out some of the most discussed and incisive effects of the lockdown that relate to the topic of digital transformation that have been discussed before:

- Rapid adaption of video conferencing tools
- Rise of asynchronous communication and peer learning
- Debriefing as part of the remote learning process
- Imitation of “analogue” formats and “analogue” ways of staying in touch
- Access to workshops and labs

7.1 Rapid Adaption of Video Conferencing Tools

Whereas before, applications for video conferencing have just been used sporadically, the fact that most faculty members and learners were constrained to work from home, pushed those tools to become the main instrument for synchronous communication. I know of many schools that struggled to identify the right application that might offer the best latitude of functions, which were required to cater the needs of different use cases such as e.g. call a colleague, conduct a team meeting, communicate with a large group of learners, subdivide a large group into smaller groups, etc.

Interestingly, most schools decided very briefly on a number of tools that were available at the time. Something that rarely has been reflected while taking this decision, was the fact that many of these tools perform very poorly when it comes to security or privacy issues. It became evident that the performance for the main functions of such a tool (e.g. making a group call, audio/video quality) became a much stronger argument versus security concerns.

In the context of this paper, this comes as a surprise, when we think back of the discussion about critique and politics of the digital that emerged amongst participants of the study. Finally, it shows in a very brief timeframe, what was happening before during a long period of time: all too often, for the benefit of efficiency, we tend to accept technologies and instruments that come with many shortfalls when it comes

about security, our privacy, the spread of trusted information or also the access to such technologies as e.g. broadband internet.

7.2 Rise of Synchronous Communication and Peer Learning

Even, if in many places the access to broadband internet is not an issue, anymore, the sudden demand for synchronous video-based communication and/or live streaming services led to bottlenecks during some times of the day. As a consequence, people—and especially people working in the educational sector—had to define strategies that combine synchronous with asynchronous communication. Again, this might contradict to some of the findings of the study discussed in this paper. For instance, the participant’s feedback on the importance of face to face communication and mentorship might appear as the exact opposite of asynchronous communication.

However, first experiences with distance learning at our own MA program in design have shown that the right combination of live communication and episodes of asynchronous communication between learners and educators might turn out as very beneficial if orchestrated the right way. As head of our MA program, I, therefore, elaborated a “Distance Learning Blueprint” (Fig. 6) that provided both, course leaders and students a pattern to prepare for their courses that suddenly had to happen remotely. The main aspect of this blueprint is the steady switch between synchronous ways of communicating together (e.g. a live video session with a course leader) and asynchronous ways of sharing exercises or other content, too (e.g. uploading a screencast or exercise to a sharing platform).

While E-learning, MOOCs (Massive Open Online Courses) or other forms of distance learning, all together are based of logic of the so-called *flipped classroom*, for us this was an entirely new experience. Until few weeks before the lockdown, most of our seminars and courses would happen while physically working together in our studio. Very rarely, screencasts or other forms of providing learning content online would be used throughout our curriculum.

One experience that stood out, however, was the massive increase of peer-learning. Initially, our blueprint (Fig. 7) had foreseen some episodes of learners communicating and learning amongst each other. After few days that we transitioned to

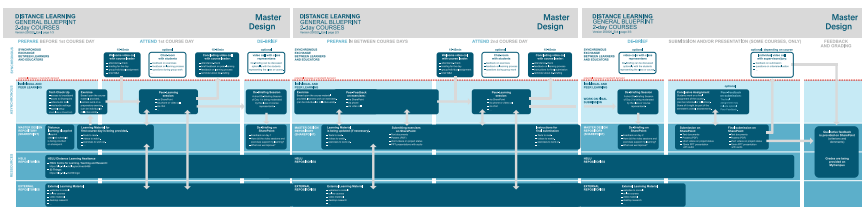


Fig. 6 Distance Learning Blueprint, author’s illustration, 2020

distance learning, it became evident that this form of learning appeared to be the most common and effective one: students started to communicate via group-chats, messaging applications or in break-out calls during the course days. This observation relates a lot to the second most mentioned topic of the participants of our study: the future of learning and its multifaceted ways of sharing and acquiring knowledge between learners and educators.

7.3 Debriefing

One of the most significant measures that we took during our switch to distance learning was the rigorous introduction of debriefing after each and every learning session. Students got provided spreadsheets on our file-sharing platform and have been invited to fill them out after each course day or evening. The sheet included three sections based upon three questions:

What have we learned, today?

Which experiences did we make with regards to distance learning?

Have there been any technical issues?

While the last two ones related a lot to the situation that we have found ourselves in, the first question closed a gap that we've been spotting for a long time in our MA program: reflecting and discussing the way we learn and our learning process progresses. Again, this relates a lot to the request risen by our study's participants to focus more and more on the topic of "learning how to learn". And suddenly, even while learning remotely, we found ourselves in the middle of this discussion.

7.4 Imitation of Analogue Formats and Analogue Ways of Staying in Touch

One of the topics that has been widely discussed amongst both interviewees and participants of the online survey, was finding the right balance between the digital and the analogue. While in our study this mostly related to the way we design and create (e.g. design of physical artefacts), in the situation caused by the CoViD-19 crisis, we explored a new dimension of the "analogue". As all of our colleagues and students had to work from home two needs emerged from the fact that most of our communication was now based upon video-calls and, therefore, also had to be planned and arranged beforehand. One is spontaneous and informal communication and the second is interacting with physical matter.

The first need led to a series of "coffee-meetings" that have been arranged amongst learners or educators: video calls without any specific topic but with a fixed point of time. This way people started to compensate what usually would happen if suddenly

bumping into each other on the corridor or during a real coffee break: informal communication.

The second was the fact, that as artists or designers, we mostly have a strong relationship to physical matter—building and creating with our hands is part of most of our fundamental training and hardly can be replaced by digital means. During our first three weeks of remote learning, a series of approaches to replace this loss emerged at our school of art and design: some teachers sent their students parcels that would contain a kit to do an exercise (e.g. design a lamp), others would send a set of cards to their colleagues to start a conversation about a topic represented on these cards.

Both examples show how much we are used to interact with physical matter as designers or artists. They also relate to our study’s finding that most participants see a big challenge in balancing the digital with the analogue—be it in design education or in our daily lives.

7.5 Access to Studios, Workshops and Labs

This last observation during the first weeks of lockdown at our School of Arts and Design relates to what appeared to be the main topic and issue to be discussed amongst our students and educators. Due to the lockdown, no one, except single faculty members had access to our studios and workshops. Amongst the many Emails and requests from our students the question of access to these facilities was by far the most important one. This, again, shows how tied up art and design education still is to physical space and creating physical evidence. With regards to the discussion and study about the role of art and design schools, this observation might indicate one thing: at last, Walther Gropius wasn’t that wrong when he wrote about hundred years ago:

The old schools of art were unable to produce this unity (of the art disciplines); how could they, since art cannot be taught. They must be merged once more with the workshop (Gropius 1919).

One question, however, remains: which are the future workshops of artists or designers? While for most conventional disciplines the wood-shop, metal-shop or 3D printing lab represent adequate physical platforms to work in the tension field between the digital and the analogue, for others such as e.g. Service or Policy Designers the workshop might need to extend to the real-life world: beyond institutional boundaries and beyond what we are used to call “the analogue or the digital”.

8 Conclusion and Final Remarks

This paper departed from the question how schools of art and design could actively take part in shaping the future of digital transformation. A qualitative study that has been conducted at Lucerne University of Applied Sciences and Arts unveiled five relevant areas that according to the participants should become starting points or even turning points for the future of design and art education.

Interestingly, the sudden move towards distance learning in universities that has been caused by the CoViD-19 crisis all across the world led to a push of digital tools and learning platforms that in most places had to be implemented in just a few days. Many observations made during this push relate to the study's findings such as the importance of critically examining the politics of the digital as well as actively taking part in this political discussion.

Furthermore, a lot of relationships between the human and the digital as well as between the analogue, physical and the digital had to be re-negotiated. In this context, it also became evident that despite the extension of arts and design into 3rd and 4th order dimensions, the physical matter and evidence still represents a vital and even fundamental part of our domain.

A central term that emerged at the end of this paper and its examination is the “workshop”. It relates to both, Gropius’ manifesto that stresses the workshop as central locus of the creative disciplines and Maldonado’s “extension” of the common workshop to the “real life lab” dealing with complex questions of society and technology—questions that involve multiple stakeholders within and beyond one single domain.

This last observation or remark emphasizes that what once used to constitute the Bauhaus or the Ulm School of Design, nowadays needs to extend to a collective that goes beyond the arts and design domain as well as beyond institutional borders. And yet, entities such as schools of art and design might need to maintain their character of a “laboratory” as part of their independent and pioneering role in society by providing lively counterparts to the huge “real world lab” that we encounter all around us.

Acknowledgements I would like to thank to all participants of both, the interviews as well as the online survey conducted in December 2019. Furthermore, I thank all my colleagues and faculty members that made it possible to shift from conventional to remote teaching in just a few days after the announcement of the nationwide lockdown of the universities in our country.

Declaration of Interests Jan Eckert is head of the MA Programmes in Design at Lucerne University of Applied Sciences and Arts, Switzerland.






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The Potential of Narrative Devices in a Video Promoting the Use of an Ambarscience Didactic Toy in Classrooms



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Abstract This research aimed to study and develop an advertising video to promote the placement of an ambarscience didactic toy in the Primary School classroom context, as complement to the teaching process, as this is something, according to our study, unprecedented in this type of toys. We aimed to understand the relevance of using nonlinear narrative structure in this type of videos and how the used of flashback and flashforward narrative devices would help in enlightening the learning potential of the toy.

For Albino (Albino 2013) babies since birth are highly predisposed to learn and their brain naturally absorbs all the information of new life, this is not optional, it is a human condition. According to the same author, since children are born they are constantly absorbing information and learning, it is up to adults to promote their learning and the development of many of their abilities. Didactic and educational toys are a good support in this training, helping them to develop all their skills in the development of imagination, memory, concentration and visual perception.

In this paper, after an introduction to the contextual and theoretical framework, we briefly present the empirical methodology adopted in the practical project, which involved all the fieldwork developed in the toys company, the enquiries for selecting the product to study and promote, the different video creative and production stages; and the test and analyzes of reactions to the video prototype.

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Keywords Advertising video · Flashback and flashforward · Nonlinear narrative · Digital design · Didactic toys

1 Introduction

Children seem to have a tendency towards natural curiosity and for discovering the world around them. Parents, teachers and educators in general often feel the need to provide the youngest with learning experiences in a playful way, in order to stimulate their creativity and imagination and enable them to acquire the essential skills to face the 21st century world's challenges. In this sense, in 2017, the ambarscience brand and a new line of didactic toys was born within the already recognized Ambar Group (Baptista 2018). These products are centered in the intersection between Science, Technology, Engineering, Mathematics, a widely discussed and studied subject namely in the education and science studies research areas. However, our project is focused on how digital video production—combining narrative design, live action video, compositing techniques and motion graphics—can promote and help ambarscience didactic toys reach the classroom context.

“Children, when playing, are in the dimension of dream and fantasy” (Freud 1973). This is the main motto of our project, as well as ambarscience mission, according to which, whenever children are playing, they can also be learning and evolving the different thinking abilities (see Fig. 1). Therefore, the main objective of our project was to realize the most effective type of audiovisual digital narrative to be used in the dissemination of ambarscience products for their adoption in classroom, as a complement to the learning process.

The brand ambarscience was launched with 46 different products, one year later it has already 68 (Ambar 2018). With this diversity and growth, the need to advertise the toys and reach the target audience for whom they are intended—the children—arises. In this project we have considered that a good use of these products would



Fig. 1 Ambarscience advertisement example

be in the school context, particularly in the classroom. Therefore, despite the direct target of these toys are the children who will be playing with them, we had to focus our project in potential stakeholders that will ultimately responsible for putting these toys in the classrooms: teachers, educators and school principals; and also the parents and grandparents who will be responsible for the children and even give continuity to the learning process at home.

There were several work stages that played an important role in this project: the interaction with our target; the fieldwork in the company in order to understand the features and functionalities of each different toy model; and the in-depth study of contemporary audio-visual narrative structures, production techniques and tools. That being said, as fundamental for the understanding of the problem, two research questions were formulated:

- How can audio-visual communication contribute to the process of dissemination, adoption and use of educational toys, such as the ones from ambarscience brand, in learning processes in a school context?
- What type of audio-visual narrative and techniques are the most effective in convincing the target audience?

2 Theoretical Framework

A theoretical research was developed, based on literature review, exploring the area of Advertising and Video narrative devices. Relevant authors and concepts related to the project theme were identified and studied.

2.1 *Advertising as a Crucial Tool in Selling Products*

According to Oliveira (Oliveira 2016), the videos have the power to create emotional connections between people. Everything that goes through our mind has, in fact, a form similar to a video. According to the same author, thanks to the evolution of digital technologies, in recent years video production has transcended movie studios and become one of the most popular forms of communication. Adding to this, “advertising is an important and fundamental means for promoting products, services or brands of any company. A good advertising campaign can make a big difference in the promotion and launch of new products or services and also in the maximization of profits that are obtained through its use” (Studiobox 2015).

For Casarotto (Casarotto 2019), Advertising “is an area of knowledge, within the Social Communication, which studies not only the technique of the activity, but also its function in social and cultural relationships”, in such a way that it is omnipresent and plays an active role in our daily lives. According to Nogueira (Nogueira 2014), human behavior, in general, is influenced and modified by numerous forms of advertising, whether simple or complex. According to Classic Behaviorism (Watson 1913)

human behavior is conditioned through a stimulus that, after it, will be given an answer; such answer can be analyzed as the completion of the consumer's purchase. For example, when we see advertising for a very fresh soda, do we feel a desire for drinking? If the answer is yes, our desire has outstripped our need, so our behavior has been influenced by some image inserted in the context of the advertising campaign, in which the product is directly linked to our desires and emotions. This means that our brain is bombarded every second with information, but we must adjust the behavior to our own needs.

Therefore, in one hand, if advertising encourages consumerism, influences behavior or invades people's routine, one can say the impact of its power of persuasion is at the very least controversial. On the other hand, it can also fulfil the function of informing or entertaining with creativity. As target audience we have to choose the "side of the coin", being aware that it's not the advertising that forces us to do something, it rather encourages us, leaving the final decision to us.

According to Saba (Saba 2014), "advertising is not just a commercial technique which aims, through its mechanical or suggestive incitements, at making us purchase a certain product". It is also a socio-cultural outcome, and this close relationship with society makes advertising a reflection of contemporary culture, being a dynamic factor of evolution through its suggestive strategy. "Advertising creates predispositions to consumption" (Sant'anna 2005).

The production of certain products leads to their consumption/use by people. If this is a mass production, it is assumed that it will lead to mass consumption/use. However, for this to happen, companies and brands use psychological persuasive techniques and means of dissemination to try to convince the largest number of consumers. "Advertising is therefore the means by which the advertiser is allowed to get into the consumer's head to prove and establish the brand's position, conveying its message and awakening the need for consumption" (Costa and Mendes 2012). It is at this level that the design, dissemination and expansion of a brand (Martins et al. 2021) is located, in specific environments, safeguarding a psychological persuasion in the consumer, which can be for instance through an audiovisual medium that will encourage him to purchase the products.

2.2 Video as a Digital Advertising Medium

It is important to know that Video is a system for recording and reproducing images, which can be complemented with sounds, and that it is recorded on a magnetic tape (in the case of analog video) or, currently and mostly, on digital storage media (in the case of digital video). Meanwhile, the term has gained a wide scope, and now, in short, in the context of visual production, almost everything that is not static could be called video.

The increasing diversity of digital advertising, including the variety of existing videos, has transformed the way brands and consumers are connected (Brandão et al. 2012). In this digital setting, Video has in fact been gaining an extraordinary relevance in the context of advertising campaigns.

“Previously, companies were limited to offline media, such as flyers, greeting cards, billboards, and—for those who had more money—TV, radio, and newspaper advertisements. Today, however, the internet opens the advertising doors for any company to find its audience, promote its brand and do more business online. Banners, sponsored links, social networks, Email Marketing, there is an infinity of channels and formats to benefit from” (Casarotto 2018).

The first thing we should know when we start an audiovisual content project is that there is no magic formula for success, however, we believe that if we can follow the 10 rules structured by General (General 2016), we can achieve good results. In general, these 10 rules represent the various phases of audio-visual production. For instance, segmenting audiences, choosing the type of video and structuring the script, can be framed in the Pre-production phase, because although you don't see this work clearly in the final piece, if you do it well, it will be crucial in the quality and success of the video. In the editing process, the selection of the footage, the technical creativity and the ability to capture the viewer attention in the first few seconds, so that he keeps watching it until the end, is also fundamental. Finally, after finishing the video, it is also important to promote it carefully and chose the appropriate CTAs,¹ video miniatures to be used online, the best keywords for an accurate SEO² and in general for its fast and successful dissemination within the most efficient means.

According to Mateos (Mateos 2018) for some time now, video ads have appeared in the online advertising scene. The growth in recent years is exponential, on the one hand, due to the improvement in the quality of the Internet connection, and on the other hand, due to the higher average consumption of data per user.

In the audiovisual media, according to Ferreira (Ferreira 2017) there are two types of advertising: the Commercial, which is the one that surrounds us the most and encourages us directly to buy, and the Institutional, which is intended primarily to alert consumers to certain aspects of life in society. In the case of Commercial Advertising, the consumer is convinced to purchase a certain product or service, such as a car, a trip, a show, etc. In the case of Institutional Advertising, consumers are alerted to the prevention and implementation of rules of life, such as a solidarity campaign, road prevention, etc. In the opinion of the same author, the type of language and visual aspects are different in these two types of advertising and should be considered in the production of an advertising video.

In the case of ambarscience, the videos will have characteristics of Commercial Advertising, because although they can convey messages related to the added value that these toys have, they will always intent to sell them. Therefore, the most important considerations that the author highlights are: the language and content has to be

¹Anacronym for Call To Attention, a marketing term that refers to what instructions we want to give to our audience.

²Anacronym for Search Engine Optimization.

adapted to the context, situation and type of audience; and an attractive visual aspect has to be also organized and direct in order to highlight the qualities of the product or brand.

2.3 *The Use of Narrative Devices in Video*

According to Camolli and Narboni (cited in Silva et al. 2017, p. 193) it is fundamental to focus our thinking on cinema, in which “the ‘story’ often refers to what the film deals with and ‘narrative discourse’ corresponds to the way the film tells the story”. When the chronological time of the events is different from the order in which they are presented, it is said that there is an Anachronism, a chronological inconsistency, which may occur through 3 types of narrative devices:

- Analepsis: back in time (flashback);
- Prolepsis: anticipation of events (flashforward);
- Ellipsis: time jump, omission of events.

Based on the work of Gerard Genette, narratologists have been studying the relations between the story and the narrative discourse, which may be distinguished not only in terms of the order in which the events are narrated, but also in terms of their duration (the time of the narrative is usually shorter than the time of the story), in terms of their frequency (how many times an event occurs in the story and how many times it is narrated), and in terms of the way or the point of view from which events are narrated (Catharino 2009). These four aspects when combined may create powerful moments of surprise. They constitute the very nature of this narrative model and are one of the main reasons why it is well accepted by audiences.

Another different form of approach in cinema are non-linear narratives, which reflect the way we experience thought, memory and imagination, as a more fragmented configuration. According to Bordwell, “a non-linear ordering presupposes a series of temporal and causal gaps, which suppress information and apprehend questions whose answers are purposefully suspended until the climax of the film or after that” [cited in Silva et al. 2017, p. 199].

According to Catharino (Catharino 2009), “the order relationship consists of the differences between the development of the narrative and the story, touching on the question of linear sequence in opposition to the non-linear one. The narrative can respect the normal sequence of the supposed ‘real’ events, proceeding from the beginning to the middle and end, or it can even shuffle this sequence”.

Our video was thus built on Anachronism, where the temporal jumps portray the different moments in the character’s life. Moreover, the need to go back in time to find the explanations of the events that took place, is another fundamental focus in the construction of the whole narrative.

3 The Project

Ambarscience’s products are developed in order to address programmatic contents of the various educational age groups. At this moment there is still no direct insertion of their educational toys in the school context. Therefore, and with the support of theoretical research, the idea of developing an advertising video for promoting the connection between the toys and the Classroom emerged.

3.1 Preparatory Work

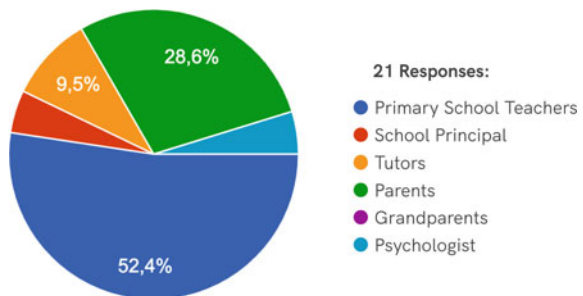
After a first phase of recognition of the case study, with long hours of field work and company analysis—from conversations with employees to the usual SWOT analysis—, as well as the study of examples of other competing brands of educational toys, we proceeded to a questionnaire. This questionnaire was presented to people directly or indirectly involved with children of the educational level to which the selected ambarscience products are focused: the Primary School (6 to 10 years old).

The issues to be addressed in the first part of the questionnaire were organised in order to understand the relevance of the project, in particular by collecting opinions on the role that educational toys may have in a child’s learning path, the viability of including them in a classroom context and ideas on how this could be achieved. The second part of the questionnaire aimed at understanding which category of toy would have the greatest potential in helping learning in the classroom and which toy our project could start with.

With a sample defined by convenience, we obtained 21 answers from people in the school context—teachers, tutors and principals—, a Psychologist and others who typically follow the children’s teaching path at home—parents and grandparents (see Fig. 2).

Although the set of respondents is very small, and therefore not representative of the potential universe to be surveyed, i.e., the answers may not reflect the generality, the results indicated clues that we considered relevant for guiding our project.

Fig. 2 Demographics of the initial questionnaire



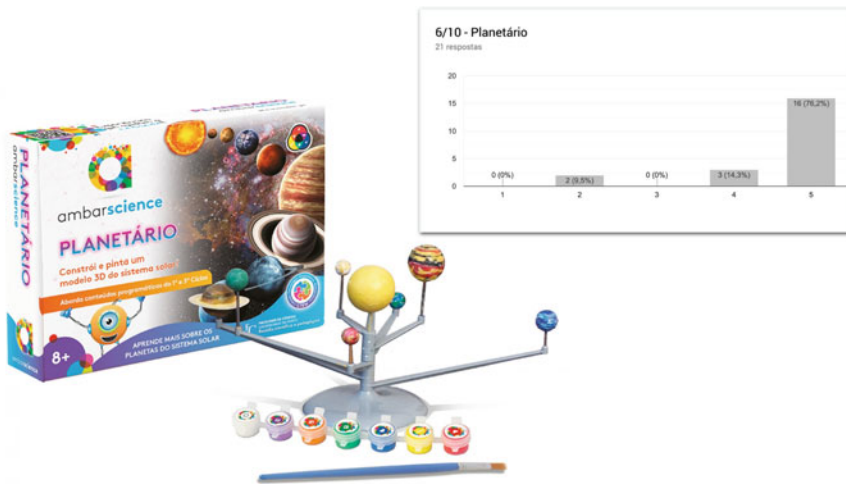


Fig. 3 Ambarscience Planetarium and the Graphic Table showing its votes

In fact, the teachers seemed to be interested in the use of this type of didactic toys in their classroom and the “planetarium” was the most voted toy and thus chosen to be promoted with our project (see Fig. 3).

3.2 *The Planetarium*

Based on the questionnaire made to people directly involved with Primary School children, we defined that the practical project should make an advertising video to the ambarscience’s toy called Planetarium.

It was then necessary to study every component of the product in detail. This helped us in understanding its benefits, and aware that this is not a simple toy. The position of each planet, their different colors and so many other details that with the help of the assembly manual aimed at promoting the understanding of the Solar System subject, usually addressed in Primary School classes. To say: “did you know that the Sun has yellow and orange tones”, is different from saying: “this sphere that you have in your hand represents the Sun, let’s paint it to represent fire”. We believe that with this toy children will be more engaged with a “learning by doing” process.

“The possibility of bringing the game into the school is a possibility to think education in a creative, autonomous and conscious perspective. Through play, not only does it open a door to the social world and to children’s culture, but it also finds a rich possibility to encourage their development” (Friedmann 1996, p. 56).

Nevertheless, a difficulty emerged: how could we do an advertising video of something that is not within our reach, such as representing planets, filming space, getting an Astronaut or even a Rocket? All of this was almost unthinkable, because

they're pieces that do not exist in our daily lives. This was the main difficulty that forced us to find ways to show what we do not need to see so that the viewer understands what we are talking about, using an Ellipsis, a narrative device.

Thus the basic idea for the advertising video was formed: a toy that, indirectly, provoked something in a child's future. With this, nothing better than to associate to a Primary School, where a boy played with the Planetarium and learned something from it that later made him become an Astronaut.

3.3 Pre-production

An extensive pre-production work was developed in order to filter and consolidate the ideas and creative concepts and deepen all the narrative details. This was then organize in a Dossier that would guide all people involved in the production of the video.

The video message was that a didactic toy is a good complement in the children's education. Thus, the narrative would take place in two different moments: in the classroom with children playing with the Planetarium toy and, later, an adult who recalls that moment after many years.

The Story

“The success of a child who becomes an astronaut, derived from the incentive that one day, a simple toy about planets, caused him.” This storyline contains the main ingredients of the story: the “child” and the “toy”. The plot is that the main character, the child, one day played with something that influenced his path and his future, whose success is mainly due to the toy. The “success” here is objective, being related to the complexity and demand of the astronaut career that is compared to the diametrically opposite simplicity that a toy can have.

After defining the storyline, we also developed a brief synopsis in order to present a summary of the story that would be told, in a non-linear way, in the commercial video:

“A kid during a class at Primary School had contact with a toy called Planetarium that encourages children to build the Solar System, painting each of the planets and perceiving their position in space. This contact with the toy awakened in him the interest for Astronomy, and eventually he became an Astronaut.

The boy's name is Marcus Pontes, today he is 80 years old and decides to go to the attic to see his Primary School Course Book and write there the event that marked him 50 years ago, the return of his trip to Mars.

The video tries to convey the success that a contact with a simple toy can provoke in a children's future, appearing at the end the brand that is indirectly responsible for the event ‘ambarscience—experiences that help to grow’”.

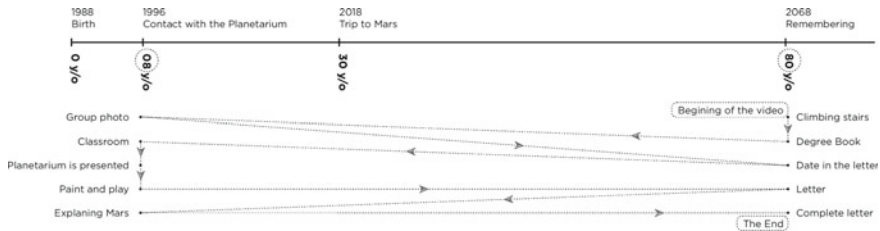


Fig. 4 Narrative diagram

The Plot

While history presents events in a chronological order, the plot is the way we have chosen to tell those events, which does not necessarily have to follow their chronological order. In this way, we know that a story can be told in countless ways. While in a story we ask “what comes next?”, in a plot we ask, “why?”.

In the case of our video, we intended to create a non-linear structure where the scenes of the character’s life as a child are alternated with the moments when he is already an adult. A scheme was then developed to help understand the way the viewer will understand the story while watching the video (see Fig. 4).

The scenes were filmed in two different locations and times, alternating between past and future. To facilitate the acting work, the script was developed in a very detailed way, including the description of the characters and what they have to do, the characteristics of the places or elements present in the scene; what happens and how it happens; and what the characters have to say or do.

After the literary script, a shooting script was also developed, providing on a grid all the necessary information for recording each shot, such as shooting day and place, scene and shot numbers, shot type, camera angle, camera movement, lighting, shot description and audio information.

Finally, a storyboard was also developed to visually test the script, namely framing, composition and shot types, as well as eventual camera movements, allowing a better control of continuity aspects.

In the pre-production dossier, all other elements that would be part of the video production were also referenced in a section called Extras, listing Places and Type of Characters, Props and Costumes, Production Equipment and a Calendar. These were all fundamental points for an effective production.

3.4 Production

The rigorous Pre-Production Dossier should have made the following phase, the production, easier. In this case, as in many others, the film shooting did not follow the chronological order of the events, nor the order by which those events would be presented. Rather, due to low-budget, the shooting had to follow an order based on the

availability of human resources (actors and people involved in technical support), logistics (availability of recording places) and the access to equipment (cameras, tripods, audio recorders and microphones, lighting kits and accessories).

The characters needed for the production would be between six and eight children, with approximately 10 years old, who would represent the students in the classroom, a young teacher and a gentleman around 80 years old. In the casting process, as the budget did not allow to work with payed actors, a teacher was cautiously chosen to play the role of the teacher's character, enabling a more natural acting. Also, a boy and an elder gentleman with facial similarities were carefully chosen to play the role of the main character in the different moments in time. Costume Design was also fundamental. Colors, patterns and props were chosen to locate the action in the future.

In case the project would be implemented or disseminated in any advertising medium, authorizations duly signed by the children's parents were required, complying with the General Regulation Law for Data Protection, operating since May 25, 2018.

After a *réperage* process, two different scenarios were chosen for their architectural and interior design features to represent the primary school in 1996 and the astronaut's house in 2068 (Fig. 5).

For a fully functional audiovisual narrative, particularly with regard to aspects of continuity, it is essential to ensure that a great attention is paid to all details. Several technical aspects were then very relevant in the final narrative, as an example:

- The main character's name is "Marcus", inspired by Marcus Cesar Pontes (Brazil, 1963), the first Portuguese-speaking astronaut to go into space in 2006, aboard the Soyuz TMA-8/ISS;
- The child who represents Marcus is the one who stands out the most, even by his size, to emphasize his abilities and above average intelligence, which made him later become an Astronaut (Fig. 6);
- The main characters have a mole on their right hand, which you can see when he paints the Planetarium as a child and when he write the letter as an adult. This mole is the element that connects the two characters;

Fig. 5 Recording places





Fig. 6 Marcus pontes and the characters representing him

- The dates do not come by chance, knowing that 2018 was the time when Mars was closest to earth (Observatório Astronómico de Lisboa 2018) and that July 31 of that year it would be 57.6/Million km, which is the starting point of the whole narrative. Approximately after 5 months of travel,³ in December 2018, he would be returning from this great achievement, at the age of 30;
- The dates presented in the video help to contextualize it. “June 2, 1996” appears in the classroom white board when he was in his 4th year of Primary School and he writes “December 31, 2068” in a letter when he is 80 years old, mentioning that 50 years have passed after the most important moment of his life;
- We may see the astronaut’s helmet on the desk where he writes the letter and the spacesuit in the background.

The logistics were not easy. From preparing all the recording gear, depending on whether the recording places were exterior or interior, to interacting with the children and repeat the same scenes 4, 5 or 6 times, or even collecting new shots from different points of view, in case some of them did not work. Everything was considered at maximum detail, always supported by the Pre-production Dossier, so that, when editing, it would not be necessary to repeat the recording of any scene.

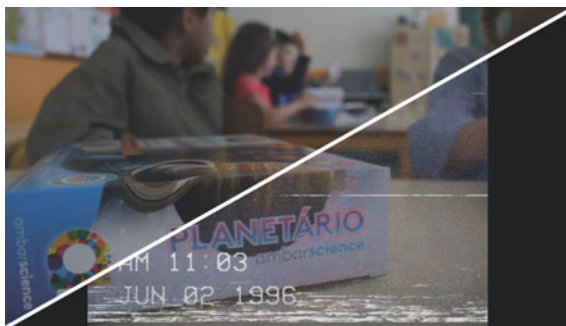
3.5 *Post-production*

After finishing the whole process of capturing images and sound, all footage was organized to facilitate the editing process.

Transitions like Cross Dissolve and Dip to Black were prudently used to mark the moments when there should not be any temporal continuity, namely when there were anachronisms. The main particularity of the narrative is the alternation between 2068 and his memories of playing with the Planetarium in the classroom. In order for these passages to work in a time span of approximately 70 years, the visual languages had to be very different.

³Calculation based on the news available at: <https://pplware.sapo.pt/ciencia/base-marte-elon-musk-2028/>, last accessed 2018/07.

Fig. 7 Solution for representing past time



To represent the past, all the images with children were edited to portray the year 1996, when almost every homemade video was recorded on magnetic tape (VHS,⁴ Hi8⁵). For that, a set of effects was used in order to simulate low resolution and high noise, analog glitch, contrast reduction, 4:3 ratios, the word “PLAY”, and the recording date/time which besides being elements typically present in home videos recorded at that time, also help the viewer to place the events in time (Fig. 7).

To represent the future, managing the effects was a more complex task, as guessing the visual aesthetics in 50 years from now would be very speculative. Even so, we decided to start from the idea that the aesthetics will be guided by the simplicity of scenarios and cinematography. We thus color graded the final image with a bluer and faded tone (Fig. 8).

For the moment the 80-year-old character picks up the yearbook, we wanted to make a transition from photography to video as if the viewer would enter a time portal. This was perhaps the most difficult technical task. To do this, we combined a Chroma Key technique with Motion Tracking and Freeze Frame, always chasing for the most realistic final result (Fig. 9).

Fig. 8 Color correction representing future time



⁴Video Home System is the commercial standard for consumers of analogue videotape recording, developed by JVC in 1950.

⁵Video format created by Sony in 1985 to compete in the film market with VHS.



Fig. 9 Chroma key technique

At the end of the video, on a clean background a brief pack shot was created with a slogan and a small animation in the “a” of the amberscience logo, representing the gentle movements of the test tube bubbles of a “creative science”.

After editing the visual component, it was necessary to edit the sounds that would go with it, both the diegetic and non-diegetic voices, as well as the Foley, which contributed to the credibility of the whole narrative. All the sounds were edited and tuned, balancing intensely and correcting noise problems and background echoes. The sound track was chosen to reinforce a certain melancholy in the beginning, for capturing the attention of the viewer. A more intense rhythm arises at the time of interaction with the toy. All sound has been edited to establish a relationship with the visual component of the video.

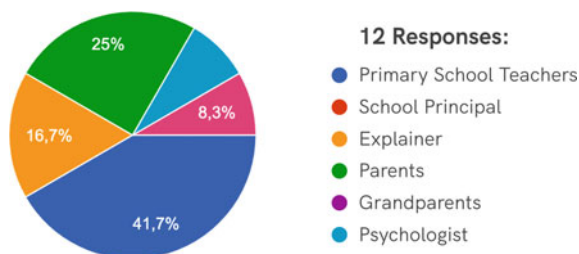
4 Analysis of Reactions to the Prototype

In order to gather viewers feedback, the first video prototype⁶ was presented to the same people who were involved in the initial questionnaire. This restricted group was chosen because they were already familiar with the project, understand its purpose, and, as previously stated they were directly associated with Primary School children.

The initial idea would be to organize a Focus group experience, by bringing this group together and, after presenting the video prototype, create an informal moment of reaction analysis. However, as the group was very diverse, it was very difficult to reconcile everyone’s availability. As a solution, an online questionnaire was developed, and even so, only after some insistence, 12 answers were obtained,

⁶The first prototype of the video can be viewed online at: <https://youtu.be/yVlqm-Myo4M>.

Fig. 10 Demographics of the second questionnaire



out of the 23 people involved in the initial questionnaire, of which eight were teachers and tutors (Fig. 10).

Regarding the video presented at the beginning of the questionnaire, the respondents stressed out the importance of toys in children's activities and seven of them understood the main video message. The other five needed to see the video again to understand certain details that went unnoticed in a first glimpse, such as the mole in the hand of our character. The respondents also identified the analog video effects, the different dates and the yearbook, or even the clothes and the helmet, as relevant details that went unnoticed when watching a first time.

Finally, in order to gather constructive criticism from respondents, they were asked to list aspects to be improved. Although laconic answers were expected, quite the opposite happened. Respondents presented several aspects that deserved careful analysis in order to be included in the final result. In particular, they stressed that music should be better known and not so nostalgic, which, after consideration, we decided not to change, as the nostalgia that music conveys at the beginning of the video is intended to create an atmosphere of remembering that would draw the spectator's attention. Also the choice of a better known music would entail high costs related to royalties of use and broadcast. However, some of the remaining highlighted details, were analyzed, improved and fixed.

In general, the respondents' opinions were very satisfactory, which seems to be synonymous with the fact that the main message that educational toys help children's development and can be relevant complements in the classroom is being conveyed in our advertising video.

5 Conclusions

The final result of this project is an advertising video for an ambarscience toy,⁷ where the added value it can have in children's education when inserted in a classroom context is transmitted. The project began with a phase of field work in the company, which allowed a perception of reality. Then an introductory questionnaire was implemented to people involved with Primary School children, to understand

⁷The final result is available online at: <https://youtu.be/b9Pxyj9Oylk>.

which toy is the best to advertise in our project. After choosing the toy, the practical project was conducted dividing the work into the pre-production, production and post-production stages. At the end, and following a n iterative methodology, a new questionnaire was developed to present the video prototype and collect reactions, criticisms and suggestions for its improvement.

The main objective of this project was to realize the most effective type of audio-visual digital narrative in the dissemination of ambarscience products for their adoption in classroom, as a complement to the learning process. A commercial video was produced with a message demonstrating the potential one of these toys can have in the future of a child.

With this project we believe that audiovisual communication can help in the dissemination and adoption of educational toys from ambarscience, namely through advertising videos loaded with emotional narratives based on fictional stories of effect and success. Moreover, in order to capture the audience's attention in the first seconds of a video and keep them curious until its final outcome, we believe it is necessary to invest in dynamic and complex narrative structures and techniques, typically used in film production, such as anachronism or even the popular Plot Twist.

In a final analysis, we point out that there were very fruitful moments related to the process and working methodology, namely, the work in close partnership with ambarscience in its own facilities, the implemented questionnaires and the Pre-production Dossier, being this the most relevant piece of the whole video production process. We have indeed experienced the importance of pre-production work, the first work phase in an audio-visual production to which many creators have been dedicating less and less time, probably due to the time span that have been gradually shortened by clients in a time of almost instantaneous digital content production and consumption ecosystem.

In a future phase, we will need to analyse and test other narrative structures in advertising videos (e.g. transmedia storytelling); create of a methodological plan for the production of more videos promoting the inclusion of other ambarscience educational toys in the classroom context; and develop a strategic communication plan to disseminate these videos to their target audience (e.g. social networks).

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Connection of Dynamic Temporal Continuities in Videogames



João P. Ribeiro, Miguel Carvalhais, and Pedro Cardoso

Abstract This research examines temporal continuities in videogames—the passing of time regardless of player action—and players’ understanding of it, taking into account videogame and media theory. It presents a chronology of schools of thought and an analysis of the application of the theory to two case studies, to determine the motives behind players’ actions over time.

Subjects played two videogames of different genres, and an analysis of mixed nature revealed a lack of consensus about who is in control of the passing of time in the narrative of videogames.

Results demonstrate the ambiguity in the awareness of the passing of time, showing that: (1) players distinguish narrative time and story time; (2) time can be studied through dynamic problems presented to players; (3) narrative cycles inform scene segmentation. The study corroborates previous hypotheses about the resolving of conflicts bringing an end to the narrative, thus also to the temporal continuity. Data shows evidence of the possibility of analysing time in videogames through some of the theories and frameworks tested.

Keywords Videogames · Temporal continuity · Narrative · Story · Action

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1 Time in Narrative Media and Videogames

1.1 Time in Narrative Media

G rard Genette (1980) discussed the concept of *time of the narrative*, which had long been a subject of discussion and confrontation in literary works. He agrees that comparisons between the temporal plane of the story (where the narrator is, concerning time) with the spatial plane of the text (the spatial location of the narrator in the story) are valid and pertinent. At the same time, we cannot match the duration of a narrative to that of the story, since people cannot assess the length of the narrative (Genette 1980, p. 86). The story is the unshaped content and contains events, characters and settings (Toolan 2012, p. 15). Narrative is “a sequence of logically and chronologically related events, bound together by a recurrent focus (...) on one or more individuals (...) in whom the reader becomes interested” (Toolan 2012, p. 8). The duration of a narrative is simply the time that one needs for reading. However, reading time will vary according to various factors (Genette 1980, p. 86). Due to this temporal dichotomy, Genette proposes the distinction between *erz hlte Zeit* (story time) and *Erz hlzeit* (narrative time, or pacing) (p. 33), as proposed by G nther M ller (1948).

Besides dealing both with the time of the story and the narrative, narrative media are also spatial—spatial and story advancements of time are linked together and cannot be disjointed. Space is existent only once when we consider variables of direction, velocity, and time (de Certeau 1984, p. 116–87). Space is feasible location that has its moving components collapse the foundations of its surroundings by path and speed, and is specific to a medium (Read 2003, p. 138). Barbara Tversky agrees with this dichotomy between space and narrative, arguing that things like protestations, games, speeches and campaign remarks, twist, like poetry, between the terrestrial and the celestial, the rational and the subjective. Narratives become parables with messages: they twist psychologically. They are speed shifting. This is also what narratives offer. Music, for example, is linear in time but spatial through instrumentation. The instruments might be out at different periods and play different sounds at different paces and areas. Paintings also have a structure, not linear, but central and peripheral (Tversky 2019).

Seymour Chatman introduces the idea of the class of text-types in spatial and temporal media. Text is “any communication that temporally controls its reception by the audience” (Chatman 1990, p. 7),—as in media which has set times for interaction or exposition, like films which are not interactive and have set running times. Non-text communication can include e.g. photographs because typically their audience decides how much time will be spent looking at and analysing them, thus controlling exposition time. Chatman makes a distinction between texts and other communicative objects, like non-narrative paintings and sculptures, arguing that the latter do not control the time-space continuum in the public’s awareness (Chatman 1990, p. 7). While we do need time to look and regard artefacts like pictures and sculptures, that time is not controlled by the artefact itself. Non-narrative artefacts like paintings

present themselves altogether, and we need to examine and read them in a manner which must be decided by ourselves. Text-types ask us to *embark* on the journey on the beginning that the artefact chooses and to obey its *temporal unfolding* until the end it chooses as well (Chatman 1990, p. 7). Chatman marks the difference between the three basic text-types as:

1. *Narrative*: has a rich structure separate from its medium. The deep structure comprises story components expressed to the public through various forms of representation.
2. *Description*: makes observable or conceivable the properties of objects.
3. *Argument*: aims to persuade its recipient of the legitimacy of a proposition (Chatman, 1990, p. 6).

An internal temporal order defines *narrative*, termed *chrono-logic*, while *Description* and *Argument* are atemporal (Chatman 1990, p. 9). Due to their complexity, videogames employ *Narrative* text-types, but they also resort to *Description* and *Argument* text-types. While Chatman's taxonomy is essential, it does not allow us to evaluate temporal continuity in videogames—that is, the passing of time in a videogame, regardless of player action. One of our hypotheses is that *segmentation*—how a videogame is split into different and smaller components—might provide us with a framework to advance our knowledge. To this purpose, we studied Edward Branigan's proposal for a narrative schema in film.

Branigan's proposal consists of an outline of the core elements of a narrative schema, laid out like a hexagon. He suggests that a narrative can be constructed and deconstructed “by moving through the hexagon to create patterns at the levels of action, scene, episode, sequence, etc.” (Branigan 1992, p. 17). The outline comprises eight components which can be replicated in numerous patterns to improve our understanding of the story. We can move across the hexagon-shaped schema in multiple ways and as often as we want. The components of the schema are:¹

1. *Abstract*: “a title or compact summary of the situation which is to follow.”
2. *Orientation and Exposition*: orientation is a report on “the present state of affairs” while “an exposition gives information about past events which bear on the present.”
3. *Initiating Event (or New Line of Action)*: changes the present state of affairs. “A narrative which delays orientation and exposition and begins with an initiating event (...) is said to begin in medias res.”²
4. *(New) Goal*: “a statement of intention or an emotional response to an initiating event by a protagonist.”
5. *Complicating Action*: “arises as a consequence of the initiating event and presents an obstacle to the attainment of the goal.”

¹In the original text, Branigan establishes a different terminology between the figure and the body of the text, hence the differences between the listed components and Fig. 1.

²In medias res: “a Latin expression that refers to a story, or the action of a play, etc. starting without any introduction” (Cambridge dictionary online, 2020).

6. *Climax and Resolution*: “end the conflict between goals and obstacles and establish a new equilibrium or state of affairs.”
7. *Epilogue*: “the moral lesson implicit in the history of these events”.
8. *Narration*: “constantly at work seeking to justify implicitly or explicitly (...) why the narrator is competent and (...) why the events are unusual” (Branigan 1992, p. 18).

We believe this schema can be applied to videogames. We will use *Pokémon Gold Version* (Game Freak 1999) as an example:

1. The game’s title screen serves as the *Abstract*.³
2. An introduction to the game’s setting and the first player choices is given by a non-player character (NPC)⁴—Professor Elm—acting as *Orientation and Exposition*.
3. Another NPC steals one of Elm’s *Pokémon*, fulfilling the function of *Initiating Event*.
4. As a response, Elm encourages the player to journey across the game world—this a (*New*) *Goal*.
5. Because of the *Initiating Event*, the player will find many *Complicating Actions*, such as the various NPCs that they have to defeat and puzzles they need to solve to reach those NPCs.
6. The *Climax and Resolution* is the Pokémon league, a top-level tournament in the game.
7. After this, the credits roll, but the player will have the chance to return to most of previous locations and NPCs as well as new ones. These post-game events represent the *Epilogue*.
8. Combining all the previous elements is the *Narration* which connects all characters, locations and plot points. At any given time, the player can return to previous points and talk to past-met NPCs, effectively navigating through the narrative schema.

Douglas (1994) debates the process to find the ending in interactive fiction (Douglas 1994, p. 159). She concludes that we recall our understanding of common structures in narrative form, whenever an expected structure breaks. She claims the outcome of narrative closure is fulfilled when we are successful in resolving narrative friction, minimizing ambiguities, clarifying conundrums and incorporating the most significant number of narrative components into a logical question (Douglas 1994, p. 185).

Referring to hypertext as a narrative medium, Terence Harpold agrees with Douglas. He states that closure can be found whenever users want, provided they have all the elements they need. However, Harpold concludes that users can never reach a definitive ending (Harpold 1994, p. 192–3). The topic of hypertext is also

³Usually, the title screen displays the title of a game alongside some artwork (in certain cases, the title screen is often where players may select to launch a new campaign) (Henkemans and Lee 2001, p. 372).

⁴“A non-player character (NPC) in a video game is a character who is not controlled by the player” (Wolf 2012, p. 464).

crucial in the debate of linking and exploring traditional media, like novels, through hypertext (Ladow 1994).⁵

Videogames such as *Myst* (Cyan 1993) demonstrate how the definition of hypertext can be used to analyse and link scenes through time, as well as to raise players' awareness of their relationship with time, as they create a parallel between the hypertextual narrative and *Myst*'s crossing of *puzzles* and *exploration*. In essence, they are hypertextually linked to each other. The only way players have to gain access to other worlds is by solving puzzles, which are interconnected, like the text is in hypertext. Applying the ideas of Douglas and Harpold, we can affirm that, in *Myst*, players conclude the game whenever they feel like they have enough evidence to bring the narrative to an end. However, for some, closure may only be achieved when all puzzles have been solved, since the backstory of the game's characters is only fully revealed then. This need to solve all puzzles forces such players to explore the game's spaces further.

Within this segment, we presented several commonly discussed issues relating to the interpretation of time in narrative media and the many analytical differences among approaches. We evaluated efforts to formalize narrative analysis, focused on systemic aspects. Specifically, the relation between space and time and the elements which compose a narrative were addressed objectively. We further spoke about efforts on looking at narratives as a text-types and on differentiating different forms of text. The studied theories suggest that hypertext as a concept and other methods of connection of different sections can be used to study time in narrative media. Our readings made it clear that it is essential both to academics and general audiences to have a clear distinction between story and narrative. Story comprises described occurrences. Occurrences contain decisions made by actors; actors offer motives for the activities they perform. One story can be presented in various forms—various narratives. Narrative is a decision on what occurrences we wish to be concerned with and when—it is a chronological description or expression of the story. A different sequence of occurrences means we have a different narrative emerging from the same story. We hypothesise that such propositions can be applied to the study of time in videogames. So, we gathered the theories that consider that in Sect. 1.2, while also including different ways of approaching time.

1.2 Time in Videogames

Espen Aarseth explains that players and their actions contribute to the realization of temporality in videogames. Players' understanding of time as they experience depends on the actions undertaken by the player, in cooperation with the developments issued by the rule-based space (Aarseth 1999, p. 31–41). Jesper Juul differentiates *fictional time* from *event time* (Juul 2005), defining the first as “time the player

⁵“Hypertext, hypothetically, allows users to infinitely traverse between related materials on the web instantaneously” (Webb 2012, p. 5). George Landow describes such texts as metatexts. He suggests that we can use metatext to link cross-disciplinary media as well (1994, p. 18).

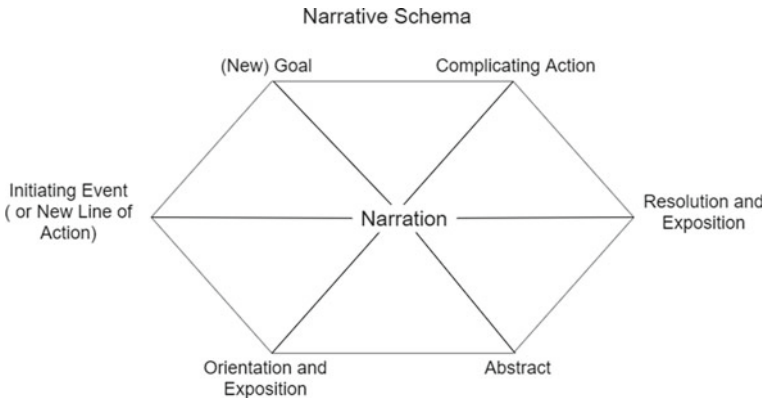


Fig. 1 Narrative schema (modified from Branigan 1992, p. 17)



Fig. 2 On the left, an illustration of the concept of Playtime in abstract games, in which a digital system is not enforcing the game rules. On the right, an illustration of the concept of Game State in its relation to player interaction (modified from Juul 2004)

takes to play” and the second as “time taken in the game world” (Juul 2004). He links the two through a *mapping* which projects the player’s time and actions into a game world. Juul argues that when we play videogames, we are “simply interacting with the game state” (Juul 2004) (Fig. 2).

In 2007, Michael Nitsche and José P. Zagal & Michael Mateas published two independent papers contributing to the comprehension of the dynamics of time in videogames. He affirms that videogames can place players in specified spatio-temporal domains. Nitsche also argues that the senses of time and space are intertwined and mutually beneficial (Nitsche 2007, p. 145). As a result of a continuous space, “the timeframe is freed to explore new configurations.” Such a method exceeds “the mechanical mapping of ergodic participation and game state change.”⁶ Instead,

⁶A key component of interactive text production in videogames is the user’s involvement in digital content. Aarseth uses the word ergodic to explain the difference of interaction like this and other forms of communication. Participation relies on the physical exercise of the interactors—their activity in the material world that is having the impact of feedback in the virtual environment. Aarseth emphasizes that the individual will have completed a semiotic series through immersive interaction with the virtual world, and this limited action is a function of physical construction that does not allow for the different definitions of reading. Media like novels, movies, or radio will not deliver this degree of ergodic participation, so Aarseth distinguishes ergodic participation from active reading. Instances of ergodic participation include clicking a mouse, tapping a key and moving a control stick (Nitsche 2007, p. 31–2).

spatial understanding is the fabric by which the player comprehends time. That connection tries to consolidate the player's comprehension of the game's status—the current configuration of game rules after input of the player. Such spatial and temporal understanding provide context for the narrative (Nitsche 2007, p. 149).

Zagal and Mateas (2007) define a temporal frame as a group of events, in conjunction with the temporality caused by the links among events. The authors suggest four shared temporal frames:

1. *Real-world time*: “events taking place in the physical world.”
2. *Gameworld time*: “events within the represented gameworld, including events associated with gameplay actions.”
3. *Coordination time*: “events that coordinate the actions of players and agents.”
4. *Fictive time*: applying socio-cultural labels to events, as well as narrated event sequences (Zagal and Mateas 2007).

Their correlation and differences are observable in *Animal Crossing: New Leaf* (Nintendo EAD 2012). In this game, the town's clock is synced to the player console's internal clock, so that the real-world time is equivalent to that of the gameworld's. However, in *Bravely Default* (Silicon Studio 2012) two minutes of real-world time correspond approximately to 12 h of gameworld time.

Julián Gonzáles and Olga L. Obando state that video games can be studied and classified as *types of dynamic tasks*. Tasks are problems that players have to solve. Through some of those tasks, we can describe time in videogames. The authors suggest a model that can help us face time in videogames by looking at the restrictions and possibilities offered by a game, in a dynamic and complex relationship. As such, they call them *dynamic tasks*. Those tasks suggest that the activity of playing a videogame is displayed in real-time and that the operations performed by the player in time (t) affect what they will do afterwards (t1, t2, tn...) (González and Obando 2008, p. 76–77). It also means understanding that what emerges in the videogame activity are forms of situated cognition (Susi and Rambush 2007, p. 731).⁷ González & Obando define the following videogame classification criteria, according to the types of goals and tasks:

1. *Implementation*: Choice regarding a set of predefined possibilities. The structure of the lived time will be fixed by the search for correction and appropriate movements.
2. *Empowerment*: Organization of resources and inputs. It is about doing a job whose rhythm and time is imposed by the materiality of the work.
3. *Updating*: Resolution of problems or questions. Improvisation with its rhythm and characteristics.

⁷Classic and modern cognition approaches are involved in the same topics, that is, the essence of knowledge and intellect, but they are profoundly distinct in their approach to how these problems can be addressed (Susi and Rambush 2007, p. 731). Instead of researching cognition, or gameplay, through means of experiments, it is believed that the hypotheses of “situated cognition maintain that intelligent human action has evolved within and is shaped by and adapted to the specific forms of activity within which it occurs, and that cognition must therefore be understood and studied as an aspect of embodied practical activity” (O'Connor and Glenberg 2003).

Fig. 3 Temporal Framework of Adventure Games (modified from Fernández-Vara 2009, p. 271)



4. *Virtualization*: Creation of problems and worlds. There are no foreseeable ends or means. Creation strategies are not anticipated (González and Obando 2008, p. 82).

Clara Fernández-Vara proposes a model to be applied to adventure games and is intended to consider how time serves as performance in the story and the game. The model consists of three components: *player time*, *simulation time*, and *story time* (Fernández-Vara 2009, p. 271). *Player time* represents the time of contact between the player and the game (Fernández-Vara 2009, p. 272). *Simulation time* represents “the time of the events that happen within the simulation, as the player interacts with it” (Fernández-Vara 2009, p. 272). Using Genette’s definition (1980, p. 33–34), Fernández-Vara tells us that *Story time* is a combination of events and the duration of the story and is itself a part of the broader narrative (Fernández-Vara 2009, p. 266) (Fig. 3).

Fernández-Vara also proposes that the passage of time is studied as a design element. She claims that the “regulation of time in the simulation is part of the design of adventure games” (Fernández-Vara 2009, p. 275). The way a videogame regulates time is influenced by the reference frame used in the calculation of how time passes: the *player* (real-time), the *simulation* (cycle-driven time), or the *story* (event time). The time within the game passes in *real time* once “simulation time is synchronized with the player’s time” (Fernández-Vara 2009, p. 275). *Cycle-driven time* uses the simulation frame⁸ as its primary point, “so that time passes after each player interaction” (Fernández-Vara 2009, p. 277). The passing of time can also

⁸Time in the simulation is regulated by cycles. The simulation frame is the current cycle.

be delivered through the *events* within the story, utilizing puzzle-solving or in the cut-scenes (Fernández-Vara 2009, p. 278).

Pedro Cardoso created an *Action-Oriented Framework* with seven dimensions. The work is an analysis of the player-game connection and uses an action-oriented frame of reference based on *actors*—“entities through which action is enacted in the game and of which the player and the game system are a part of” (Cardoso 2016a, p. 57). *Chronology* is a dimension that emphasizes players’ awareness of the changes in a sequence of events, with objective time management in mind (p. 60). Within *chronology*, there are:

1. *Preterite actions*: Those that concentrate on events of the past, using computer system memory to access stored data. There are two subtypes:
 - a. *Replay actions*: “allow the player to return to a certain moment in the chronology in order to change its outcome” (Cardoso 2016a, p. 61).
 - b. *Review actions*: Enable players to witness past events without affecting their outcome.
2. *Present actions*: “those that are solely focused on the really short time span that is the immediate present time” (ibid.).
3. *Preemptive actions*: “action (or set of actions) that consists in the interactant’s preparation for a determined foreseen or anticipated situation” (Cardoso 2016b, p. 154).

Akin to Zagal and Mateas (2007), Hanson (2018) suggests that videogame mechanics introduce a new paradigm for experiencing time in modern society and names that concept *game time*. Primarily general-purpose, game time distinguishes itself by its plasticity, navigability and potential. Game time is restrictive and demands repetition. Hanson reveals that in contrast with traditional tabletop games, cinema, television and other media outlets, videogames’ temporal constructs offer opportunities for engaging players with “liveness, causality, potentiality, and lived experience” (Hanson 2018 p. 2). Those opportunities include players’ ability to move “through the temporal structure of the diegetic game world to accomplish specified tasks” (Hanson 2018 p. 135)—basically, time travel within the story which is dependent on player action. Players can also pause, save and restore a game, and those are essential and critical game-temporal manipulations (Hanson 2018 p. 86).

Hansen and Valentin (2019) also proposed considering time as an essential factor in videogames, in which urgency is a motivator for the why and when of player action. They introduced a model for depicting the *agency/urgency loops* which players feel when interacting with videogames while taking decisions. The model offers a textual and visual statement of how a player can interpret a game, what powers their actions, and in which manner that refreshes or modifies the state of the game (p. 37). The basis of the framework is the videogame. Videogames may be seen as including game elements and narrative elements alike. Both the game and the narrative each catalyse a loop which “repeats throughout the play session—an *agency loop* and an *urgency loop*” (p. 37–38). Within the *agency loop*, the game elements set the stage for a game state. In contrast, the *urgency loop* starts as a depiction of the game world, which

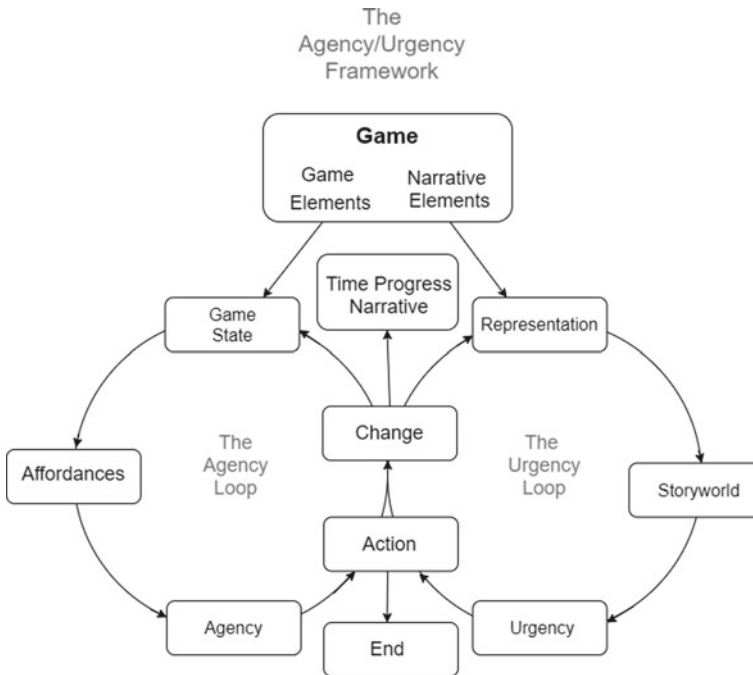


Fig. 4 The Agency/Urgency framework (modified from Hansen and Valentin 2019, p. 38)

consists of the game's narrative components, e.g. visualization, text, cutscenes, or in-game events (p. 38) (Fig. 4).

In short, most theories relate the passage of time in videogames to sequences of events in the story and narrative order. As with other narrative media, story in videogames refers to plot content, while narrative is a chain of events linked objectively and sequentially. Players' actions change the state of the game and the sequence of events, meaning that their actions affect the narrative. While media like non-interactive cinema can have non-linear narrative orders, those orders are still determined by the team that makes the film. However, in videogames, players can sometimes individually decide the order in which events unfold. They can also control the duration of the narrative e.g. all viewers of *Anima* (Anderson 2019) will watch it for its running time of 15 min (unless they do not watch it until the end), but players of *Baldur's Gate* (BioWare & Black Isle Studios 1998) can choose the order of their quests, what characters perform them and for how much time. Players and their decisions advance the temporality of videogames. We found that space and time interweave and thus are mutually advantageous. There are four conventional time frames—*real-world time*, *gameworld time*, *coordination time*, and *fictive time*. Authors note that video games can be viewed and categorized as dynamic tasks and that time serves as performance in the story and the game. Players are actors in the game system, and their actions can be described chronologically. Lastly, we learned that urgency drives the motives and decisions of player action.

2 Evaluation of Temporal Continuities

The objective of this part of the study was to: (1) Determine when and why players decided to act; and (2) Identify whether players can differentiate narrative time from story time.

2.1 Method

Outline

Two games, representing two different genres, were played by a small group (n = 10) of students of the Interactive Games course unit in a classroom setting.⁹ Each game was played for about half an hour, and the students completed a questionnaire for each game.

Student Selection

All Interactive Games students were invited to participate in the project. A group of 10 students constituted our sample.

Game Selection

Two games were selected: *Brawlhalla* (Blue Mammoth Games 2017) and *Bury me, my Love* (The Pixel Hunt et al. 2017). *Brawlhalla* is a competitive online fighting videogame and *Bury me, my Love* is a narrative-based game centred around a Syrian refugee. In the latter, players interact with character Nour in the role of her husband. Players may elect communication parallelism of quasi-real-time or matching their speed.

We chose these case studies because they are idiosyncratically different in aspects such as: genre (action vs adventure), perspective (side-scrolling vs text-based), gameplay (fighting vs interactive fiction), setting (fantasy vs contemporary/middle eastern) and pacing (high-paced vs slow-paced). Being mechanically and aesthetically distinct, they allow us to ascertain the disparities in the questionnaire answers, granting us the ability to distinguish what might be specific to a case study.

Procedure

1. We began by sitting the students by a table with a PC and making sure they were comfortable with all the software and hardware so that usability would not be an issue.
2. Only one student played at a time, with the others outside the room.
3. After the play sessions we briefly explained the concepts of story and narrative in videogames.

⁹At Instituto Superior de Ciências Educativas do Douro (ISCE DOURO).

4. A paper questionnaire was distributed. Four types of questions were used: *integer* (to define time, in minutes), *ranking* (1 to 5), *open-ended* and *boolean* (true and false).
5. The questions related to students' understanding of narrative time and story time on both games.
6. Players' control of time was measured through questions on perception and how much agency they exerted over the temporal order.
7. Using keywords, students defined the events which lead them to use input actions in both videogames.
8. We asked them to explain why they used such input actions at any given time.
9. Questions were used to ascertain whether the videogames were immersive.
10. Students identified when in their sessions they felt the games' narratives were completed, if ever.
11. The questionnaire ended with a question asking on whether the play sessions had lasted 30 min each, despite supervision.

The questions presented to the students were the following:

1. How long do you think the narrative of your gaming session lasted? (Integer/Minutes)
2. How long do you think the story of your gaming session lasted? (Integer/Minutes)
3. How much do you feel you were in control of the space-time continuum? (Ranking/1–5)
4. Do you feel that you exercised agency over the temporal order? (Boolean/Yes-No)
5. Define, with keywords, the events that led you to exercise input actions in the game. (Open-ended)
6. Explain why you have performed the input actions described above. (Open-ended)
7. Define your goals and obstacles in the game session with keywords. (Open-ended)
8. At what point in your gaming session did you feel the narrative was over? (Open-ended)
9. How long did your gaming session last? (Integer/Minutes)
10. How long do you feel you were immersed in the game world? (Integer/Minutes)

2.2 Results and Analysis

Overall Results

In this section, we analyse the results and compare them to the concepts and frameworks reviewed in Sect. 1, specifically those of Hansen and Valentin (2019), Fernández-Vara (2009), Chatman (1990), Gonzáles and Obando (2008) and Douglas (1994). The theoretical bases of these frameworks are interconnected, regarding

differences between story time, narrative time, narrative closure and time passage. Acknowledging the importance of all works in literature, we focused on these because the others were conceptually removed.

The research consisted of 10 questions (four integer, one ranking, four open-ended, and one boolean). The answers can be observed in Tables 1 and 2. The answers to open-ended questions are not represented in the table because they cannot be quantified nor easily represented in the tables. Open-ended questions will be subjected to qualitative analysis in the sections below (Figs. 5 and 6).

Question 1 looked into the duration of the narrative in the players' sessions. Question 2 scouted the duration of the story in players' sessions. Question 3 has investigated how much players felt they had control over time and space. Question 4 examined whether players felt like they had agency over the temporal order in

Table 1 Answers on game 1 (*Brawlhalla*)

| | Q1 | Q2 | Q3 | Q4 | Q9 | Q10 |
|------|-------------|-------------|------------|--------------|-----------|-------------|
| U1 | 30 | 30 | 5 | Y | 30 | 30 |
| U2 | 26 | 0 | 1 | N | 30 | 20 |
| U3 | 30 | 30 | 2 | Y | 30 | 20 |
| U4 | 30 | 30 | 5 | Y | 30 | 30 |
| U5 | 30 | 0 | 3 | Y | 30 | 30 |
| U6 | 16 | 6 | 1 | N | 30 | 20 |
| U7 | 14 | 6 | 2 | N | 30 | 20 |
| U8 | 25 | 15 | 3 | Y | 30 | 25 |
| U9 | 20 | 10 | 1 | N | 30 | 20 |
| U10 | 30 | 20 | 5 | Y | 30 | 30 |
| Mean | 25,1 | 14,7 | 2,8 | Y6-N4 | 30 | 24,5 |

Table 2 Answers on game 2 (*Bury me, my Love*)

| | Q1 | Q2 | Q3 | Q4 | Q9 | Q10 |
|------|-------------|-----------|------------|--------------|-----------|-------------|
| U1 | 30 | 30 | 1 | N | 30 | 30 |
| U2 | 28 | 28 | 3 | N | 30 | 28 |
| U3 | 30 | 10 | 2 | Y | 30 | 20 |
| U4 | 30 | 30 | 5 | Y | 30 | 30 |
| U5 | 30 | 2 | 3 | Y | 30 | 30 |
| U6 | 10 | 20 | 2 | N | 30 | 30 |
| U7 | 25 | 20 | 3 | Y | 30 | 28 |
| U8 | 20 | 15 | 1 | N | 30 | 25 |
| U9 | 30 | 25 | 5 | Y | 30 | 30 |
| U10 | 25 | 20 | 3 | Y | 30 | 27 |
| Mean | 25,8 | 20 | 2,8 | Y6-N4 | 30 | 27,8 |

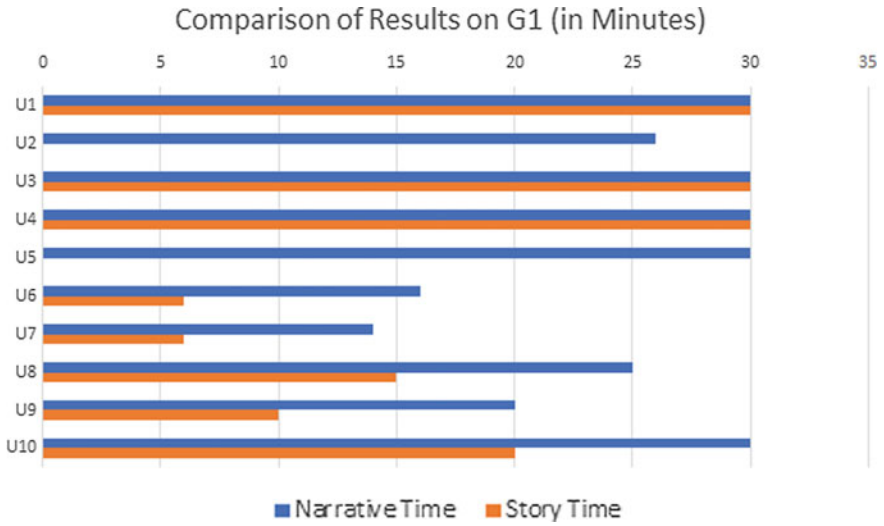


Fig. 5 Comparison of results on questions 1 (duration of the narrative) and 2 (duration of the story) on game 1 (*Brawlhalla*) (in minutes)

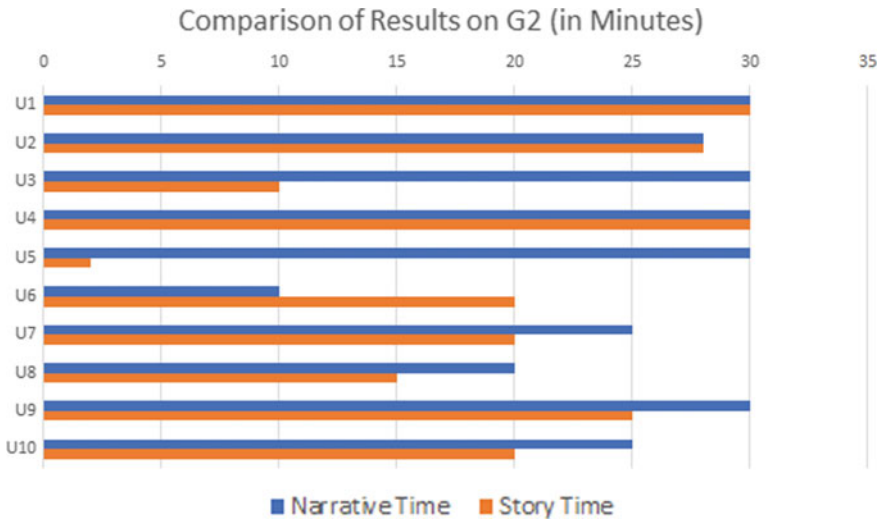


Fig. 6 Comparison of results on questions 1 (duration of the narrative) and 2 (duration of the story) on game 2 (*Bury me, my Love*) (in minutes)

their sessions. Question 9 considered if players effectively had 30 minutes-lasting sessions. Question 10 observed how much time users felt like they were immersed in the game worlds.

Narrative Time, Story Time, and Game Time

Tables 1 and 2 show that most players were able to differentiate between the temporal plane of the narrative and the story, with most agreeing that the overall narrative was larger than the story of the game. Evidence is conclusive in showing that a videogame's narrative is plural in components, consisting of a mixture of elements such as "visualization, text, cutscenes, or in-game events" (Hansen and Valentin 2019, p. 38), although that evidenced should be validated in more studies because the one we conducted was small in participants and playtime, and the participants do not constitute a random sample.

Results are inconclusive in showing players' understanding that time passes differently between player time (real-time) and the story time (event time). Most players found the story of the game to be shorter than the narrative in both case studies. Our non-participant observation of the play sessions of G1 showed that some players spent around one minute reading character lore in the game. However, players claim to have been exposed to the videogame's story for 15 min.¹⁰

Videogames as Text-Types

Results are also inconsistent in showing us whether videogames are or are not understood as what Chatman calls text-types. G2 puts no imposition on the number of time players have to answer to character Nour. In G1 battles have countdown timers.

Nevertheless, players answered that they did not feel in total control of time, giving us the same mean answer (3) in both cases. This uncertainty is increased further by the fact that 60% (in both games) of players answered that they felt like they had agency over the temporal order. Control of time and the temporal order is what distinguishes text-types from other types of artefacts. Players seem to be split about their understanding of who is in control of time: themselves or the rule-based space of the videogame.

Event Sequences

Question 5 asked users to define the events that triggered their actions in the game. Most answers on G1 described the need to attack and defend with their player-character as their primary motivation. The majority of replies on G2 reported on the need to answer character Nour and advance the story as the main incentive. This meets González's and Obando's (2008) expectations that time in videogames can be studied through *distinct dynamic tasks*.

We also questioned users why their response to the events was as described, on question 6—many answers on G1 related to the need to understand game mechanics

¹⁰When the study was conducted, the character lore was the only part of the game containing the story. As the game is constantly being updated, it is possible that future versions contain more developments regarding the story.

and find out the victory conditions. The majority of respondents on G2 said that they had no agency other than to reply to Nour and advance the story.

Narrative Closure

On question 8, we asked players to report the moment in which they felt the narrative concluded. On G2, most players said the narrative was never closed. On G1, most players stated that the narrative was only closed after: finishing the first round, returning to the character selection screen and starting a new game. “It was like closing the cycle, dictating the end of the narrative.”¹¹ Our literature review claims that the resolving of narrative frictions brings narrative closure. This was evidenced in our analysis, as players of G1 felt narrative closure after finishing a round, but not the session, an indication that elements such as rounds, levels, episodes and other mechanics of progression can be enders or separators of narrative moments.

Other Results

On question 7, we requested players to define their goals and challenges in each session. On G1, most players answered that keeping their player character *alive* and defeating their opponent was their primary challenge, as we expected. On G2, most participants focused on answering as the primary goal and reported the lack of agency as a *challenge*.

On question 10, most players reported more immersion in the game world of G2. A potential cause is their feeling that the narrative of G2 never ended.

3 Conclusions and Future Work

In this paper, we researched different ways time is understood and analysed in videogames. Our literature review states that we cannot analyse time without considering space as well, and that within time we have two practicable approaches: story time and narrative time.¹²

Based on Chatman’s framework, our analysis shows that players are split on who is in control of time in videogames, pushing the research on videogames as text-types to future studies. Such research should be more diverse in the sample, time of session and number of objects studied.

This research further confirmed that time might also be analysed via distinct dynamic tasks in videogames. Players were able to identify their inputs and the reasons for their inputs, which can be used to map agency and the passage of time, as distinct motives for input signal temporal progression. Players’ resource awareness and their application represent both goals and tasks, which lead to the resolution of narrative friction.

¹¹ Authors’ translation of a participant’s answer.

¹²In the original works by Günther Müller in 1948, story time is described as *erzählte Zeit* and narrative time as *Erzählzeit*.

Future studies need to evaluate Fernández-Vara's temporal framework for videogames as the model insists that time passes in both real-time, event time and cycle-driven time but our evidence is inconclusive in revealing players' understanding that time passes separately in real-time and event time. Different methods of sampling and analysis are needed to test this concept.

Our literature review concludes with the most recent proposition of the evaluation of time in videogames (Hansen and Valentin 2019), which suggests that urgency motivates why and when players act.

Overall, our results confirmed many theories of various authors, although the analysis of some resulted in contradictory outcomes. This experience leads us to ascertain that dynamics tasks and narrative cycles are suitable models for studying temporality and players' understanding of time in current practices, as they were the ones whose results conformed more to both ours and the literature's expectations, although we acknowledge that they will have different results depending on emotional, sociological and ethnographic specificities of users. Further assessments require more case studies, more participants and longer play sessions to validate the research.

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Open Project - A Project Opened



Pedro Motta Silva , Rui Dias , and Rogério Ribeiro 

Abstract This article presents *Open Project*, a project consisting of open sessions and presentations, dedicated to the reflection and discussion of themes in the intersection areas between audiovisuals, film, sound, music and digital media. The paper begins with a description of the main concepts and objectives of the project. Followed there is a brief contextualization of the proposed themes adopted, a resume of the two editions held at ESART - School of Applied Arts of the Polytechnic Institute of Castelo Branco, between October 2017 and June 2019 and some considerations about the projects' visual identity and the communication strategies adopted. The final sections will approach some of the main conclusions regarding the audience feedback and participation and we will provide a brief insight into the projects' future developments and ramifications.

Keywords Sound · Music · Audiovisuals · Film · Digital media · Intermedia

1 Introduction

The creation of an environment to promote the sharing and discussion of ideas across distinct areas of expertise can sometimes be difficult to attain in academic contexts, where the subjects and communities tend to be separated, even when they share the same physical space. The students are introduced and guided through a set of relevant references, concepts and knowledge base that is necessary for their integration in the study area and respond to their perspectives for the professional world. Although this is an understandable and to some extent necessary result of the natural

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progression in the study process and development of expertise in each area, it is also true that very often different areas can intersect, and that sharing knowledge across different subjects can potentiate the development of new ideas that may lead to new solutions and developments. Also, a growing number of areas exist that require competences and knowhow across multiple subjects. Areas related to digital media, audiovisual production, media arts and multidisciplinary performance, for example, have an intrinsic multidisciplinary nature that require constant renewal and that can vastly benefit from broad-minded creators and professionals, with a cross-disciplinary mindset.

The project described in this article was created within this mindset and derived from a set of conditions that nurtured the idea of promoting open discussions around a given cross-disciplinary thematic, outside of the classroom scope. It was not created having a clear and formal conscience of these factors, but instead it naturally emerged out of several separated discussions, provocations and shared ideas between the authors and some more curious students of the Communication Design and Audiovisual (DCA) and the Electronic Music and Musical Production (MEPM) programs at our school. We believe this approach will have appeared due to our distinct training areas, which, nevertheless, seldomly walk side by side. Inevitably, and due to a series of common interests, we started to discuss these topics in an informal way. Little by little, started to think that, very likely, our informal conversations could result in something more consistent and useful to the student community and beyond.

2 Objectives and Philosophy

The main concept of Open Project is the exploration of topics of intersection between audiovisuals, film, sound, music and digital media, in a casual, informal and open environment. This concept comes to the fore from one of its main premises, which is the systematic questioning by its practitioners, of the practices, concepts and technics employed on the production of audio, audiovisual and multimedia. Fundamentally, the genesis of the project is in the questioning of preconceptions and common places of the grammars and techniques in the production, conception and distribution of the media product, searching for the verification or, contrarily, breach elements, as a result of the reflection made.

As such, we organized our discussions into short contextualizing sessions, open to the community. These sessions were grouped into sets of eight sessions with a specific thematic orientation, which we designate as a season.

Each season has a defined theme, which allows us to pursue a more thoroughgoing approach along the various sessions. The seasons' two initial sessions, are expositive sessions, in which the proposed theme is presented and contextualized in the light of our individual areas of expertise, namely one session with a stronger focus on film, audiovisual and new media, and a second session focusing on sound, music and new media. These sessions are not forcibly bound to these areas, but, for obvious reasons, strongly directed by them. In both seasons, we were joined by Professor Fernando

Oliveira, with a graphic design background, with particular emphasis in typography and large experience in advertising, who directed “extra” sessions which focused on these areas.

The subsequent sessions of each season are discussion and follow-up sessions in which, progressively, all the participants share their own ideas and reflections about the proposed theme, so that the individual approaches can be discussed and developed collectively with all the intervenients. This way, it was intended that, although each intervention may be the result of the individual reflection by one intervenient, it may have been aided by the discussion and input from all the other intervenients.

This leads us to yet another aspect of the project, which is the work production. Each season is planned in order to include and encourage the development, implementation and presentation of works or interventions, based on the seasons’ theme. These works can be of any format—photography, musical composition, video, installation, etc. - and are presented at the end of the season, in a collective exposition named Open Day.

Furthermore taking into account the works produced within the scope of the reflections, we also have as objective the itinerant exhibitions that, in the end, would concentrate and take a set of works on the same theme to a wider and more dispersed public than that can be found in the first phase, within the environment of ESART and the city of Castelo Branco.

Lastly, we are planning a publication for each theme, temporarily entitled “notebook and exhibition catalogue”, that will contain information about the theme, and, of course, information about the authors and the creation process of each work in the exhibition.

3 Themes

Open Projects’ initial scheme was conceived to have four thematic seasons and, so far, two themes have been developed: “The Error” (“O Erro”) and “AsSynchronicity” (“AsSincronicidade”).

The choice of theme is, in a way, arbitrary, in the sense that it is discussed by the project leaders. “The Error” approach was centered on our background in audiovisual, music and new media. As such we set out to study the “The Error” in the context of the actual cyberculture exploring erratic terminations in our digital and social daily life and in the way, in society as individuals, we deal with these abnormalities. This approach led us to explore the Concepts of Aesthetics in Error and how can an Error Originate an Aesthetics.

In the second season, “AsSynchronicity”, and because our universe of action and experience is largely built in a linear and chronological way, we decided precisely to explore this relationship in time and space. We agree that digital has clearly challenged the paradigms of design, production and dissemination in our areas of activity. If doubts exist about the statement, let us think, as mere examples, of the

way we currently consume audiovisuals and music or how important is to us a device like a smartphone permanently connected in our pockets.

Each of the themes described above will be addressed properly in dedicated papers to be published in a near future.

4 Planning

Since Open Project is an open project, we could not expect anything other than a flexible planning structure that is susceptible to changes. However, since the beginning of the project, its guidelines have been well defined and outlined, and the changes to which the project has been subjected, in the meantime, were essentially due to the volume of work that the teaching activity involves and semester and annual particularities of the school calendar.

4.1 *Accomplishing It*

The project started with a semi-annual timeframe in the first season, “The Error”. As such the projects’ kick off, with the expositive sessions, was in the 3rd week of the second semester of the academical year of 2017–2018. With this schedule, we managed to escape the bustle of the semester beginning, taking into account however, the Easter break (between March 24th and April 8th) that would certainly be beneficial in terms of individual reflection on the theme. As such, the first discussion and follow-up session took place on April 18, about a month after the last contextualization session, and was one of the longest and most interesting sessions since there were many reflections on the theme that were shared. From that session onwards, we entered into a logic of fortnightly meetings that allowed visible developments and maturations, which were shared and discussed throughout the following sessions. In the week before the Open Day, there was a final planning session with defined intervention spaces and an advanced version of the Technical Rider.

The date of 13 June for the Open Day, although in the last week of the semester, was chosen so that the event could have more impact, benefiting from the fact that, in that week, various events of the MEPM course would take place. More over ESARTs’ Fashion Show was undergoing its final preparation stages (which meant that during the week Fashion and Textile students meet at school for late hour work) and, very important, of course, we could count on the support of the Student Union not only in terms of logistics but also with a food and drink structure that made the whole event more appealing.

For the following season, 2018–2019, we thought it would be beneficial for all players to extend the seasons’ intervention time and thus, instead of making the season happen in a semester, give it a slightly longer duration. As such, the season began in the final phase of the first semester, more specifically in the 12th week,

extending until the end of the second semester. The contextualization sessions took place on the 5th, 12th and 19th of December, followed by a long break, the result of a “whimsical” school calendar with the Christmas break, compensation week and the two exam periods. On March 20, we had a session prepared by Rogério Ribeiro that we could call “mixed”, since it was, on the one hand, a contextualization session and, on the other, a discussion and follow-up session¹. The discussion and development sessions remained regular until the Open Day on the 5th of June. However, due to different circumstances, the event itself ended up not taking place.

At the beginning of this academic year (2019–2020), we realized that there was a wealth of reflections on the themes addressed in the first two seasons that were either materialized in the format of a scientific article with some brevity or, most likely, would be lost since we would approach a new theme in a new season with the same dedication and dedication as the previous ones. So, we decided not to start a new season but to close the previous two seasons with the publication of our reflections.

5 Brand Identity

Brand Identity, as referred by Raposo (2008), is “*a visual code formally coherent, composed of the visual and written discourse, and that relates all elements which materialize the Identity [...] thus defining its identity*”. (Raposo 2008).

The way this projects’ Brand Identity was developed reflects the way that the project itself was created and its purpose.

The idea was inspired by the plot of the German webseries “Dark”² (Berg et al. 2017; Netflix 2019; Wikipédia 2019; Gonzaga 2018), which comprised a succession of events between the disappearance of two children in different moments of an intertwined temporal line across three years, in intervals of thirty-three years: 1953, 1986 and 2019. The link between these moments in time inside the same story is an existing wormhole in the middle of the forest, originated in a nuclear powerplant in a fictional city in Germany.

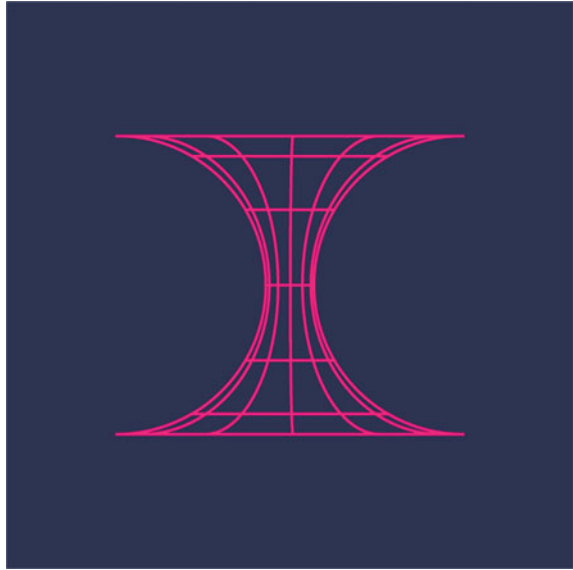
The idea of a wormhole (Stierwalt 2019; Wormhole 2019) which allows us to move forward of backwards in time and space, by entering one of the sides of the hole and “travel” to the other side, is itself an inspirational loop, as it seemed the perfect representation of the objectives and the intrinsic philosophy in this project, and used as a starting point.

The way in which knowledge and ideas, previously compartmentalized and organized, by means of comprehensive themes, presented in non-mandatory sessions and after school hours, formed an entry for the themes. During the sessions, these themes were shared and debated, resulting in abstract or concrete, tangible or intangible

¹In the session, amongst other examples, Black Mirror: Bandersnatch film (McLean et al. 2018) was shown in full. The path choices were a decision of all the present in the session.

²Dark is a German web series created by Baran bo Odar e Jantje Friese and distributed by Netflix (started on the December 1st 2017).

Fig. 1 Open Projects' symbol, *wormhole* inspired



reflections, which may differ from the original form of presentation of the theme. Thus, as in the Dark series, the projects' identity tries to mirror the unknown because one never knows for sure what awaits us when leaving a wormhole (Fig. 1).

As the purpose of Open Project is to question, think and stimulate our minds, the colors are drawn from common examples in the universe, where the contrast is deliberate, such as the case with the writing of code with a vivid green in a dark computer screen.

Thus, the chosen colors have the objective of creating a strong impact in dark backgrounds, without light, like a restless glow, given by the incandescent lights (Fig. 2).

This same objective originates the development of the logo, which transmits the idea of traveling through a narrow tube, in an unusual perspective, creating some discomfort and crashing with the principals of legibility and readability defended by many authors along several years, like the typographer Tracy (1986), which defined:

“Legibility is the term to be used when discussing the clarity of isolated characters [...] refers to perception, and its measurement is the velocity in which a character can be recognized. Readability describes a quality of visual comfort [...] refers to the understanding, and its measure is the amount of time a reader can dedicate to a text segment without getting tired.”
(p. 31)

This vision is altogether more accented by the absence of fragments in each of the letters that compose the logo. Counterpointing the affirmation by Frutiger (2007), referring to the work of typographers in the construction of typographies, *“The typography should be made in a way that no one should notice it”*. (Frutiger 2007).

There is also the symbolization of two entrances of the same wormhole between the two letters “O”, where two apparently equal circles hover, but due to distortion,



Fig. 2 Colors pairs scheme defined by the authors for each Open Projects’ theme

become clearly unique. This feature contributes to the idea of the transformation that the passage through this wormhole takes on. The same manner in which we pretend that the Open Project sessions contribute to the scrutiny and debate of ideas and concepts, where the original deforms in an evolving process (Fig. 3).

This bold creation form, aiming to contribute to the nearly experimental exercise and contrasting to the principals studied and defined through time, is itself also a way to emphasize the identity that the project itself wants to convey, namely, to question, reflect and stimulate our minds to what surrounds us (Fig. 4).

Contributing to the visual identity of the project, a set of elements were created to originate a unique environment, characterized by small contrasting annotations,



Fig. 3 Open Project Logo

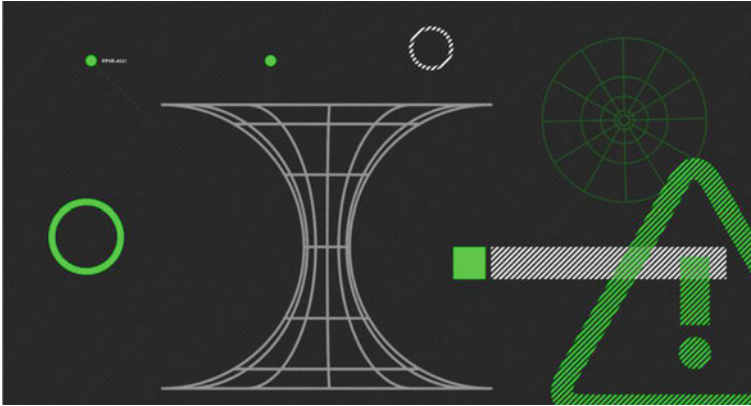


Fig. 4 Elements of the visual universe created for Open Project

without an apparent rigor, but that define a particular and unique aesthetics, capable of conveying the identity of the project and suggest the identity without the presence of the Brand Identity itself.

“The corporate image is the final objective of the communication design project. [...] It’s the spontaneous or intentional interpretation made by the society, each group, sector or collective, about the organization.” (Raposo 2008).

The visual identity of the Open Project was being developed in parallel with the sessions of the first season. Thus, its visual representation was made public with the communication for the 1st Open Day (The Error | Open Day), also it appeared in the information and identification of the works carried out by the participants of the sessions on this theme.

In the second season, and with the visual identity in use, our communication focus was transferred to the particularities of the season, its calendar, its schedules and the places where the sessions would take place (Fig. 5).

Thus, from a communicational point of view, we understood that the school space would not meet our needs. To see: a universe of relatively narrow and dark corridors with pre-destined places to host posters of different events and that the student population, in their breaks, used to move between classrooms. From this analysis, two things became obvious: the first was that, if we followed this same communication logic, we would not create any impact, and the second was that the Open Project was not, in its essence, prone to a communication strategy formatted alike. As such, we decided to subvert what was being done by others, with regard to their communication and their strategies, and we sought a breach that was more in line with the projects’ open philosophy.

Thus, simple execution methods were used, with minimal costs and close proximity to the target audience. As an example, the poster which is the most common and most used communication element since the invention of typography, as Estrela (2004) refers when stating that the poster originated in the 19th century. XV, with



Fig. 5 Work identification for the 1st Open Day (The Error | Open Day)

the first known printed copy - the “Great Pardon of Our Lady” (1492). Thus, A3-size posters were printed, but their placement was unorthodox since it happened in unusual places, such as the floor of the corridors instead of the usual showcases and on the bathrooms walls, which had not yet been explored as such in a communicational point of view³. Some of the posters had a QR Code in the center with a sync link to a Google calendar where all sessions of the season were already booked. In other words, the physical environment allowed direct transposition to the digital universe of the Open Project without major complications.

In the digital universe, the presence of the project was ensured on the Facebook and Instagram platforms, thus ensuring proximity to our target audience. It was essential for us to have an online presence as it was crucial for our target audience. In fact, as mentioned in the Study developed by Hootsuite and We Are Social in 2019 (Global digital report 2019; Lima 2019), Facebook leads the list of social networks with the most users, with about 2 billion and Instagram with 849 million users, with the majority of the latter having ages between 25 and 34 years.

Bareme Internet, which is dedicated to studying the relationship of the Portuguese with the internet, reveals that 5.3 million of the Portuguese population use social networks, and Instagram was the social network that has most attracted new Portuguese users having had a growth more significant in the last five years, as revealed by the study “The Portuguese and Social Networks” carried out by Marktest Consulting (S/n 2018), every year since 2011 (Fig. 6).

On social networks, we shared the same information, with images of the posters, as well as with information about the dates of the sessions (Fig. 7).

³Its impact was such that two weeks after being placed, the posters on the floor were still readable because people avoided stepping on them. In the beginning of the 2018–2019 academic year there were still posters on the toilets walls.

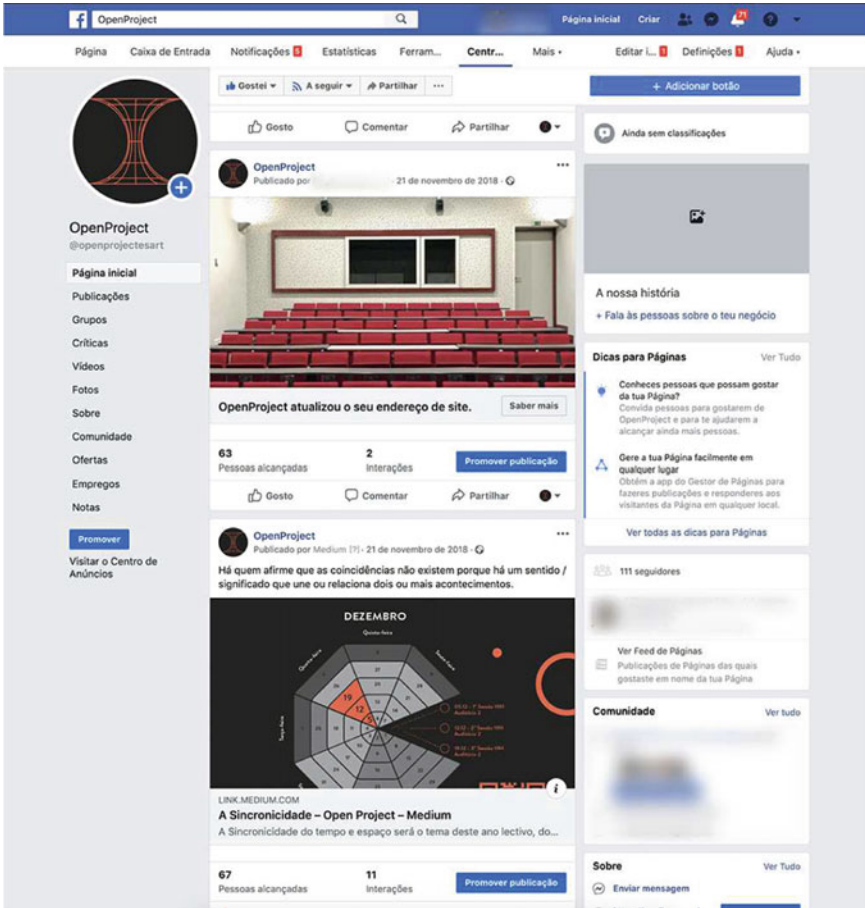


Fig. 6 Open Projects’ Facebook profile page

We also challenged the schools’ audience, and not only but also, to create, starting from a pre-conceived phrase, new phrases, leaving them in plain sight. The “exercise” was based on words written on pieces of paper, which could be removed from their initial sites and altered by others, which were located near the panel. Thus, the participants could create a new sentence, which can be more or less elaborated, a reflection of their own or a humorous note. These supports also had a QR Code that acted as a trigger for online sharing. Thus, this intervention that allows you to share a thought in a simple way through a pre-defined phrase, has come to promote a practical materialization of the theme completely framed in the concepts that we set out to address in the season. To see: when sharing in a specific space but at a specific time, any user forced the synchronism with the others. It is true that the synchronism occurred at the same time but in another (own) space (Fig. 8).

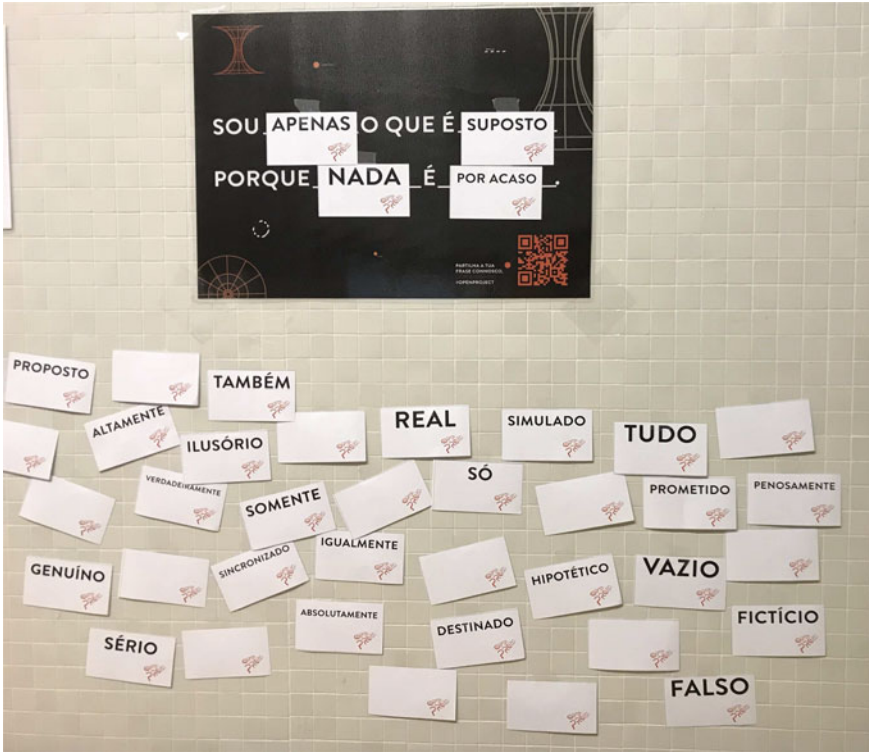


Fig. 7 One of the AsSincronicity boards placed in the students’ meal room

6 The Error | Open Day

The Error | Open Day had several interventions. Nine different interventions were envisaged, although in practice seven were carried out. Of the seven, four were the responsibility of the project leaders and the remaining three were the responsibility of MEPM students. The approaches and formats were frankly diverse, from extremely personal, thoughtful approaches, to more spontaneous and even somewhat ironic approaches (Fig. 9).

So, in summary, we could describe them as follows. Starting with the students’ interventions:

- (1) “Digital Transmutation” by Guilherme Pimenta⁴, is an intervention that uses the raw data of any type of digital content to play with the idea of transmutation between digital software. Presented on a laptop as a personalized workspace with different icons from various programs, the installation allows the user to hear sound representations of raw digital bits of common computer programs.

⁴At the Error | Open Day date, Guilherme Pimenta was a MEPM 1st year student.



Fig. 8 1st Season (“Error”) and 2nd Season (“AsSincronicity”) sessions’ schedule

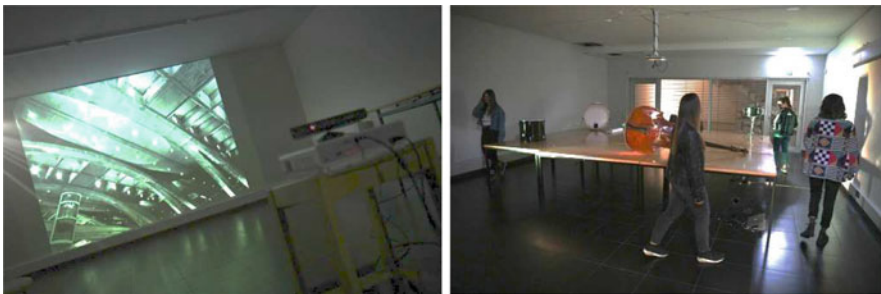


Fig. 9 Images from The Error | Open Day, 13th June 2018. Photos by ESART Students’ Union

(2) “Happy mistakes”, by Louis Wilkinson⁵, is an intervention that uses the frozen frames of a Skype video chat and converts them into a musical generator, triggering sounds and musical notes every time the image freezes. The concept and purpose of the installation is to show that the error can be used, in several different ways, to create a positive connotation, as long as we accept to lose some control over the creation.

⁵At the Open Day date, Louis Wilkinson was an MEPM 2nd year student.

- (3) “Esquizofonia”, by Luís Miguel Oliveira⁶, is an intervention that deals with the ideas of relocation and expectation, dissociating the sound result from its sound producing origin. The installation space features five traditional classical acoustic instruments. Each instrument has a loudspeaker that reproduces the sound of a specific machine previously recorded in the textile manufacturing workspace, in the school corridor.

With regard to the other interventions, we have in the trilogy “Imprevisto”⁷, “Sabotagem”⁸ and “Écrans”⁹ a photographic approach to various situations of “Error” that we can find in our daily routines. Thus, in “Imprevisto”, we explore the unexpected forms and visual metaphors that we encounter daily. In “Sabotagem”, the action of Man and Nature in the transformation of something that was created with its own sense or purpose is explored, making evident the transposition of that same sense or purpose. In extreme transpositions, the creation of a new purpose, sense or function can even be verified. Finally, in “Écrans”, the erratic terminations that are found regularly in public computer information systems are explored¹⁰.

In “it’s all the same/I think I’ve seen this b4”, an interactive intervention, the critic to the dramatic visuals achieved through digital manipulation that dominate the images acquired and processed by our, once basic mobile phones, now powerful smartphones, prevails. The purpose of the intervention is to affirm that the visuals are superimposing themselves to the content and that increasingly we verify two interesting phenomena: the first is that, visually, many of the shared images are of identical appearance, as the result of the processing to which they have been subjected, generally with a relatively limited palette of effects that the most popular photography applications have. The second is that, apparently, in the current global sharing of images, a strong visual is worth more than content that appeals to reflection or criticism.

7 Conclusions

Over the course of two academic years, we engaged, among other activities, in curating, producing and promoting the Open Project. As a result we had two seasons full of interesting moments with very peculiar dynamics. The contextualization sessions, which so much personal investment demanded, proved to be sufficiently appealing to teem the house with people, in particular those of the second season. The discussion and development sessions, particularly in the first season, were true moments of sharing and critical and reflective discussion. If we think that the project

⁶At the Open Day date, Luís Miguel Oliveira was an MEPM 1st year student.

⁷Imprevisto could be translated as Unforeseen.

⁸Sabotagem could be translated as Sabotage.

⁹Écrans could be translated as Screens.

¹⁰Often referred to as Digital Signage.

is completely extracurricular and that the sessions take place after school hours and at night, then the indicator seems to be very positive.

From the various reflections brought to the discussion in the first season, “The Error”, nine reached the final stage. Seven of which were shown to the public who passed through the School of Applied Arts of the Polytechnic Institute of Castelo Branco on June 13, 2018 for The Error | Open Day. From the feedback we got from the first season, was that no one was indifferent to the sessions and interventions. Such feedback, led us to believe and bet strongly on the second season “AsSynchronicity”. With the experience of the first season, we elaborated deeper contextualization sessions, as the theme required it, and better prepared from the point of view of sharing knowledge and reflections. Also, we decided to record the sessions in full on video. The fact that “AsSynchronicity” | Open Day has not been carried out does not mean that there were no good sessions, much reflection and discussion on the theme and the approaches taken. We just couldn’t make it to the planned day, June 5th, 2019, with interventions ready to be shown to the public.

We believe that the result is positive due to the amount of critical thinking in which the sessions were evoked, whether in conversation or in production in an academic context, such as the works of one or another curricular subject. In fact, as an example of this transposition, Luís Miguel Oliveira, an MEPM student, currently in the last year, chose to develop his main research project in the area of sound art and sound installation, referring to the work he developed for The Error | Open Day, in June 2018, as a reference for motivation and background.

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An Introduction to Over-The-Top Entertainment. India—A Perfect Playground for This Digital Industry



Neel Vipinchandra Naik 

Abstract This theoretical paper is part of an ongoing Ph.D. research project aiming to study the ever-growing genre of Advertisement Video on Demand (AVOD) specifically available on free to access platforms such as YouTube. The research will focus on the Indian digital entertainment market and is going to study various types of AVOD products produced by a variety of content creators, from the established production houses to independent entrepreneurial ventures, that have established their foothold in the industry over the past 5 to 6 years. Those products will be analysed from a creative and production point of view, using a mixed methodology.

The paper aims to make a brief characterization of the global digital entertainment industry, namely its existing trends (in particular concerning music, gaming, and sports), its challenges and opportunities. It will also mention the conducive conditions created by authorities, service providers and equipment industries. Some key concepts of the research project, such as OTT and AVOD, will be defined along with this characterization. The Indian Subcontinent will be given a specific emphasis.

Keywords Digital entertainment · Over The Top · AVOD · India

1 Digital Entertainment Market: Contextualization, Trends and Challenges

Entertainment as an industry has grown in line with advances in technology, increased incomes and more time available for leisure and recreation. Demand for entertainment products and services has grown rapidly in this context, and has led to the creation of many of the dominant forms of contemporary entertainment.

The media and entertainment market is a multi-faceted combination of a wide variety of industries. These segments include film production companies, publishing companies, radio and television broadcasters, among others.

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Table 1 Entertainment areas and segments

| Areas | Segments |
|------------------|---|
| Electronic Media | Film TV Radio |
| Art & Leisure | Theatre Music Dance Fine Arts Visual Arts Museums Theme Parks |
| Recreation | Sports Travel & Tourism Shopping |
| Interactive | Gambling Video and Online Games Toys |
| Communication | Publishing Event Planning |

Source Based on Stein and Georges (2018, p. 1)

Stein and Georges (2018) identify five areas of entertainment: electronic media, art & leisure, recreation, interactive and communication, and analyse the challenges and trends of each area (Table 1).

Digital Entertainment is characterized by being or providing amusement or enjoyment, displayed digitally on electronic devices such as computers, tablets or smart-phones. The digitization of content and ongoing innovations in technology, as well as internet usage, is a trend that will continue to drive growth and force changes in the media and entertainment industry, affecting clearly and directly all its areas and segments. Diversely, consumers are saturated with the amount and diversity of available options and therefore is natural that when one segment of the entertainment market grows, another segment might decline (Stein and Georges 2018, p. 1).

The old saying “adapt or die” applies directly here. The companies that faced the challenges and are still alive created online content and adapted their products for new electronic devices. They’ve strategized ways to keep revenue flowing and experimnt with new revenue streams, such as digital subscriptions and online advertisements. Moreover, the companies are working towards creating consumers’ entertainment and media consumptions into experiences uniquely tailored to their own personal preferences, contexts, and schedules. Many others, however, didn’t succeed in adapting to these new demands and are now vanished. As Stein and Georges stated (2018, p. 1) “entertainment is a big business (...) and competition for attention and money is fierce (...)”.

According to the latest Outlook Report of PwC (2019) one can identify the following Macro trends on the Entertainment & Media market:

- Total global Entertainment & Media revenue is set to see a 4.3% CAGR from 2018 to 2023, sending an overall figure of US\$2.1 trillion up to US\$2.6 trillion by the end of the forecast period. This pace is close to historical trends, even as shifting consumer behaviours reshape the industry.
- Over the next five years, China’s absolute growth in entertainment and media will exceed that of the US for the first time. In that period, the US will add US\$71bn (a 2.5% CAGR), while China will add US\$84bn (a 7.7% CAGR).
- It is to nobody’s surprise that this is, increasingly, a mobile world. We see mobile continuing to soar, with smartphone data consumption overtaking that of fixed broadband in 2020. In many developed markets, penetration is at or approaching saturation. Meanwhile, in certain markets such as India, Indonesia and Nigeria, which are highly populous but spread over vast and challenging geographies, operators have poured their efforts into mobile growth.
- Over the next five years, digital—especially mobile—revenue will continue to make up more and more of the industry’s income, boosted by big gains in Internet advertising and data consumption.
- By 2023, marketers will allocate more than 50% of their budgets to digital advertising. The Internet is already the single-largest advertising segment, accounting for 40.6% of all ad revenue in 2018.
- Virtual reality (VR), OTT and Internet advertising lead the segments in terms of growth rates. Despite having difficulties meeting high expectations thus far, VR is overcoming challenges. Video games, which are expected to get a lift from new 5G networks, are the principal driver of VR headset adoption. India leads as the market with the greatest growth, but China will reach an important milestone.
- Globally, digital music-streaming revenue is rising rapidly, accounting for 50% of recorded music revenue in 2018. To capitalize on this growing market, key players will redefine themselves as “audio” providers—becoming one-stop shops for consumers browsing music, radio and podcast content.

Additionally, to these trends, one can identify, in the dedicated literature of the area (Stein and Georges 2018; PwC Outlook Report 2017, 2018, 2019), other relevant issues that are having an impact on today’s entertainment industry. We would like to highlight here four of those tendencies.

Understanding the Audience

Tastes and consumer patterns of the audience are changing—obsessed with entertainment but not with the same things or in the same way; preference in using interactive electronic media. The industry has to reinvent itself to reach or resonate with this audience.

Advances in Technology

Technological changes are occurring in just about every area of the entertainment industry, which is being challenged to adapt or change its traditional business models to meet the technological demands of its consumers.

Synergy/Convergence; Vertical & Horizontal Integration of companies

The entertainment industry is composed of big companies that are getting bigger. As they get larger they have more vertical integration, that is, they have control over the entire process—from conceptualization, production, and delivery of the product to the consumer; they create synergies, meaning, they take an original product with success and easily morphed it into, for instance, mechanizing, books, performances, DVDs, mobile apps; and they also use horizontal integration to span into diverse segments of the industry and control more of the market share. Big decisions in the industry are often taken less on a gut feeling and more based on careful, in-depth research. Understanding statistics is useful in this field, as well as knowing how to use research databases and search engines.

Copyright Concerns & Regulations

One of the biggest concerns in the industry is how to control content and protect copyrighted material. Around the world issues with data privacy and security are capturing the attention of policymakers and regulators.

2 India's Media and Entertainment Industry—The Growth Story

India is considered as an underdog when it comes to the Media and Entertainment industry. Given its massive output of 1,500–2,000 movies per year in 20 different languages and various television shows, it continues to fight for its position on the global entertainment market. But this is soon going to change!

Since the beginning of the time human being has used the technology to succeed. The tools that we have designed have helped us to amplify our potential. But nothing has created a bigger impact on our life till now compared to digital technology.

India, from a demographic point of view, is by far the world's largest economy and is at a critical time in the digital revolution. It has evolved as a mobile-first, digitally-driven economy, catapulting from desktop to mobile. India's path towards a successful digital future is brought about by a combination of demographics, globalization, technological advancement and reforms by the regulatory bodies. India has come a long way from its early days' computerization in the 1980s to digitalization in the early 2010s.

1970s to Early 1980s

Due to the closed economy of India during this period there were minimal opportunities for the growth of digital technology. The complex system of permits and regulations resulted in a limited number of private players across sectors, resulting in monopolies. The media option were few and far to choose from, the consumers had to limit to a restricted number of radio and television channels. This was the time when landline networks and print media ruled the communication sector.

Mid 1980s to 1990s

This was the beginning period for computerization in the country. Encouraging government policies resulted in the sudden growth of the IT industry. During this period, the country emerged as an attractive hub for technology services providers. Resulting in a shift from the traditional sectors such as agriculture and manufacturing towards the service sector. Thus, Imputing a fast GDP (gross domestic product) growth.

1990s

The 90s brought in economical liberalization, opening the country's doors to foreign companies and their innovation. The biggest impact was felt in the television market, from just one government-owned broadcaster the industry started flourishing with the arrival of the local and foreign broadcaster. Similar changes were seen in the telecommunication sector, the advent of private players brought in much-needed competition and more options for the consumers to choose from. Till the year 2000, the information technology sector—still in its infancy—grew ninefold.

2000 to 2009

Rise in globalization and advancement in technology worldwide, the early 2000s experienced a shape growth in new digital means of communications. Indian telecom industry invested heavily in setting up networks and infrastructure foreseeing the massive demand the country was about to experience. It was during this time that the country saw an increase in the number of content production companies and an increase in national and regional cable and broadcast channels.

2010 Till Present

It was very clear by the by early 2010, that the imperatives driving the use of digital platforms across the country were affordability, accessibility, and awareness. These factors, combined with content, devices, and connectivity, marked the beginning of an era of a digital revolution in the years that followed, allowing the country to evolve from desktop to mobile and from 2G to 4G. The smartphone is a go-to device as a digital platform for most of the younger generation. This has sparked a new wave of digital media content that is localized and personalized. Thus, creating a fertile environment for start-ups in India's Media and Entertainment Industry.

2.1 India's Digital Revolution & Internet Landscape

In India, digital technologies are readily adopted by the young generation. India, like many other countries, is moving towards a society where digital is an integral part of life, where people interact with it regularly for their daily activities and needs. Digital technology simplifies, enhances and enriches lives considerably. As it permeates deeper, the way people express their feelings, share ideas, manage their health, and lead a safe and independent life will create a profound impact. Digital

technologies have enabled us to work together online without limitations such as age, gender, race, religion, experience, or income. We are better able to connect online with influencers, inspire them, generate ideas and build on those ideas to create successful businesses. The Indian government's focus on innovation is expected to lead the nation to its digital future with initiatives like Digital India, Smart Cities, and Future Skills.

India is at the point of unprecedented change, as the anticipation about the new trillion-dollar economy builds up to a roar. Though deeply rooted in their culture, Indians are surrounded by change and commotion; the upheaval comes from their creativity as well as desire for innovations and progress.

India finds itself on the cusp of immense change as the excitement around the trillion-dollar digital economy builds up to a roar. Indians are still deeply rooted in their tradition but at the same time, they are surrounded by disruption and change. On the other hand, Indians are teeming with ideas, entrepreneurship and the thirst for change and reform.

Since its introduction in the mid-90s, the internet continues to evolve constantly and is gripping everyone's imagination regardless of the age demographic. The digital literacy is on rise bringing with it substantial mobile and internet penetration in the last few years. Indians are adoption to new-age technologies with open arms. This has created new digital avenues and contributed to a rise in internet-enabled platforms consequently emerging as a key feature in the Indian internet landscape.

As per a 2018 report by IPSOS (Money Control, 2018), India has emerged as a second-largest online market after China and has more than 450 million internet users. In India—2021 forecast highlights by Cisco, it is projected that about 59% of the country's population will have internet access and that an additional 2 billion devices will be connected to the network by 2021. Both rural and urban areas are likely to continue with this trend in the coming years, mostly led by the Government's campaign for digital innovations as well as by the affordability and consequent usability of smartphones.

There is a unique diversity to the "Indian Internet Consumer" due to India being a country with many languages. Thus, making it much more important for the entertainment industry to concentrate on content that is both appropriate and meaningful to these audiences, with a view to greater outreach and customer interest.

3 OTT Market

3.1 Introductory Characterization

OTT stands for "over-the-top" the term used for communication and broadcasting services provided over the internet, generally film and TV content, without requiring users to subscribe to a traditional cable or satellite paid service.

Despite sometimes OTT is used interchangeably with the acronym VOD and the two terms look quite similar, they should be distinguished as VOD means “Video On Demand” and is the actual core service based on broadcasting platforms that allows users to pick and choose the videos they want to watch from their collections and access that content at any time anywhere.

OTT services sometimes complement the traditional telecom and broadcasting services offered by licensed operators. Some cable companies offer OTT solutions like HBO Go or HBO Now as part of their premium subscriptions. Nevertheless, high-value content at low cost, original content, and compatibility with multiple devices are just three reasons why the OTT media services are more appealing than media distribution channels and platforms, such as telecommunications networks or cable and satellite television providers and frequently bypass those traditional options that acted as a controller of such content. Thanks to its internet-based delivery system, with OTT the only thing customers’ needs are an internet connection and a compatible hardware device.

In the literature, one can find multiple references to diverse business models that can be applied to the OTT services. Generally, the model adopted depends upon the market and type of content offered, customer segment, business strategy, and competition.

There are services that operate with mixed or hybrid models designed to maximize content monetization opportunities and where the customer will, for example, pay a monthly fee—which will grant access to parts or certain types of content—but some extra fees can be applied to watch premium content. Although, most business models applied to OTT can be described as “SVOD”, “TVOD” or “AVOD”. And despite the all share video-on-demand in the acronyms that doesn’t mean they are exclusive to VOD.

SVOD—Subscription-based video on demand is a type of service, where the user enters into a subscription agreement—pay a periodical (weekly, monthly or annual) fee which will then grant him access to use the service until unsubscribing, that means to watch with no limits. It is often the go to-monetization model for new OTT businesses as it ensures a steady recurring revenue and has a lock-in effect on users (Ex. Netflix).

TVOD—Transactional based video on demand or pay-per-view will normally not charge anything to sign up for the service/create a user profile, instead, the user will pay a one-time fee based on the content that is watched or resources used. Most often this relates to movies and series but is also used for live sport and events. This model offers operators better revenue opportunities for new and on-demand content but it can be difficult to acquire and retain users (Ex. iTunes).

AVOD—**Advertisement based video on demand** is a model that is free for users, who pays are the advertisers. Users are free to log in and stream videos, in return for spending time watching ads. This model can work better as a complementary strategy to the other two models. To be a successful product it should be a short duration content with mass audience appeal, a large audience is needed to generate noteworthy advertisement impressions (Ex. YouTube).

Additionally, and according to Baldry et al. (2014) we can add business models that are monetized through: (a) Donations—Some platforms, such as Wikipedia are funded by donations (Ex. Crowd Funding); (b) Freemium—Basic features are free to use, but some premium or convenience features are offered at a price; (c) Monetization of Information—Users disclose Information about themselves, suppliers monetize these.

Considering the content of couple of reports (OMR 2019; AMR 2019), the global over-the-top market can be segmented into:

- (1) Content Type: Text messaging and images; Video/TV; Voice calling (VoIP) (Ex. WhatsApp, Viber, Skype); Games.
- (2) Mode of Deployment: Cloud-based; Web-Based; On-Premise.
- (3) Device Used: Mobile devices (Smartphones and tablets can download OTT apps from a supported digital storefront); Personal computers and laptops (Most computers support OTT content viewing through desktop-based apps or web browsers); Smart TVs (The latest TV models often include pre-installed OTT apps or provide users with an option to download them); Digital media players (Third-party devices like the Apple TV, Gaming consoles, Set-top Boxes and Blue-ray Players, also include the ability to download and run OTT apps).
- (4) User Type: Personal, Commercial, Government; Media & Entertainment, Education & Training, Health & Fitness, IT & Telecom.

Geographically, the OTT market is generally classified into four major regions: North America (US and Canada); Europe (UK, France, Germany, Spain, Italy, Others); Asia-Pacific (China, India, Japan, South Korea, Australia, Others) and LAMEA (Latin America, Middle East, Africa). Presently, North America is primarily driven by the presence of the major players in the business; however, Asia-Pacific is estimated to witness the main lucrative growth.

OTT term perhaps does not describe, nor do justice to, what is clearly one of the most fundamental advances to the media distribution landscape. With OTT, decision making on what to watch, when to watch it and on what device to watch it, is now more firmly in the hands of the consumer and guaranteeing a satisfying experience has never been of more importance.

3.2 Rise of India's Online Video

Over the last decade, there has been a global transformation in how consumers watch videos and listen to music. The media industry is undergoing a transition like no other from the days of terrestrial broadcasting and public television viewing to highly personalized, small screen use. With hyper-competitive dynamics coming into play in India, the industry's rate of change continues to accelerate. Meanwhile, India's appetite for entertainment continues to increase due to high-speed broadband connectivity, availability of multiple platforms and ease of payment options, creating the right environment for the consumers.

OTT has become the key driver of growth in video and media consumption globally, with a growing number of people consuming content over the top (OTT) across varied platforms. Over the past couple of years, OTT content, which is video being distributed over the Internet as an alternative to traditional media, has seen considerable proliferation compared to conventional video. The advantage of using OTT service is that it is less costly and more efficient and customized for specific consumption.

A key factor perpetuating the increase in OTT content consumption is the fact that a significant portion of OTT content is delivered via smart and mobile devices. Through investing in innovative technology and creating original content specifically for OTT use, key players provide an additional boost to this market. At the same time, broadband connectivity has widened its presence worldwide, enabling the viewing of OTT content by other internet-enabled devices such as smart TVs, STBs, and gaming consoles.

According to a 2019 Big Market research, OTT players are showing strong growth globally. The global OTT market is predicted to grow at a rate of 17.16% CAGR, and the revenues are expected to reach USD158.4 billion by 2025. This big canvas has enabled both SVOD (subscription video-on-demand) and AVOD (ad-supported video-on-demand) to flourish and even co-exist. At the moment, the United States and Canada dominate the OTT market, due to the availability of high-speed broadband, the presence of established content creators and providers in the area and the significantly higher costs associated with more traditional media delivery modes (such as PayTV). In Asia Pacific (APAC), Europe, the Middle East and Africa (MEA), and Latin America, the OTT market is growing rapidly.

Throughout India, 95% of households have a single TV but mobile devices are becoming the main source of viewing for on-demand entertainment (TV & OTT in 2018, MXM India 2017). The emergence of an age of on-demand content is simply a result of growing numbers of consumers viewing media beyond their living room screen. The conventional TV boxes are being replaced by the 5+ inch smartphone or a tablet for personalized entertainment. Due to this shift in viewing patterns by consumers, several Over the Top (OTT) players have entered the entertainment market and have started providing content such as live sports, reality programs, children's shows, films, TV series, original content, and user-uploaded videos.

Some of the main drivers of OTT growth, other than internet penetration and smartphone growth, are single-television homes, a low number of digital video recorders (DVR) and Indians on the move.

According to a recent report from market research firm Media Partners Asia (MPA), the OTT market in the country is expected to cross 100 million unique monthly users by 2020.

The form of digital consumption in India is distinctly different. Digital consumption in India has been additive in comparison to conventional TV and print and has not cannibalized traditional media use. For example, total media consumption has grown between 2016 and 2017 for all product segments. Total consumption among digital consumers grew faster, while traditional media consumption did not decline substantially (Table 2).

Table 2 Time spent by internet users on accessing media

| Type of source | 2014 | 2016 |
|----------------|-------------|-------------|
| Print | 0.5 h (15%) | 0.6 h (17%) |
| Television | 1.7 h (50%) | 1.5 h (42%) |
| Digital | 1.2 h (35%) | 1.5 h (41%) |
| Total | 3.4 h | 3.6 h |

Source BCG CCI Digital Influence Study—2016; BCG analysis

Table 3 Hyper competitive Indian OTT market with various players and different business models

| | |
|------------------|---|
| Broadcaster OTTs | Hotstar Zee5 Voot Sun NXT Sony LIV |
| Social Media | Facebook Twitter |
| Telecom OTTs | Airtel Jio Vodafone |
| Distributor OTTs | Tata Sky Dish TV Hathway (Ditto TV) Sun NXT |
| Global OTTs | Netflix Amazon Prime Video YouTube |
| Others | EROSNOW Viu ALT Balaji Hoichoi TVF YUPP TV |

Source BCG analysis

Business models for the OTT platform are still at a developmental level. Companies are also seeking to strike a balance between Advertisement Video on Demand (AVOD) and Subscription Video on Demand (SVOD) revenue streams. The Indian OTT market still relies heavily on advertisement revenue. Over the last few years, the AVOD model has thus succeeded in building a large user base on free-to-access sites (like, for instance YouTube); On the other hand, and despite the SVOD model could catch up with the arrival of major players like Netflix and Amazon Prime, the model is yet to find its feet, due to the unwillingness of customers to pay for the content (Table 3).

According to Ajit Mohan, CEO, Hotstar, “Online video consumption grew almost 5X in India in 2017, outpacing that of social media & data as a whole. More than 90 per cent of the watch time has been on mobile. An average user spends 2.5X more time watching content

on mobile than the web. Small cities with population of 1-10L clocked highest growth rate in watchtime” (KPMG 2019).

The Indian OTT industry is hyper-competitive and has been able to attract a different type of player offering a variety of value propositions to consumers based on their different business models.

- All of India’s big popular networks have launched their own OTT channels, for instance. Hotstar, Voot, Zee 5 and Sony Liv. They have put online their vast libraries of television content, augmented with additional content by licensing and originals.
- Major OTTs such as Netflix, YouTube, and Amazon Prime have extended their offerings to India. YouTube has traditionally set the trend for Indians to watch online content. Many major OTTs have recently begun to invest substantially in local Indian content.
- Also, the telcos, for example. Airtel, Jio and Vodafone-Idea are building models of aggregators.
- Independent content creators are developing their own OTT platforms.
- Social media platforms continue to be an important source of video consumption, and social media players are leveraging this by increasing their focus on video content.

Most of these players and models have entered the industry and evolved in the past five years. It was in 2017 that backed by the original Indian content that the market saw the first burst of “big money”. Multiple players are right now investing heavily in building new content. In the last six years, the number of players on the Indian OTT market has seen significant growth of 3.5 times, from just nine players over 2012 to 32 in 2018 (Table 4).

OTT players are increasing their investment in original content at a fast clip. The nature of the shows produced is also evolving in addition to live sports rights. To attract eyeballs, a differentiating product is required, demanding the content creator and aggregator to bet aggressively on the original content.

Most of the consumers have up to three video/OTT apps on their smartphones. According to a study, all the platforms struggle with retention of the consumers—on an average 50% of OTT apps are uninstalled within the first week. All OTT players are fighting for the top three spots for their consumer’s attention. In this race at this point, YouTube is on the top with 32% of the consumers using their app to access entertainment.

4 Conclusion

Summing up, the entertainment industry is experiencing a transforming turmoil, finding itself trying to embrace change and make way for a new age. Consumers are demanding more options for, and control over, entertainment and, therefore,

Table 4 Increase in number of players in Indian OTT market from 2012 to 2018

| | |
|------|---|
| 2012 | 9 OTT players |
| 2013 | SONY LIV |
| 2014 | Hungama Myplex TVF YUPP TV |
| 2015 | ErosNow Hotstar HOOQ Airtel TV MUVIZZ |
| 2016 | Netflix Amazon Prime video TriplePlay Arre VIU Asianet Voot Jio TV |
| 2017 | Lattu Kids |
| 2018 | ALT Balaji Hoichoi Sun NXT Zee 5 |
| 2018 | 32 OTT players |

Source Ovum OTT tracker, BCG analysis

content-delivery methods and revenue-generating models are experiencing major changes.

Digital entertainment has seen tremendous growth in the last decade due to the favourable environment generated by the advancement of both hardware and software technologies, as well as new entrepreneurial ventures. This has paved the way for consumers to access entertainment on their fingertips when and where they want.

The OTT services seem to have come to fill the void that was being felt in the entertainment industry and rapidly is becoming one of the top mediums for product and service delivery.

We’re currently witnessing a new wave of diversification and increased competition across OTT markets, that will generate new challenges but also opportunities in the near future. Just to mention few rivalry signs: Amazon Prime is developing its own critically acclaimed programming that rivals Netflix’s original content; HBO has recently entered streaming license agreements to stream content like Game of Thrones in select countries; and Disney just launched Disney + - its own branded video streaming service. On the other hand, customers are experiencing “subscription fatigue” from engaging with so many platforms and the industry needs to find

solutions. Despite these challenges, OTT market has great potential and there is clear room to grow. For instance, video streaming services are on the rise globally and beyond global adoption rates, major opportunities or potential exist in non-entertainment markets, such as educational or health-based content and children's programming. We can't forget that OTT services are still rather new, and certainly will undergo significant changes in the years to come.




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Lexus Used-Vehicle Online Platform: Comparative Analysis of Major Competing Brands' Websites



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João Neves , and José Silva 

Abstract The purchase of cars is increasingly influenced by digital. For this reason, car brands have increasingly focused on digital communication strategies in order to capture public interest in their products. This bet on digital is not only in the sale of new cars, but also in the sale of semi-new and used cars.

Aware of this new market trend, Lexus Portugal has ordered the present study, which has as main objective the design of a promotion and sales online platform for seminew and used cars of this brand.

This online platform is not intended to be only a website for the dissemination of the available fleet of cars for sale. It also intends to offer its user a pleasant environment; and, as the user browses the website, he will hopefully be effectively informed about the main attributes of Lexus cars, namely their high reliability.

This paper focuses mainly on the first phase of this research project, where a comparative analysis was developed on the online platforms of the main competing Lexus brands.

Keywords UI & UX design · Digital design · Communication design · Lexus Portugal · E-commerce

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1 Introduction

This research has as main objective the development of a online platform for the sale of semi-new and used cars from Lexus Portugal, which allows the user a good navigation experience and information about the main attributes of the products and services of the brand.

According to those responsible for the brand, the current used car website of Lexus Portugal, despite responding to the basic needs of purchase, does not allow the user a pleasant and properly informed experience about the brand, which is penalizing for sales. One of the main features of the online platform is the high reliability of its cars, namely the Lexus Hybrid Drive system, which has made Lexus the world leader in hybrid cars in the premium sector. Hybrid Drive is a technology that combines the strengths of a petrol engine and an electric motor in a vehicle propulsion system that ensures high fuel economy and low gas emissions.

The desire to provide a pleasant experience of comfort has inspired Lexus to expand the possibilities of design and technology, while always maintaining the perspective that everything you create should generate intuitive action.

There is no single method capable of identifying all usability problems and user experience. The user experience (UX Design) is a set of methodologies that aims to achieve satisfaction and capture the interest of the potential customer, through usability and concepts related to the interaction between users and digital devices. It is intended to explore and investigate the relationship between the digital object and the user interacting with the Lexus used car online platform.

Thus, in this research themes such as user experience, its involvement with the interface, empathic design and usability were addressed, which make it possible to focus project practice on the application of design principles and methodologies, focused on the potential buyer.

Lexus Portugal offers a wide range of services and products known for their luxury and quality. However, this research questions whether the current website has the ability to transmit to the consumer, either through images, interactions and information content, the true experience and values present in the concept and products of the brand (Hector 2018).

Throughout the research, the best contents to present on the page were studied, what is the most effective visual environment for the projection of the brand concept on the interface, as well as sensory issues were explored, from sound, video and small animations, as auxiliary tools in the transmission of the message that the brand wants to pass on to the user.

In this article we present a synthesis of the first phase of research that consisted in a comparative analysis on the online platforms of Lexus' main competitor brands.

2 Methodologies

The methodology of this research aimed to study a set of practices and processes that propose a new approach to the defined problems and, therefore, a set of solutions that can place the user and his experience as the main focus for the solution and obtaining information (Braga 2019; Gangadharan 2019; Hyer et al. 2017; Martins and Enes 2020).

The Design Thinking process is one of the main methodologies indicated for this research. This process focuses on providing a structure and a support for creative processes, helping to find solutions and to identify, in a project, what is essential and really innovative, with the main objective of obtaining good results (Liedtka 2018).

“These two components of design—finding the right problem and meeting human needs and capabilities—give rise to two phases of the design process. The first phase is to find the right problem, the second is to find the right solution. Both phases use the HCD process. This double-phase approach to design led the British Design Council to describe it as a “double diamond.” So that is where we start the story” (Norman 2013, p. 220).

For the development of this project, we began by studying the state of the art of this market, which made it possible to get to know the practices developed by the main competitors of the Lexus brand, namely Mercedes-Benz, BMW, Audi, Volvo, Stand Virtual and Carnext. This made it possible to get to know the territory of these brands better, such as the communication they develop for the target audience.

3 Comparative Analysis of the Online Platforms of the Main Competing Brands

The purchase of a new product increasingly involves the use of a mobile device to obtain information, opinions and assessments from other consumers. This new type of consumer behaviour forces brands to be more attentive and to think about digital solutions that bring them closer to consumers.

In order to better understand the market, an analysis of the main online platforms aimed at the Portuguese automotive sector was started. A comparative analysis was carried out on the main competing brands of Lexus, which was based on the following points of analysis:

1. **Navigation structure:** identify if it is a web page and understand its organization;
2. **Information architecture:** evaluate how the information is organized, as well as the navigation aspects;
3. **Functionalities:** the analysis of graphical and interactive elements of the website;
4. **Color and environment:** positive and negative points on decorative elements, chromatic palettes and visual components;
5. **Usability;**
6. **User experience.**

In this analysis of the online platforms, the strengths and weaknesses were studied, with the objective of apprehending relevant knowledge to be later applied in the development of the new Lexus online platform (Lachapelle 2017).

In order to make a comparative analysis, user research methods were used. The objective was to understand and define behaviors, motivations and anticipate user needs. In this way, the main competing Lexus websites were selected, focusing the research on the service of buying and selling semi-new cars. The selection consisted of six websites inserted in the Portuguese market: Mercedes-Benz, BMW, Audi, Volvo, Stand Virtual and CarNext.

Table 1 represents the online platforms of the selected brands for comparative analysis, with details of their functionalities.

Below is a brief analysis of the online platforms of each of these competing Lexus Portugal brands. This analysis allowed us to evaluate the functionalities, elements and components that build the navigation and usability of the websites; and identified the main strategies that these brands adopted.

Table 1 Comparative analysis of the websites of competing brands



| Features | Mercedes-Benz | BMW | Audi | Volvo | Stand Virtual | CarNext |
|--|---------------|-----|------|-------|---------------|---------|
| Login/Logout | x | | | | x | |
| Favorites | | x | | x | x | |
| Comparator | | x | | x | | |
| Configurator | x | x | x | x | x | x |
| News | | x | | | x | x |
| Product Highlights | | x | x | x | x | x |
| Testimonies | | | | | | x |
| Image Galleries | x | x | x | x | x | x |
| Videos/ Animations | | | | | | |
| Languages | | | | | | x |
| Prices | x | x | x | x | x | x |
| Product Promotion | | | | | x | x |
| Contacts for + info. | x | x | x | | x | x |
| Content sharing (e-mail / social networks) | | x | | x | | |
| Contact directly by e-mail | | | | x | x | x |
| Responsive Website | x | x | x | x | x | x |

3.1 Mercedes-Benz

Structure

When the user starts browsing the Mercedes-Benz website (Fig. 1), a minimalist and intuitive navigation page is displayed. The entire website is designed around search tools and there is a need to provide the user with a quick and effective way to find the desired product.

Information Architecture

The way information is viewed is one of the main weaknesses of the Mercedes-Benz website, since they have chosen to maintain filtering and direct search, without any emphasis on information, namely the advantages and qualities of the brand's services and products.

The website presents a simple structure and with a direct intention: the search for a used car is fast, without many clicks. However, although the search for the product is fast and intuitive, the brand does not inform about the advantages of buying a car at the brand's official dealerships—an argument which Mercedes-Benz should emphasize, taking into account that it is an important advantage for competitors, such as the Virtual Stand, one of the most popular Portuguese used car sales websites.

The product listing page presents a good organization and simplification of the contents, allowing the user an easy reading of the information. The information regarding the characteristics of each car and the location of the sales stand is highlighted. It is also important to underline the high quality of the product photographs, with the cars being presented in a uniform position and framing.

Features

The website presents a minimalist and direct structure, providing a pleasant search for a semi-new car. In the main page, only the necessary functionalities are available,

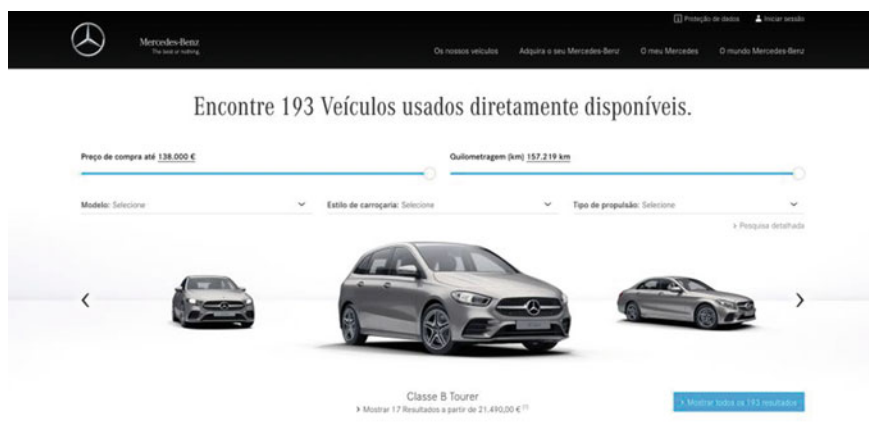


Fig. 1 Mercedes-Benz website

in order not to complicate the interaction between the user and the webpage. The presentation of the models is organized based on a product search, fast and intuitive, through appealing images; buttons that allow viewing all cars; and filtering fields that allow selecting the specific features of the cars.

We also highlight the importance of keeping useful information about cars in the product list, such as the location of the stand and the number of kilometres. It is possible to view all the pictures of the models, still in the product list page, without having to open in a new tab with the product detail.

Colour and Visual Environment

Regarding the use of colour, the website uses a monochrome environment, where the predominant colours are black, grey and white, respecting the brand's corporate identity. From the semiotic point of view, the chromatic selection of Mercedes-Benz's used-vehicle website stands out for its objectivity and pragmatism, through the use of more neutral colors, granting all the protagonism to the product's photographs.

Interface Analysis Conclusions

One of the most important features to retain from the analysis of the Mercedes-Benz website is the simplicity of the product search process and the ease of understanding of the tools provided to the user. In October 2019, the website had changes in the structure and design of the search filters, making the search more intuitive and direct—as Krug (2014) says about the ideology of simplicity: “Good design is obvious. Great design is transparent. Don't make me think” (Krug 2014, p. 39).

However, it is important to note that, despite improvements in the research tools, the platform has weaknesses in content. The Mercedes-Benz website does not convey any message about the brand's values. In other words, it's a website that simply works with a car exhibitor—which is what Lexus doesn't want. Besides exhibiting its cars, Lexus aims to transmit concepts and experiences about the brand.

3.2 *BMW*

Structure

In a first analysis, BMW Portugal's website (Fig. 2) presents a simple and effective structure, allowing the user an intuitive search. However, the communication with the user is not very dynamic and interactive.

The interface is subdivided into distinct areas in order to keep the contents organized and easily accessible. However, this type of structure is commonly used, not excelling in originality.

Features

Concerning functionalities, there is a good hierarchy through an efficient positioning of product filtering fields, allowing a direct and effective search. In contrast to the Mercedes-Benz website, BMW chooses to select and highlight some car models on

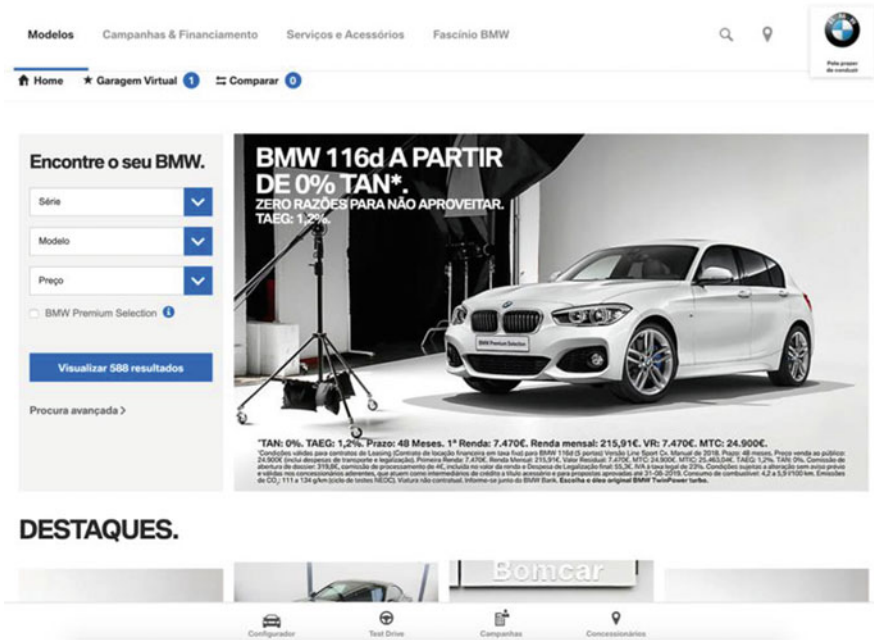


Fig. 2 BMW website (desktop version)

the main page. Small highlights are also presented, which direct the user, in order to obtain more information regarding the advantages and qualities of the service.

Information Architecture

BMW's used car website has a very commercial structure, gathering all relevant information for the user, in blocks and highlights. In this case, concept and lifestyle images have no greater importance than product information or service information.

The information hierarchy is sometimes slightly confusing. This is mainly due to the style of the titles and subtitles which are too similar in terms of dimensions, colour and style.

Colour and Visual Environment

The predominant colours are the neutral tones. The color is, in this case, used as an element that introduces hierarchy and structure to the contents of the website, making it easier to read the titles, categories and the remaining information.

Interface Analysis Conclusions

The BMW website, despite its classic structure, has proved to be a good reference in terms of ease of navigation and search; and the way it presents its products and services.

3.3 Volvo and Audi

Structure

Volvo and Audi brand semi-new and used car websites are built around car search and selection tools. In the case of the Audi website, many of these tools are poorly functional, which is an obstacle to accessing information. In both the mobile and desktop versions of Audi’s website, several poorly distributed and disorienting information text patches were detected (Fig. 3), making the content difficult to read.

Features

Regarding functionalities, the two websites facilitate the use of the car search tools, through the configurators present at the top of the main page. Based on the functionality criteria, both websites meet the basic needs of the user. However, they do not present relevant information about the brand and its values.

There are also some interesting features on the Volvo website, such as the use of thumbnails of car model images, in the configurator present on the main page (Fig. 4). These details provide fundamental support to the user, providing an easier and more informed search.

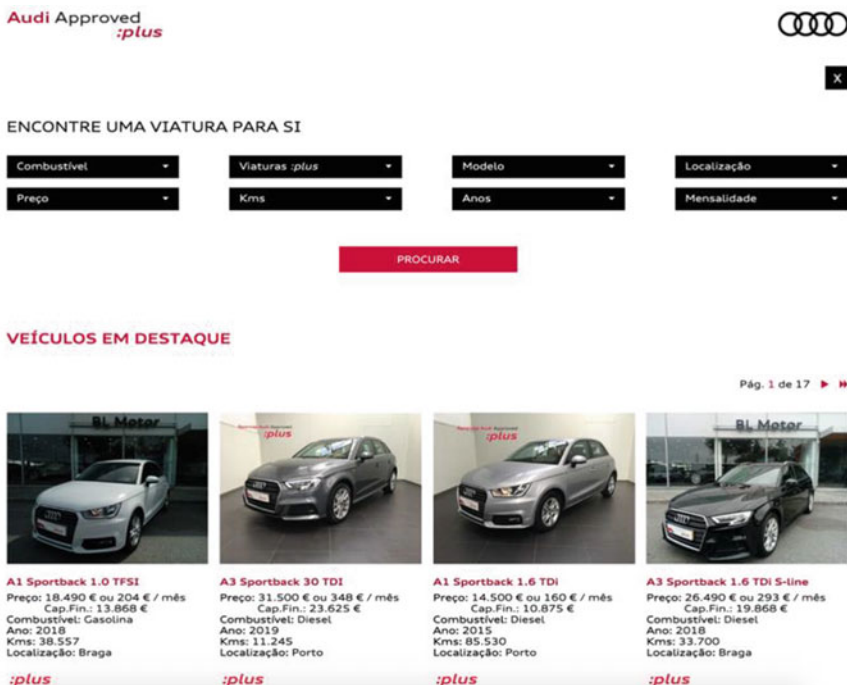


Fig. 3 Audi website (desktop version)



Fig. 4 Volvo website (desktop version)

Information Architecture

The way the content is distributed across the Audi and Volvo website interfaces is no different from the typical structures of a general used car website, and proves to be a safe and comfortable strategy for the user to search. However, on the Audi website it is important to highlight the difficulty of reading certain text blocks which display information relevant to the consumer. In Volvo's case, we emphasise the use of typography and photography as an exemplary way of presenting and organising information (Fig. 5).

Colour and Visual Environment

In Volvo's case, the information is presented in an appealing way, through the support of eye-catching images and titles, where some concepts and brand values are conveyed. In Audi's case, the interface presents a set of monochromatic tones that highlight a visual narrative that is too static and unattractive. However, it is important to highlight the high quality of the photographs of cars that are used on Audi's website.

Interface Analysis Conclusions

In short, Audi's used-vehicle website has a somewhat simplistic interface which does not respond effectively to the needs of its users. In Volvo's case, we highlight some well-designed strategies, namely the use of a modular structure that enables efficient content organisation and viewing; the use of typography and colour as a means of information hierarchisation; the inclusion of contextual images in the interface to support navigation.



Fig. 5 Volvo website (home page)

3.4 *Stand Virtual and CarNext*

Stand Virtual and CarNext (Fig. 6), are the largest and most popular multi-brand used car market websites, used by private persons and car dealers to display their products.

Although the communication strategy of Stand Virtual and CarNext is quite different from what is intended by the Lexus group, they are references that should be taken into account because they are dominant brands in the used car sales market.

Unlike Lexus, Stand Virtual and CarNext's target audience is extremely broad, with a high variety of cars from different brands.

Structure

In an overview, both websites have a homepage with a well-organized structure and a good content hierarchy. These websites do not have spaces dedicated to lifestyle concepts, welfare or promotional texts. The communication of these platforms is simple and direct, focused solely on buying and selling the product. Their webpages have a block structure, intended for the dissemination of products, where the user is given the possibility of acquiring a privileged place on the page, with prices outlined for each section (prices vary according to the level of visibility of the product).

Features

Both websites focus on two objectives: product search through filters, strategically positioned at the beginning of the webpage and with ease of handling; and the invitation to the user to make their product available for sale on the website, where the "Sell Vehicle" button is highlighted.

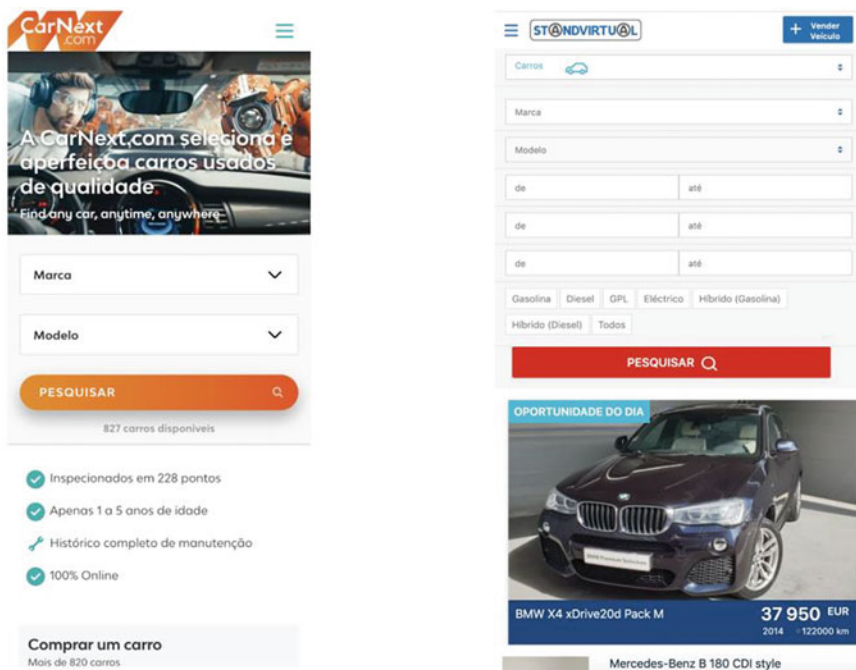


Fig. 6 Stand Virtual and CarNext websites (mobile version)

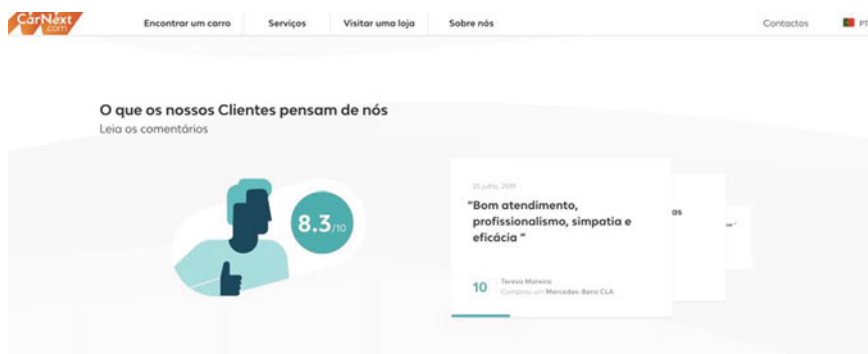


Fig. 7 CarNext Website — testimonial page

We highlight the “Testimonials” section of the CarNext website (Fig. 7). This section is an excellent detail, allowing a more personalized, dynamic and recognition experience.

Information Architecture

Both websites are designed and structured around search tools. These tools are found to be easy to implement, making access to information quite effective. There is also regularity in the dimensions of the images presented, denoting demanding formatting criteria, as well as in the way cars are photographed. It is also verified the efficiency in the organization of the information, which is extremely complex and with a number of variables and very high levels of information.

Colour and Visual Environment

Stand Virtual and CarNext websites, unlike those of car brands, are built through content provided by users, from private individuals to resale stands. For this reason, it is a platform that is constantly being loaded with new information. This high amount of information makes a good organization of the contents to be presented to the user imperative.

In a first overview, the platforms present a selection of neutral colours, highlighting the images of the cars. Sometimes, it is possible to check more vibrant tones that draw the user's attention to information relevant to the purchase process, such as prices, suggestions for opportunities and search buttons.

Interface Analysis Conclusions

The analysis of these websites were fundamental for the project, especially in the case of CarNext, which allowed us to understand the importance of a section destined to the testimonies and comments of some of its clients. The importance of using good photographs of cars should also be stressed, which contributes to increasing user confidence levels in the quality of the product.

4 Conclusions and Future Studies

The analysis of the online platforms of the competing brands of semi-new and used cars allowed a better understanding of this market, identifying good solutions and possible problems to be taken into account; and contributed to a first definition of guidelines for the design of the new Lexus online platform.

The next phase of the project will consist in the development of a set of interviews with Lexus customers and employees in order to better understand the target audience. In view of all the information collected and analyzed, the development of the platform will begin with the construction of the respective information architecture (Booth 2018; Santana 2017; Fanguy 2018; Apple Developer 2011; Martins et al. 2020).

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Fashion Design, Interiors and Equipment

Deciphering Images: A Contemporary Look at Fashion and Visual Culture



Layla de Brito Mendes

Abstract This article aims to analyze how fashion images are created and propagated by professionals and any individual, as well as their meanings in contemporary times. Through literature review and analysis of specific cases, can be observed the influence of the traditional media and social networks on the concept of visual culture, placed by Smelik (2006). Thus, it is possible to understand how the fashion image migrates from the offline to the online environment and how, in contemporary times, fashion communication is done through visual, verbal written and oral language.

Keywords Visual culture · Fashion image · Fashion and media · Contemporaneity

1 Introduction

The internet has democratized the access to information and is one of the important factors to be observed in the globalization process and in the spread of its effects. Information networks, increasingly complex, relativize time and space and guide the development of societies in all its spheres: economic, political, social and cultural.

It is impossible to imagine future without internet, especially when evaluating the context of post-modernity (Harvey 1992; Lyotard 2015). Globalization is no longer a choice to be made, societies are connected and so the effects of capitalism can be felt in real time. It provided the development of a universal language (binary), created new forms and channels of communication and shaped the technological and economic transformations (Castells 1999) that happened and that are yet to come.

On the other hand, as a consequence, the internet generates several structural crises (Castells 1999). The network makes the inequalities much more evident, individuals—that were once only receivers and now have also become senders—propagate speeches, expose themselves and copy themselves, question their identity and

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modify their behavior, especially in regards consumption (Kotler 2017). The fashion market, then, finds fertile ground to identify new opportunities, but keeping up with the speed of change, which is increasingly high, remains the great challenge (Mendes 2014).

Furthermore, the traditional media needed to adapt to the digital medium. Fashion magazines have gone through the difficult process of adapting their verbal and visual language to the digital environment, a fact that still remains to be improved (Elman 2016). Moreover, the main communication media and the renowned opinion leaders (journalists, editors and curators) still had to find their space on social networks, a democratic area of generation and propagation of content (Kristensen and Christensen 2017). In addition to being configured as an open space for each and every common individual, social networks and the way they are used have made verbal language much more succinct when compared to the role that visual language has (from blogs to Instagram), and even transformed verbal written language into oral language (so-called podcasts).

Therefore, this article presents the report of a descriptive research, in which it was observed how fashion images are created and propagated today, supporting the concept of visual culture placed by Smelik (2006) in the chapter entitled “Fashion and Visual Culture”, of the book “The Power of Fashion: About Design and Meaning”. It was developed through a literature review and analysis of specific cases, chosen because they clearly demonstrate an overview of how the transition of traditional fashion communication occurred, from the offline to the online environment. Finally, it was possible to see how, in contemporary times, ordinary individuals take the roles of both consumers and content creators.

2 Fashion Communication: Textual and Imagetic Speech Directed to Consumption

Fashion is a complex phenomenon that involves social, cultural, economic and technological values and depends directly on communication (Lipovetsky 2009). Smelik (2006) states that the way the media propagates the fashion information and the space given to it is able to “shape” its perception in society and consequently stimulate the consumption of its products and services. The society has migrated from a written culture to a visual culture, omnipresent, a process that began with the traditional media—like cinema and television—(Smelik 2006) and today, it can be said, develops through the social networks.

According to Elman (2017), the communicative fashion practice constitutes a hybrid speech formed by journalistic, advertising and aesthetic speeches. Therefore, journalistic discourse is one that reports reality; advertising discourse is one that breaks the private space and brings it to the public, by leading people to a culture of market and materiality; and the aesthetic discourse is the one characterized by visual

expressions, awareness and reflection about what is beautiful and the judgment of taste (Elman 2017).

Freitas (2005) states that the media is one of the biggest organizers of fashion trends, through advertising and also of journalism. Trends are therefore information that can be gained by observing the behavior of individuals and that carry with them aspects of preferences and tastes in a collective agreement, indicating what is being and also what will be consumed in a plausible future (Mendes 2014). In the meantime, the media have two fundamental roles, depending on who sends the message (company or individual): that of propagating products and services offered by brands, impelling them to be consumed; while indicating what is already being consumed by groups of people, serving as a market direction.

2.1 Fashion Magazines: From Physical to Digital

Fashion magazines are specialized publications, with regard to the presentation of products and concepts related, above all, to dressing. According to Moeran (Moeran 2017), they are an integral part of the fashion industry and are able to guide the reader to enchantment, desire and even consumption itself. The author explains that, in practice, fashion magazines are made up of textual and visual language, developed jointly by several professionals, such as photographers, stylists, beauty artists (hair stylists and makeup artists), art directors, designers, among others. In addition, there is the fundamental role of the editor, also known as an opinion leader. It is his responsibility to develop the concept presented and to curate information, seeking content from various sources that together make sense.

The periodicity of magazine publications has always contributed to the seasonal change in fashion, as through the dissemination of new products it directs the reader's eye, who eagerly and incessantly seeks novelty. However, the high competition in the market and the shortening of the time between the launch of a collection and another, by brands and designers, have made the dynamics of production and circulation of fashion magazines more and more sectorized (Smelik 2006). Thus, targeting information to specific audiences has increased the number of publications globally, and the magazine market has also become sectorized. The curatorship of the content presented then starts to focus beyond the aesthetic concept of the image or the brand representativeness and products that it exhibits, it also focuses on observing the consumer, to understand what he seeks, how he consumes and what he expects that the magazine communicates.

Sant'Anna (2002) states that fashion magazines have an important documentary character and that, in relation to the search for information, they are configured as the oldest means of communication. Through photography, fashion information can be better represented, due to the close relationship that fashion has with visual culture. As Marra (2008) puts it, the photographed fashion becomes an image and brings the object closer to the artistic, and through the visual language it documents, permanently, information of passing consumption. These aspects can be observed, for



Fig. 1 Prada III by Andreas Gursky (1998) at the Kunsthalle museum in Bremen, Germany (Kunsthalle Bremen 2019)

example, in the work entitled Prada, by the German photographer and artist Andreas Gursky (Fig. 1). The photographic series portrays a shop by the Italian brand Prada, a minimalist space similar to a museum or art gallery, where, however, the pieces are on display as products produced in series, almost frivolous.

These imagery records, then, assume two important functions: they become historical records when they eternalize the aesthetic values of an era and are useful to ordinary individuals, in their incessant search and decision about what and how to consume.

On the other hand, the popularization of the internet took fashion magazines to the digital medium and gave birth to a new concept of communication. The information started to be shared in a much more comprehensive way, and since it is a global network, the sectorization of the publications market became more fluid. This meant that, at first, the magazines reduced the quantity of printed and distributed physical copies, some of them even being limited to the digital format only. Thus, the entire construction of language, both verbal and imagery, needed to be rethought as a whole to be on the network, especially due to the speed with which the flow of information occurs online.

In this context, online content is more easily accessible to everyone, in addition to breaking the barriers of time and space, especially with regard to mobile access. At first, the absence of printed physical support gave the fashion information an impersonal character and distanced the reader—here consumer, but this barrier can be overcome by the beginning of the touch era. When the mouse was replaced by his own finger, the individual re-approached the act of reading, and thus his participation was intensified again (Elman 2016).

Furthermore, the digital medium has become an important ally in the process of promoting the fashion image, when photo editorials evolve into fashion films (Fig. 2).

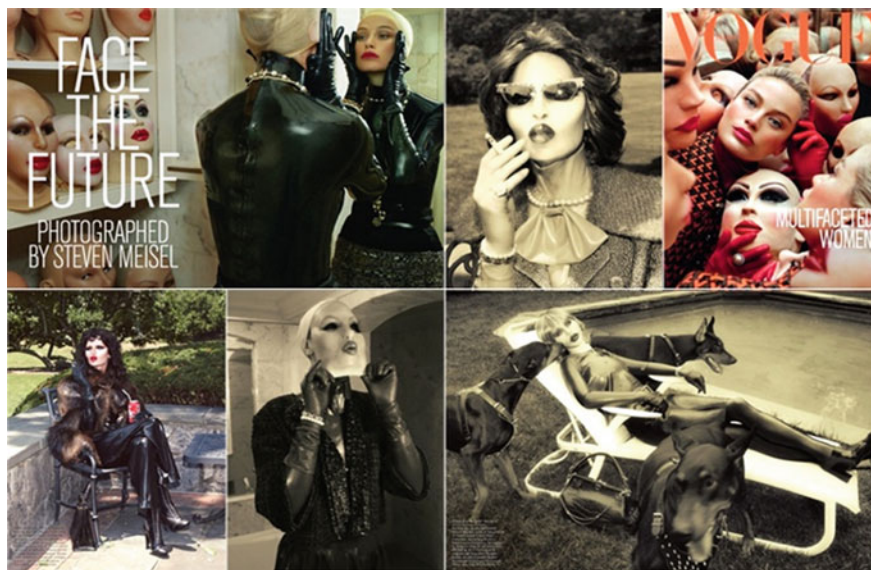


Fig. 2 Face the Future, Vogue Italy September 2012 editorial, photographed by Steven Meisel and fashion film produced by Gordon von Steiner

In the video, other elements are added and become part of the imagery concept, such as music, for example, and the dynamic image is able to take the viewer to another level of sensory perception.

2.2 *Hyperconnectivity, Social Networks and New Opinion Leaders*

Elman (2016) also states that the type of physical support/interface conditions the message, being able to change its meaning, therefore, the media needed to rethink the content to be conveyed. This is due to the fact that the individual seeks, consumes and relates to information online in several ways, depending on his degree of familiarity with the technology, and this fact can be understood by observing the values and characteristics of each generation. According to Porto (2017), individuals of generation Z (born between the mid-90s and the mid-2000s), despite being native to the digital universe, depend much less on technology. On the other hand, Urban (2015) indicates that Millennials (or Generation Y), young adults who are currently between 30 and 40 years old, are called “digital immigrants” because they lived their youth parallel to the great changes proposed by the internet and for that reason they have a close relationship with connectivity—they are hyperconnected.

In the meantime, Kotler et al. (2017) names hyper-connected subjects as net-citizens¹ and defines them as “true citizens of democracy, because they want to be involved in the development of the Internet” (p. 64). They are those who, according to the author, add tags, publish ratings and comments and who create and propagate content online. The performance, then, of net-citizens has in fact its great representativeness in social networks, an open and democratic space for sharing content. According to research conducted at the end of 2019 by the global agency We Are Social (2019), 48% of the world population are active users of social networks, and this represented an annual increase of 9.6%.

Also, according to Kotler et al. (2017), the relationship on social networks starts with a one-to-one connection and continues to increase exponentially, until it becomes a connection at the level of many-to-many. Therefore, companies, brands, designers and the traditional media (magazines and newspapers, for example), knowing the power of disseminating information to multiple groups, on social networks, create their profiles on the most diverse platforms and start sharing content through them, or even to market products and services.

On the other hand, the purpose of communication is to attract the eyes of specific net-citizens, also known as digital influencers. Castillo and Fernández (2019) define digital influencers as being micro-celebrities who have profiles on various platforms

Fig. 3 Kim Kardashian, digital influencer and world-famous celebrity, photographed by Txema Yeste for Vogue Arabia September 2019



¹Coined by Michael Hauben, at the beginning of the last century (Kotler 2017).

and that attract the attention of a large number of followers, through the textual and visual narrative of their personal life—their lifestyle. The figure of digital influencers emerged in an organic way and due to its real impact on consumption, especially in the fashion market, it became a professional activity (Fig. 3). Therefore, this figure legitimizes the power of the network's horizontal communication in face of the traditional verticalization of the discourse (company-consumer), since the report of personal experience is more credible than some conventional marketing campaigns (Kotler 2017).

2.3 From Blogs to Instagram: Textual Communication Versus Visual Communication

Kristensen and Christensen (2017) state that fashion information was previously encapsulated by fashion magazines, characterized as institutions, representing a hierarchy of communication from expert professionals to the general public. The role of magazines is indisputable in the dissemination of information, but the internet and social networks have made fashion ubiquitous, either as an individual and collective behavior, or as a market, in postmodern consumer society.

Still in the words of Kristensen and Christensen (2017), the emergence of fashion blogs places itself as a cultural intermediary, with regard to the dissemination of fashion content: the fashion blogger is situated between the traditional opinion leader (editor) and the trivial digital influencer. According to We Are Social (Harvey 1992), among the most popular social networks globally there is Facebook, Youtube, Instagram, Twitter and Pinterest, all of which are used frankly for the dissemination of fashion content, with the creation of profiles of very quick and simple way. The blog, then, because it is a hybrid interface between written text and image, ends up having its use a little more complex, from the point of view of those who develop it and from the point of view of those who read/consume it: the production of longer text requires more time in research and also demands more time from the reader/consumer of the information. In this way, the fast dynamics of the internet has made consumers much more interested in media that focus more on visual than verbal communication, in what Smelik (2006) calls migration from written culture to visual culture.

In this context, Instagram gains popularity in the fashion market, as it is a social network that is based on quick registration, editing (adding filters) and sharing photos and short videos (Elman 2016). In addition to the published image, information such as location, music, other users' profiles and classification (categorization) can be added through hashtags (Fig. 4). The user then pays more attention to the photograph, since the textual reading comes down to a short caption, and while his participation as a creator of visual content has the feeling that he approaches a professional, because the interface allows him to edit the image as your own aesthetic sense.

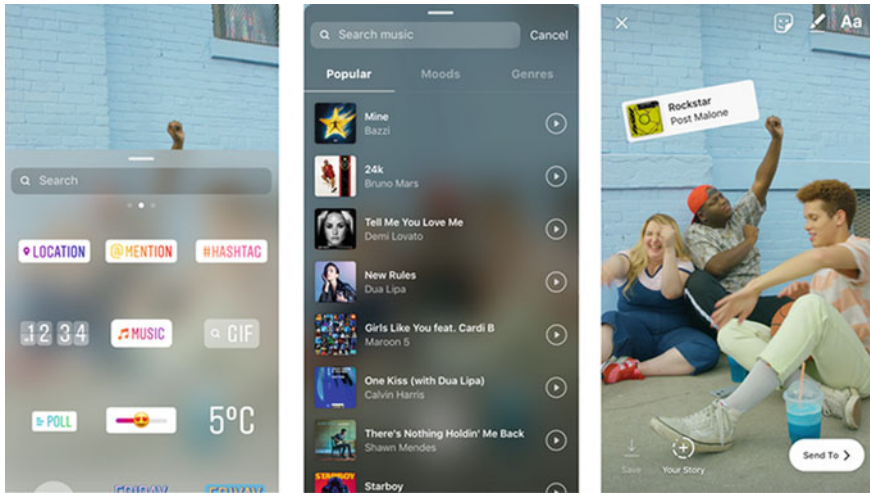


Fig. 4 Instagram and instant image manipulation (Source Instagram 2019)

2.4 Podcasts: What is the Future of Fashion Image?

Podcasts are audio media shared on the internet, usually developed by ordinary users, as a form of independent communication. According to MacKenzie (2018), they are a very convenient means of communication, as the viewer can hear/consume it while performing other daily activities (while bathing or driving a car, for example), without the need to pay attention to a screen. Although they usually last for a long time—and this aspect goes against the current search for quick information—podcasts have become popular because they are an open space for the free expression of the opinion of the content creator, where literally his voice is the central point of communication.

In the context of fashion, it is a means of communication still under development, seeking to find space between traditional and social media but which has great potential to establish itself, considering the characteristics of the consumer and the market in postmodernity. Therefore, some brands, designers, journalists and digital influencers already use it as a communication strategy: John Galliano, British designer and head of Maison Margiela's creative direction; the Italian high fashion brand Gucci; the Business of Fashion news online platform; Sofia Amoruso, entrepreneurial and creator of the NastyGal company; French journalist Camille Charrière and Canadian digital influencer Monica Ainley are some globally recognized names who already share information through podcasts.

On the other hand, it is a type of media where there is no space for the fashion image, its content is described and commented on, without visual support. But even so, the image content is propagated, the concepts are deciphered by the content creator and shared under his point of view, in a literal way of democratizing information.

3 Considerations

Like all cultural aspects of society, fashion has undergone immense transformations over time, especially with regard to its consumption. Postmodernity, the current period that is marked by globalization and the popularization of the internet, puts the notion of space and time in perspective and reorganizes individuals and social groups in a network. The individual, in the digital age, searches for fast, accurate and sometimes succinct information, and will use it in his process of consumption and appropriation of the fashion product, having started with a specialized traditional media or social networks.

Before the emergence of social networks, traditional media were primarily responsible for the development and propagation of the fashion image. Fashion magazines disseminate information about products and consumer practices through textual and visual language, prepared and selected by professionals, but they had to adapt their format to the digital medium—a difficult and still under development process. In social media, information also needs to find its proper format, relative to the text or image, which is why digital influencers have gained important space in the market: the information they spread is horizontal and represents the real consumer experience.

Curating information is quite complex and important, with regard to the propagation of speeches and concepts, but today the common individual is placed face to face with the curator, in the role of content creator. And if, in both situations, the information before being released goes through the subjective perception of a subject, the space to question its content must also be the same.

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Art and Fashion a New Approach



New Forms of Value Fulfil at the Intersection of Fashion and Art

Maria Antonietta Sbordone 

Abstract Fashion as such was born from the French *couturiers* who made it a work between Art and handicrafts; the ability of the master craftsman fully fulfils the desire to sublimate the image of the woman, as an expression of the aesthetics of the time. Art itself provides an inexhaustible reservoir of artistic intentions, to be poured into the ravenous world of fashion; the transfiguration and implementation of Art in fashion takes place thanks to the many craftsmen's craftsmanship, that transfer the artistic intentions into manual work practice, characterized by incessant creative rituality. Pouring the contents of the Art into fashion, with common or less common materials and techniques, depends directly on the *couturier*. The artisan culture' evolves according to the requests for creative implementation; keepers of the "artistic" knowledge that comes from the Arts and Crafts, Jugendstil and Art Nouveau movements. The latter expressed the idea and all the intentions of total Art. Fashion saw, through the lens of total Art, therefore, acquires new value.

Although it has been marginalized, because it is contrary to the industrial organization and the schematization of each production phase, typical of modernity—the origin of fast fashion—, it favours, conversely, the exclusivity of the handmade which corresponds to practices, related to space and time for their realization. How does fashion evolve, from *couturiers* to industry, to the complexity of a heterogeneous system, up to the latest expression of the *savoir-faire* of luxury? The latter is closely connected to the new expressions of trans-modernity and the all-contemporary obsession with widespread aestheticization, promising the emergence of artification of fashion.

Keywords Artistic intentions · Incessant creativity · Artistic knowledge · Exclusive handmade · Artification

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1 Introduction

The progressive transformation of the forms and conditions of implementation of the Fashion artefact, from the Atelier to the Fashion industry, finally to today's Fashion System, contains parallels and similarities with the evolution of the production of goods and services in general.

The transition from a form of work organization, initially headed by a *couturier*, subsequently with the advent of the "Fashion Industry", the organization is fragmented into individual production units, creative-design (divided into textiles and clothing), directed by a team where, at the head, there is a designer or several designers. The subsequent transition to the "Fashion System" highlights a complex type of organization in which different industrial, craft and professional activities interact and where, creative and design activities are widespread in the various production-distribution areas. In this kind of organization, upstream activities (research and innovation, marketing, trend surveys) and downstream activities (relationship with customers, distribution and sales, customer satisfaction) are becoming increasingly important.

This organization has multiple implementation trajectories: a system made up of large financial groups to which brands and large (historical) houses belong, investing in research and innovation and succeeding in establishing themselves on domestic and foreign markets; in parallel, a dense network of small and medium-sized enterprises exists, brand owners and often licensees of large brands, specialized in the creative production process. There are also new roles of creatives and designers who have an advanced approach, they formulate a product concept that adheres to a new scheme of thought, related to resilience and resistance.

The new creatives adopt the craftsmanship system, develop innovation through the hybridization of materials and processes, moving on non-conventional terrain. They are on the threshold of the traditional that intersects innovation, translating it into a fluid material, on which isolated concentrations are grafted, all tending to new visions of Fashion.

2 Creation and Routines

The so-called traditional fashion creation is centred around the figure of the *couturier* who works in his atelier, submerged by the tools of his work; a vast tangible and intangible archive continuously updated to feed ideation and realization. The figure of the *couturier* established himself between the end of the nineteenth century and the sixties of the following century.

Connoted, in the beginning, by an artisan knowledge of the practice of hand-made and by accurate attention to material quality, the *couturier* establishes direct relationships with his client-guide to whom he transfers the cultural and artistic atmospheres of the time. Its goal is to enhance the beauty of the body, through

tailoring modelling, creating unique sets in the culture of the time, with a clear reference to the artistic movements prevalently of Art Nouveau, with all geographic declinations.

The *traditional fashion model* of creation is followed by an *enlarged-based design model*, founded on the comparison between the designer the company and the world of production and consumption. The process of fashion appears as integration between knowledge and product, with a precise idea of a connection system between services, manufacturing industry and creative laboratory, system leads by the style department (Loschek 2009).

The transition from *enlarged design* to the subsequent phase of *widespread design* is achieved thanks to fashion designers who declare a breach with established ways and methods. Fashion opens up to hybridizations and contaminations with other systems: materials engineers, mathematicians, graphic designers, artists, directors, photographers, designers, architects, video makers. The manipulation of the yarns, the study of the sensitive quality of the material, the chromatic research, the grafting of the sciences into textile innovations, and the development of new materials, in addition to the search for environmentally and socially sustainable solutions, represent new horizons in the fashion-oriented field.

The *enlarged design*, based on the aesthetic-experimental research that takes place in the style department, introduces us to the practice of *widespread design*. The protagonist is the “fashion designer oriented” to the design as a multidisciplinary tool. A fashion designer whose origin lies in the figure of the artistic director who goes beyond the authorial dimension, since it is a design-driven practice that leads him to work in well-structured teams. He is called to reexamine and reinterpret the history of a particular brand.

Over time, this kind of designer has become a sort of “explorer of parallel worlds” and at the same time, a “visionary of the future”. Explorer, he/she translates past and future history into new material: from the historical-iconographic deposit of the Maison, he/she updates stylistic elements, materials and practices, through the multidisciplinary research of contemporary inspirations.

Dischronically (Sbordone 2012), between the late nineties and the beginning of the 2000s, he/she oscillated between two prevailing orientations: crafts updating and virtual-augmented fashion. The dress represents the geography of stylistic relationships that evoke marginal territories, made of manual and artisan practices (Conti 2005).

Solemn demonstration of their origin lies in the a-temporal and dischronical order that is not evident in the space of the dress but, is expressed in the time of the narrative, decisive for the understanding and disseminating knowledge.

The virtual-augmented fashion orientation refers to the ways and times, on the one hand, of the diffusion of knowledge of the creative-realization processes, on the other hand, to the ability to create an interdisciplinary or multidisciplinary space.

This kind of space represented a relational eco-system of a technical-scientific nature, closely connected to the manufacturing system that feeds on the innovations inputs provided, to be implemented in production, acting to introduce innovation

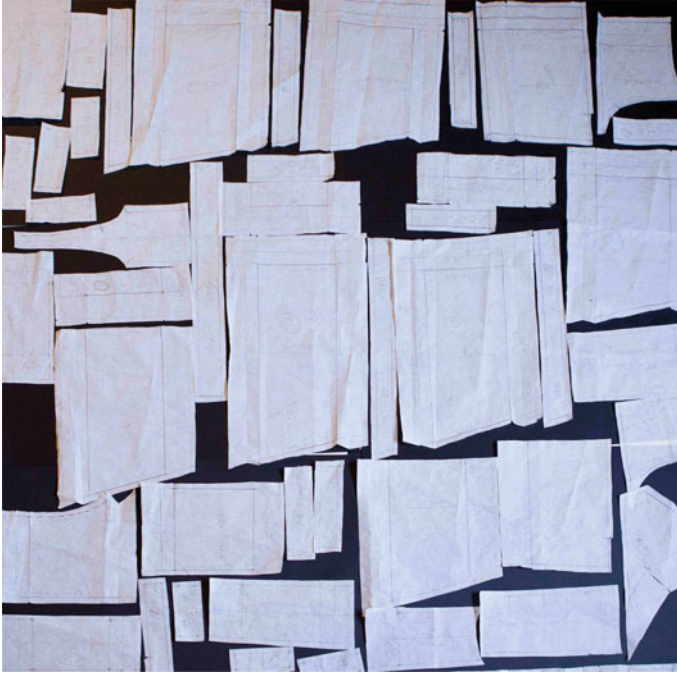


Fig. 1 Creation and routines. Pattern making process phase of positioning on fabric

along the entire value chain. The eco-system is completed with the critical-historical-artistic components that summarizes the forms of innovation, through the actuality of the organic translation of the forms created (Fig. 1).

3 Feeding New Knowledgeable Values

“In the current global expansion of the interdependence of economies, all cultures come into the game, cross over, mix and are decontextualized and made spectacular. Nurturing the continuous renewal of signs and sense productions with which fashion feeds. Fashion is in fact an overflowing text of objectifying speeches, of grammar internalized in bodies, clothes, accessories, images. So today fashion, which has always been a world in multiple dimensions, is not only a change, trend, spirit of the times, a succession and combination of styles, it is not only a relationship between social classes but the fullest expression of a post-modern industrial culture, which has its own way of being in the project” (Fiorani 2006).

The design-oriented stylist, therefore, finds the design action by determining a complex system of interdisciplinary or multidisciplinary interactions. Since, some scholars from different backgrounds (anthropologists, sociologists, economists,

historians, the designers themselves) consider fashion, despite being an expression of the textile-manufacturing production sector, as a creative and/or cultural industry aimed at capillary and incremental innovation (Unesco 1982).

It is widely believed that fashion is a *sui generis* cultural industry, supported by the implementation of various programs. “New distribution strategies in the area, technological experiments [...], after-sales service (tailoring repairs, custody and refurbishment, customization or sizes etc.), engineering of the collection, uses according to a precise scheme that takes into account the evolution and segmentation of the target, their symbolic needs and their spending power. In the supply chain, there is still a significant component of material production of the final goods which incorporates a set of executive work and use of labour-intensive industrial plants, but also of knowledge and craftsmanship skills that contribute to the construction of the value of the finished garment. However, most of the industrial process consists of intensive design planning operations, where design and innovation activities are predominant” (Mora 2008).

While, the cultural-creative and design dimension lies in an interdisciplinary or multidisciplinary vision. Additionally, the fashion project performs the space in which different practices hybridize to create a product with multiple identities. Design-oriented stylists elaborate a process within which non-adjacent professionals are committed to sharing in a converging project: a type of clothing, but also the complex system of collaboration with all the consequences on the networking system. The goal is to create an all-encompassing, multifaceted design that aims at measure itself with dischronical contemporaneity.

“It is a plural design in which the specializations, increasingly sophisticated and contextual, multiply, without thus giving rise to closures and rigid compartments, but to a plurality of languages and specificity of methodologies, which interact and make more pervasive and articulated the field of planning.” (Fiorani 2005).

The founding element of the fashion project, as experienced today, which holds together the creative dimension and the cultural one is innovation. Recognized as the essential to assign absolute relevance to research as understood by the culture of the project; a system of convergent and simultaneous knowledge that is planned to be re-positioned and re-interpreted in emerging and unusual contexts. Since it is a process spread through the network, because it is characterized by the sharing of knowledge, it lends itself to the transfer of technology and knowledge, breaking the schemes and spreading from one production sector to another.

Innovation, to take up Augé’s words: “It does not concern the strictly technical sphere: it is the translation of a vision of the social, economic and political world” (2012). “Training for innovation means, [...] training for technical realization but also thinking about the society in which such realization is placed. The development of innovation not necessarily is limited in finding the best “technological” solution: this innovation must be in harmony with the expectations of the various stakeholders (users, communities, producers, etc.). In short, a complete upheaval of the traditional cartography of knowledge” (Augé 2012). A rethinking that is based on clear concepts. “In praise of diversity, participation, interdisciplinarity, the relationship between the technical and social spheres, the praise of research, continuous training” (Augé 2012).

In the production sector, innovation is also synonymous of co-design that means: a company develop services or products in a collective and total perspective, and it is precisely at this way that other sectors of fashion design take place (Fig. 2).

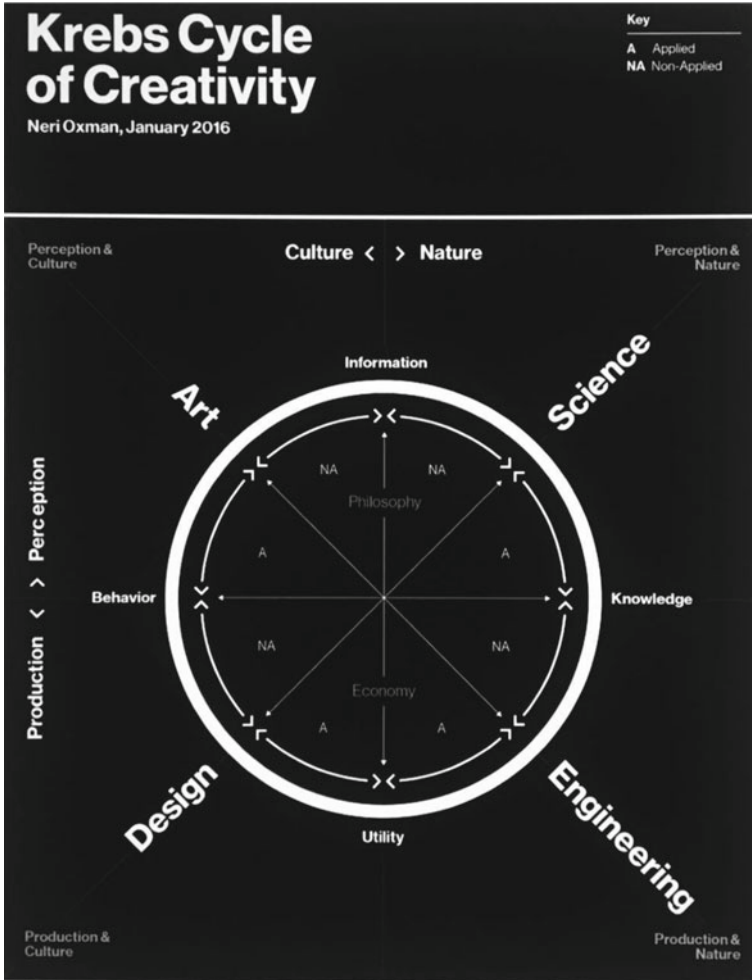


Fig. 2 Unorthodox approaches. Of anti-disciplinary or of anti-fashion. Kreb’s Cycle of Creativity, Neri Oxman, 2016

4 Unorthodox Approaches of Anti-disciplinarity or of Anti-fashion

Augé's interdisciplinarity condition assumes the role of interpretative model and new condition in the Fashion creation-oriented, if, moreover, the hypothesis of evolution beyond Fashion, means to acquire extraordinary tools to stimulate the co-creative cycle, which requires the expansion of the condition of almost de-specialization and therefore of advanced hybridization. In parallel, the possibilities inherent in an "anti-disciplinary" approach (Ito 2016) are investigated, as a direct consequence of the symbiosis of the creative-technical-scientific disciplines, proposed in the Krebs Cycle of Creativity by Neri Oxman (2016)¹.

Starting from the assumption that the current interdisciplinary model is based on a clear integration of collaborative disciplines, the "anti-disciplinary" model is placed at the antipodes: "it is a question of working in spaces that simply do not adapt to any existing academic discipline, the antidisciplinarity is a specific field of study with its particular rules, its frameworks and its methods" (Bill Welense in Ito 2016). The hypothesis that the integration between Fashion Design and different disciplines (technical-scientific) can take place in an "anti-disciplinary" way, to configure a rigorous and at the same time engaging and prosperous model, giving an original and unorthodox contribution of the 'exo-disciplinary' kind.

The slogan with which the recruitment of the MIT Media Lab laboratory takes place is significant, in fact, it is based precisely on the dialectic between the disciplines which, not finding a point of contact, because this simply does not exist, quotes: "if you do not fall into any discipline existing either because you are among the disciplines or simply beyond the traditional disciplines (...), come to the Media Lab only if there is nowhere else to go".

We are the new *Salon des Refusés* "(Evan Freedman in Ito 2016). In view of a non-collocation, almost a refusal by the consolidated interdisciplinary establishment, the image of the space of antidisciplinarity is represented through points that emerge from a white substrate and that can be translated into isolated points; they are placed in the heterogeneous humus where they were generated, which plays the role of condenser and diffusion medium.

The representation of the anti-disciplinary space uses the following image: "When I think of the "space" we have created, I like to think of a huge piece of paper that represents "all science". The disciplines are small black dots on this white sheet. The enormous quantities of white space between the points represent the antidisciplinary space" (Paul T. Kidd in Ito 2016).

The available white space has the essential characteristic, as well as antidisciplinarity, of a sort of "de-specialization"; black points represent anchors, where the

¹The Krebs Cycle of Creativity (KCC) is a map that describes the perpetuation of creative energy (creative ATP or "CreATP"), analogous to the actual Krebs Cycle. In this analogy, the four modes of human creativity—Science, Engineering, Design and Art—replace the carbon compounds of the Krebs Cycle. Each of the modes (or "compounds") produces "currency" by turning into another one.

location of the disciplines, understood in a current way, finds an uncertain, voluntarily fluid and variable positioning, dependent on time rather than space. The urgency of dealing with complex systems that configure creative-operational networks requires a substantial effort in redefining the approach which, of course, no longer satisfies exclusively the condition of interdisciplinarity.

The hypothesis or proposal in terms of a creative-technical-scientific approach is oriented towards the definition of a collaborative model (Ito 2016), in opposition to the many interactions that make up a complex mosaic of so many different disciplines. Often, spatially and temporally interconnected disciplines do not clarify the terms of the same problem, when investigated from another point of view, precisely by virtue of an approach that derives from a substantial set of the orthodox operational tools.

The conquest of a white space of design and action, placing itself in the same groove of philosophical reflection on the future of the technical-scientific approach, in the creative and operational areas of the Fashion system—devoted to antidisciplinarity—, finds its point of arrival in a sort of “de-specialization” with respect to the conditioning and heritage that each discipline carries with it.

If we reflect on the recent evolution of fashion that gradually moves from the design of artefacts, products to services that prelude the “complex adaptive systems” (Ito 2016), where new systems of values are established, the central role of the designer becomes participatory. The action of the designers, engaged in the development of products and systems that interact with the environment and with the human being, focused on customer satisfaction and environmental circularity, refers exclusively to the increase in the efficiency of sustainable operation.

A condition that does not guarantee the inclusion of other sorts of systems, given that the boundaries of each one is not defined univocally and that once the transformation is triggered, congruent and programmed systems for self-evolution could,—also given the adaptive and complex nature—respond in a negative way to the unintended effects on them, from which many negative and unintentional responses for ourselves could come (Figs. 3 and 4).

Fig. 3 Sheltered from the loss of *savoir-faire*. Anne Agbadou-Masson for DIOR cruise collection in Morocco, 2020



Fig. 4 Sheltered from the loss of *savoir-faire*. Craft wool processing for DIOR cruise collection in Morocco, 2020



5 Sheltered from the Loss of *Savoir-Faire*

If we think of anti-fashion as the possibility of thinking and designing fashion as a creative, cultural and inclusive work, characterized by a conscious “decomposition of knowledge”, we get to the idea of redefining the “use parameters” of knowledge.

A process that requires a reorganization of the traditional edges between the disciplines which, in this case, uses the interstitial space, that connects the latter to re-compose the associative dynamics or, conversely, dissociative (Alison and McCarthy 2017). This process is not immune to confusion and loss of specificity or skills, two parallel planes of the above-mentioned design white space can be distinguished: a plan for re-contextualization of the boundaries of the disciplines, which is played on the theoretical-critical level; the other one of continuous updating of the specific features of hand-made and artisan production practices.

The two plans are closely connected, one affects the other, are immune to any type of hierarchy. If anti-fashion is created as an autonomous and resilient process, and if the foundational prerequisites of the unity of the arts, prefiguration of the complete subsidiarity between the artistic and scientific disciplines, are settled, unexpected scenarios emerge within which scientific knowledge is lost their original identities, to merge with the arts (Mora 2008).

The design-oriented stylists develop a trend that places them in the role of producers not only of creators, thanks to advanced technologies and devices for controlling operations remotely they are simultaneous: in the place of ideation-creation (style office); a moment later at the production control (atelier); estranged and immersed in the search for innovative scenarios (trend research); or looking for working techniques derived from old production methods (tradition and heritage); creators of connections with other places of production and creation; discovering local working techniques in compliance with the rules, they re-interpret the stylistic motifs; concentrated in the transfiguration of their creations, they graft the values of local cultures (Sbordone 2016).

In short, great interpreters of everyday life rise to the role of directors and a moment later, or even simultaneously, they lower themselves to the role of producer. Interchangeable roles are played at the level of the process of the ideation-creation, production, distribution and communication phases, established on horizontal exchanges a “type of approach, knowledge sharing [...] developed in the within the community of practice” (Bertola and Conti 2007).

Symptomatic of this process is precisely the imprinted character, that is, intricate humus that does not remain hidden but reveals itself in its essence of nourishment becomes evidence and reference of contents and visual for that granary from which the anti-fashion, isolating the variables of current fashion, it focuses on proposing a new value-creation process.

The latter is based on the widely tested assumption that gives the fashion project the label of process-product, inextricable duality: the element of the creative project can be touched by hand and if this is true, it cannot be only an individual expression but, it contains and demonstrates belonging to a wider supply-chain characterized by alterations and relocations, by anticipations and anachronisms (Matteucci 2017). The complete work, but never finished in its obvious finitude, leaves the speeches open because the continuous references are, although still the expression of an authorial “gesture”, the reflection of an identity that anticipates the antidisciplinarity of inextricable plural and indivisible paths.

The designer-oriented stylists by redesigning the ideational and productive praxis amplify the effects of the relationships established between ideation and execution. The main purpose is to arrive at an identity system based on the concept of resilience: welding the knowledge of traditional local techniques with the experimentation of the most advanced ones, means participating in the ongoing trend of autonomy and resistance to the superfluous. The tendency to go beyond one’s own competences does not mean abandoning the specific features of the textile-manufacturing sectors, but rather raking knowledge freed from disciplinary constraints to create goods full of scientific and cultural references (Chauchat 1981).

The sharing of the ideational-productive processes diffused within the heterogeneous network of actors, the designer-oriented stylists consider the fashion project a sort of “social and cultural object” without disciplinary boundaries where everyone finds their contribution. The platforms such as Instagram, Pinterest and Facebook collect and narrate the processes that lie behind the new creations of the movement identifiable as anti-fashion; a new life project is concealed behind the beauty of the narratives that are the evidence, the proof of the truth of the processes and practices, represent the authenticity of science that responds to the advancement of the creative project because it is in the concern of multiple disciplines (Caves 2000).

The totality of the anti-fashion project reveals itself in the ability not to move the gaze elsewhere and to focus attention on the evidence of the manifestations of inclusive know-how, supported and nourished by narratives, living testimonies of the progress of the project: styling department that feeds creativity; discovering of local working techniques in specialist companies; consequentiality in choosing materials; deciding themes of the collection; dealing with narration/representation of the garments and the atmosphere of communication.



Fig. 5 The savoir-faire vs artification. Hand-woven textiles for DIOR cruise collection in Morocco, 2020

Anti-fashion does not focus on the market tout-court but on the culture that each creation as such expresses, the new value chain that is developed is all in the challenge to transmit a total project even more inclusive of the consolidated rhetoric of Art Nouveau that, although it revealed the close relationships between the major and minor arts, remained a legacy of a rich and cultured bourgeoisie (Crane 2012).

The new trend of total art, the expression of which resists and amplifies the creation of fashion, a sector that influences every interstice of society in a constant and widespread way. It expresses the inexhaustible capacity of attraction that is exercised through effective and increasingly aggressive, convincing mechanisms (Lipovetsky and Serroy 2013). This creative energy has to deal today with the environmental challenge and with the increasing commitment of the younger generation who ask for social and cultural contents, rather than empty symbols (Fig. 5).

6 The *Savoir-Faire* vs *Artification*

The anti-fashion-designers, witnesses and initiators of an interconnected and hybrid system, move within the different phases of the design process independent and self-reliant. They work closely with expert craftsmen to recreate textile surfaces,

increasing their symbolic meaning through yarns, prints, applications that derive from unique and irreproducible manufacturing techniques elsewhere; the close link between processing and territory draws greater strength and is consolidated in productive landscapes (Gecky and Karaminas 2012).

The productive landscape is an inextricable combination, completely merged with the human landscape; the way of composing motifs, the way and techniques for creating complex representations. The rhythms of ancient textures are relaunched by contemporary motifs, textures or prints on different materials each reveal of its own territorial context, where the fusion of languages takes place in expressive variables that condense manual skills and tangible and intangible resources. In this scenery of convergence towards territories that express production excellence, anti-fashion stylists are creators of meaning; each of them interprets contemporaneity through their own itineraries of meaning, maps are one of the most tangible expressions of the encounter between design-creative skills, the scouting of exclusive manufacturing techniques and the productive and cultural landscape that favours and inspires them.

Among the most emblematic examples that resist at the time is the map of the *savoir-faire* of the Dior Maison: “At a period when there is a lot of talk about cultural appropriation I think it is necessary to explore the very essence of fashion, which is also technique and tradition”, said Maria Grazia Chiuri, at the helm of the womenswear of the LVMH Maison; “If you ask me if I took the risks, I answer yes. Today, designing fashion is not just making a beautiful dress but thinking about codes and craftsmanship”. The program that carries on in the name of the Dior tradition is to: “(...) enhance and highlight the great *savoir-faire* of the Maison”, the commitment is aimed at expanding the existing heritage and injecting creativity through the culture of contemporaneity.

The ateliers of the French Maison, which have always supported the production, are a real reserve of crafts and knowledge that, originating in France, determine the interest and admiration of the owners and those who “make” fashion in international level. “You can literally get lost in these places,” says Chiuri, “when they brought me to my establishment, I was overwhelmed by so much knowledge, by so much beauty. Craftsmanship and *savoir-faire* are and remain fundamental values for contemporary fashion. It is the basic qualities that make this craft great”.

Alongside the historic ateliers of Dior, the policy brought by the brand that holds the luxury production label is fully expressed in the cruise 2020 in Marrakech in Morocco, where local culture inspires and is an integral part of the creations becoming a real expansion of the French ateliers, an international laboratory.

The dualism between cultural appreciation and appropriation is clarified in the commitment shown on this occasion (and in others) by transparently establishing the origin of the brand-related to a specific country, with its own stylistic identity, which appreciates local cultures by integrating techniques craftsmen in their original *savoir-faire*. Dior amplifies his Parisian ateliers to expand the map of international *savoir-faire* that contains the laboratories of the world, belonging to the productive landscapes. According to Thomai Serdari: “Today, Dior reexamines its relationship to the concept of craftsmanship and questions how craftsmanship itself becomes a

touchpoint through which the brand connects with other cultures and more customer segments in the global market”.

In Africa, the Maison collaborates with the Sumano social project to facilitate interaction with Moroccan tribes and local artisans. Over the months, four Anti-Atlas tribes have worked to create more than 250 ceramic pieces for the presentation of the collection. The artisans developed their version of the iconic coat of the Dior work—made up of six hand-woven and hand-painted henna panels—which opened the show. The technique of wax fabrics—which have a high cultural significance—has been integrated into several models, the collaboration took place with the Ivory Coast Uniwax studio. Before and after the show, the contents published on Dior’s social media channels shared the narratives on the involvement of the artisans with a wider audience, ensuring that the cultural and social contents of the brand spread beyond those present.

“We decided to talk about the craftsmanship that travels all over the world,” explains Ms Chiuri in a short film when asked why she was inspired by Africa for the collection. “I like this idea of travelling objects and techniques.”

“Luxury brands that are invested in long-term growth and have declared their commitment to authenticity, emotional sensibility and open-mindedness are expected to tread carefully around other cultures and their proper intellectual treasures,” Ms Serdari continues in arguing, “Dior has articulated its own identity very clearly “Dior’s initiative sets a great example of how a luxury brand can contribute to the strengthening of other people’s culture and the reinforcement of its economy” (Serdari 2015).

6.1 Conclusion. Wearable Works of Art

The dynamics of the appropriation or appreciation of luxury brands of savoir-faire expressed by local world cultures represents one of the aspects of a very evident phenomenon that has been making its way for at least twenty years, a sort of “artification” of fashion (Kapferer 2012).

This phenomenon emerges from the need for luxury brands to stand out more and more in world competition, this is equivalent to transforming the perception of luxury from a sector that cultivates excesses and inequalities to a sector that, conversely, transforms consumer goods into identity values. Historic luxury brands are at the center of a phenomenon that is constantly advancing, through the concept of artification they carry out a process of brand transformation in the same way as a witness of contemporary art (Volonté and Pedroni 2013).

In order to be realized, this process requires the skill of the craftsmen who devote time to making unique objects, expressing specific techniques. Luxury brands engaged in global competition, to face the numbers of industrial production, to maintain the aura of exclusivity that surrounds them, are obliged to adopt protections. The handiest shelter consists of the artification process that takes place through appropriation dynamics of the strategies of consecration proper to art. The brand adopts

the strategy that consecrates an episode or an art object, making use of designated places such as museums and art galleries.

The need to resort to art to change the statute contributes to the legitimization of high prices because these are not entirely commercial creations, given the time and the skill necessary for their realization, they are priceless and timeless precious objects. These criteria, excluding access to a few, refer to humanistic motivations, focusing on the sublimation of creations or objects that condense the work of artists of great talent, traditions and culture, art and creativity characterized by timelessness. According to Kapferer (2012) “artification can create value in four major ways: producing a continually renewing contemporary image of a brand proud of its heritage; presenting the brand as an advanced cultural agent, not a commercial one; reducing the obligation of rarity in the era of reproducible works of art (Benjamin 2010); creating a barrier to entry against newcomers, such as creative brands managed by younger designers”.

In the conquest of the connotation of art to the fashion artefact, the value-creation process sees the entry of the contents of the art and the figure of the artist who acts along the entire value chain: “upstream at the conception of products, production level, and know-how, and downstream in relation to retail architecture, window panels, packaging, merchandising, and communication. For luxury brands, every act must be creative and refined to create a sufficient gap” (Kapferer and Bastien 2012).

The artification strategy positions luxury as the model of human work, providing examples of crafts from all over the world, in addition, brands could rise to the role of living example as the only form of human work that combines creativity, art, artisan patience, ennobled to the role of a new art form that is worn and goes through the times placing itself substantially over current fashion (Figs. 6, 7 and 8).

Fig. 6 Artification



Fig. 7 Wearable works of Art

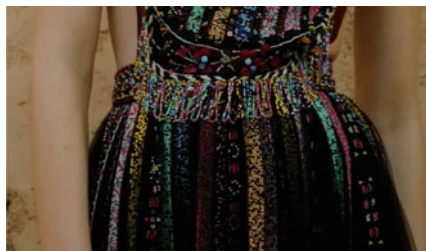


Fig. 8 Hand-woven and paint textiles for DIOR cruise collection in Morocco, 2020



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The Ephemeral Established: An Analysis of the Narratives of Fashion Exhibitions (2009–2019)



Carla Colares

Abstract Clothes are collected and exhibited since the 19th century, evidenced mainly by their historical or ethnographic characteristics. However, from 1971, textiles go through a new contextualisation when they enter the domain of museums, and other issues such as cut, author and style began to be part of the criteria for the selection of objects for the narratives in such spaces. Therefore, fashion exhibitions and museums dedicated exclusively to fashion are challenged to build this tenuous relationship, where the ephemeral and the eternal are in constant tension. This study aims to conduct a documentary research of what fashion exhibitions communicate, identifying the narratives related to the fashion phenomenon in museum spaces in the last decade (2009–2010) in nine institutions. To achieve this objective, the research technique employed consisted of an exploratory content analysis of the official description of exhibitions on official websites and annual reports. Overall, 164 exhibitions were mapped, with themes related to history and author being the most frequent. However, it was observed the effort to bring less traditional narratives, positioning the fashion object in a broader context.

Keywords Fashion · Exhibitions · Narratives

1 Introduction

This study aims to research what fashion exhibitions communicate, identifying the narratives related to the fashion phenomenon in museum spaces in the last decade. Currently, the intersection between these two universes and the consequent exhibitions connected to the theme has consolidated fashion as a major cultural attraction. Because of their relevance and popularity today, fashion exhibitions are considered part of the contemporary *zeitgeist* (Steele 2008; Palmer 2008).

According to O’Neil (2018) fashion is a popular subject because the act of dressing and comprehending how the body can be stylised makes it accessible in its essence.

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Thus, fashion is a subject that inhabits a game between private and universal, history and novelty, culture and consumption, making most people have a prior knowledge about it. Likewise, the democratisation of fashion through technology during the first part of the 21st century, with blogs, media and the fast-fashion system, is considered one of the reasons for the interest and subsequent participation of the public in these exhibitions (O'Neil 2018).

Through the permanent work related to the collection, conservation, research and exhibition activities, the museums are responsible for the shaping and the manifestation of the consciousness and identity of individuals and a community, being crucial for the understanding of personal, collective or even universal stories. These stories are articulated via objects through a dialogue mediated by the figure of the curator and exhibition designer, ratifying the notion of communication in the exhibition space. A narrative can be understood through the arrangement of objects next to multiple devices dedicated to assist, guide and stimulate the visitor. As these are considered spaces of free learning, the public, when involved with the materialised narrative, is invited to select, examine and pay attention to topics based on what they personally consider meaning, interpreting what is exposed through subjective filters such as culture, experiences, ideas and values. However, exhibitions should not be seen as pure mirrors of society, or as a black box that guards the truth, even if institutions today are perceived with integrity and have credibility in the work done on issues related to museum work. Instead, certain types of knowledge are constructed, in which some truths can inevitably be affirmed, and others overlooked (Mason et al. 2018; Falk and Dierking 2016; Chong 2010; Wood and Latham 2014; Dernie 2006).

The term "Fashion" is particularly challenging to define, but in a broad sense it can be understood as a mechanism or ideology that applies to the area of clothing (Svendsen 2010). For Crane (2006) fashion has emerged from a new way of life resulting from of urban culture and industrial society. Ancient civilisations had their own aesthetic idiosyncrasies, but it was only from economic development, with the end of the medieval period, that European societies began to cultivate the "new", in which since then clothes and their details began to change rapidly (Svendsen 2010).

With the advent of the 19th century, the industrial revolution and the expansion of mass production made fashion reach the lower social classes, segments in which, in general, almost all people were incorporated to their social interaction (Svendsen 2010). Fashion creations were centralised by Paris from the second half of the nineteenth century until the mid-twentieth century, this period being defined as "Hundred Year Fashion" by Lipovetsky (1989). For the author, fashion in this period is based on two pillars: haute couture, as an opinion-former, and the clothing industry. Consequently, fashion has become a space for display of the power of elites and a sphere of the reconstruction of social boundaries in bourgeois society (Crane 2006). From 1960 onwards, fashion passed through a new organisation called "Open Fashion," a system in which new criteria and focuses of creation were established, undoing the hierarchical configuration of trend. This new organisation is separated into three axes: a bureaucratic-aesthetic axis, an industrial axis, and a democratic-individualistic axis. Finally, "Consumed Fashion", in which society and other areas have invariably inserted themselves to this logic (Lipovetsky 1989).

Brandini (2007) states that fashion and all its orb have become a dimension that integrates meanings in postmodern society, transiting and incorporating the spheres of architecture, art, theatre, technology, politics and communication. As Svendsen (2010) points out, it is not a language, because its semantics are unstable and its meaning is directly related to the context in which it is inserted, that is, it is inconstant. Using other domains for filling it with a significance and content is part of the fashion process. However, fashion does not stop being a form of communication, exercising its power to convey an idea of what clothes can mean in a given context.

2 Fashion and Museums

From 1960, when fashion became part of a visual and popular culture, the museum was compelled to adjust to this new scenario. Fashion studies and fashion museums guided discussions on these new narratives, in which textile objects were positioned in a new and wide context. Exhibitions no longer have their starting point in the fashion object itself as, for example, the history of fashion or clothing, but rather in the phenomenon of fashion (Teunissen 2014).

According to the literature, costume and fashion exhibitions can be arranged in three moments: The first corresponds to the end of the 19th century until 1970. The second moment dates from 1971 to 1990 and the third from 1990 to the present day (Clark and Haye 2014; Melchior and Svensson 2014; Palmer 2018).

The clothes are collected and displayed since the 19th century, selected mainly for their ethnographic or technical characteristics, corresponding to the beginning of the introduction of the costume in museums and galleries as acceptable objects to be collected. The terms “costume” and “apparel” are used to designate the set of artifacts (mostly textiles) arranged on the human body (Norogrande 2015). Therefore, when we use the term “costume” we are specifically referring to the spaces that show the characteristics of clothing by their tangible aspects.

In this first period, while ornaments and accessories were collected as evidence of craftsmanship, factors such as cut and style were evaluated as ephemeral. The collections consisted especially of clothing dating from the period before the industrial revolution, which represented how people dressed across social and geographical divisions between the 17th and 19th centuries (Clark and Haye 2014; Melchior and Svensson 2014).

According to Clark and Haye (2014) it was not until the 1970s that the textile departments of museums like the Victoria & Albert in London (in the figure of Cecil Beaton as curator) and The Costume Institute at the MET in New York (in the figure of Diana Vreeland as special consultant) began to respond, even if slowly, to the popularity and demand for fashion on museum settings.

Melchior and Svensson (2014) discuss the dynamics of fashion exhibition in this period in two perceptions: front-stage and backstage. In other words, exhibiting fashion means a collection, conservation and curatorial work shaped by International Council Of Museums (ICOM) standards, “(...) focusing less on the piece of clothing

and more on creating a visual impression, a narrative to engage and evoke the feelings of visitors” (Clark and Haye 2014:8). As a result, the distinction between the museology of clothing and the museology of fashion is based on the insufficiency of the object itself in the construction of a narrative, and it is necessary to approach the intangible aspects of clothing inserted in the context of fashion.

In the third period, since the 1990s, museums are an important part of the fashion system, even if they are placed as non-commercial spaces (2008). According to Bertola et al. (2016), fashion brands are seeking the agency of heritage institutions. In fact, the construction of this tenuous relationship becomes a challenge, since the ephemeral and timeless are in constant tension, from the collection of objects to the moment they are presented.

Besides museums and institutions dedicated to the collection, conservation, curatorship and exhibition of the fashion object, these shows may also be held temporarily in other spaces, such as art and design museums. In an inventory of fashion exhibitions from 1971 to 2012, it was observed that in the first year seven exhibitions dedicated to fashion were catalogued against thirty-nine presented in 2012. The time span from 2007 to 2010 is the most frequent, with more than 50 exhibits presented per year (Clark and Haye 2014). Thus, it is concluded that: “(...) fashion is exponentially accepted as a subject for museum and gallery exhibitions and fashion exhibitions are becoming increasingly popular with new audiences” (Clark and Haye 2014:170).

According to Steele (2008) the theme is received with a stigma within the academic, museological and art critic fields, mainly because of the ethical issues involved in the relationship between corporate donations and the power in possible curatorial interferences. However, as a consequence of the increased interest of visitors in these exhibitions and the development of the discipline of fashion studies, fashion has gradually become a museum, even if it is not considered art and is not a primary responsibility of art museums (Melchior and Svensson 2014).

In commenting on the challenges that fashion exhibitions face in their scope, Melchior and Svensson (2014) argues that fashion makes museums seem appealing to the public but does not necessarily make them a place for reflection and criticism in the development of a more democratic society. The paradigms of the new museology that still shape museum policies for greater social inclusion see fashion as an effective strategy. However, for the authors, the new museology is more about the deconstruction of the authoritarian existence of the museum through critical thinking than by displaying popular culture. Therefore, it is discussed what museums can do that distinguishes them from places organically linked to fashion, such as stores, fashion weeks, books and magazines. This difference lies in providing context by visual and physical experiences, and only this critical approach can strengthen the meaning of fashion in institutions that display their heritage (Melchior and Svensson 2014).

Based on this overview, in which: (a) fashion is a reflection of the social, cultural and economic conjuncture; and (b) fashion acts doubly as a forming agent and an object of cultural heritage; the purpose of the study is to investigate the contexts related to fashion in museums, establishing which are, in fact, the micro universes

connected to this theme. Therefore, the aim is not only to catalogue the exhibitions, but to understand the meanings attributed to fashion that are exposed to the public.

3 Methodology

The venues selected for this study are grounded on the work of Norogrando (Bardin 2011) where the spaces dedicated to fashion heritage and its attributes are categorised. Thus, the institutions belonging to Group I and Group II (Table 1) are chosen for their representative role in both backstage and front-stage work, and for not being limited to a specific area of fashion or object typology.

For data collection, in addition to the name and year of the exhibition, the official description of each exhibition was collected. There was no treatment or summary of the content of the description, being reliable to the source.

Overall, 164 exposures were catalogued (Table 2).

As a research technique, the content analysis of the description of the exhibitions organised in Table 2 was applied. This technique proposes to classify and categorize any type of content, reducing its characteristics to key elements. The objectives of the analysis must be placed beforehand, but the conception of hypotheses is not mandatory. The exploratory procedure allows an analysis without preconceived ideas (Bardin 2011).

The content analysis is organised in three moments: the pre-analysis, the examination of the material and the treatment and interpretation of results. The pre-analysis is the initial stage of organisation that consist in floating reading of the text, the choices of documents, the formulations of hypotheses and objectives and the elaboration of indicators that will support the final interpretation (may or may not follow this chronological order). The elaboration of indicators, in turn, is the choice of the indexes that will permeate the analysis. The second step is the exploration of the material, i.e. the codification of the document. The third and final stage concludes the analysis with the conversion of the raw results into data, alongside their interpretation (Bardin 2011).

After the systematisation of the exhibition description tables, 52 keywords were catalogued that made reference to the central theme. From these terms, categories were created that comprehended the main themes addressed.

Table 1 Adapted from Norogrando (Bardin 2011)

| Group | Institutions | Attributes |
|-------|---|--|
| I | V&A, The Costume Institute at MET, KCI, Palais Galliera, MAD; | The great temples. They have representative collections, and do research work, extension, exhibitions, publications and are a world reference; |
| II | Museo de la Moda, MoMu, Museum at FIT, Fashion Museum Bath | Relevant museums with pertinent collections that work with specific focus |

Table 2 Exhibitions per year

| Year | Exhibition—Institution |
|------|--|
| 2009 | <p><i>Hats: An Anthology by Stephen Jones</i>—Victoria and Albert</p> <p><i>The Model as Muse: Embodying Fashion</i>—The Costume Institute at MET</p> <p><i>Madeleine Vionnet, Puriste de la mode</i>—MAD</p> <p><i>Luxury in Fashion Reconsidered</i>—KCI</p> <p><i>Fashion & Politics</i>—Museum at FIT</p> <p><i>Isabel Toledo: Fashion from the Inside Out</i>—Museum at FIT</p> <p><i>American Beauty: Aesthetics and Innovation in Fashion</i>—Museum at FIT</p> <p><i>Muriel King: Artist of Fashion</i>—Museum at FIT</p> <p><i>Night & Day</i>—Museum at FIT</p> <p><i>Delvaux: 180 Years of Belgian Luxury</i>—MoMu</p> <p><i>Paper Fashion!</i>—MoMu</p> <p><i>Bill Gibb: A Personal Journey</i>—Fashion Museum Bath</p> <p><i>Guerra y Seducción</i>—Museo de la Moda</p> <p><i>Tenis II-</i> Museo de la Moda</p> <p><i>Ícono de Música II: Michael Jackson</i>—Museo de la Moda</p> <p><i>El Mundial de Fútbol 1962</i>—Museo de la Moda</p> |
| 2010 | <p><i>The Concise Dictionary of Dress</i>—Victoria and Albert</p> <p><i>Grace Kelly: Style Icon</i>—Victoria and Albert</p> <p><i>American Woman: Fashioning a National Identity</i>—The Costume Institute at MET</p> <p><i>Eco-Fashion: Going Green</i>—Museum at FIT</p> <p><i>Scandal Sandals & Lady Slippers: A History of Delman Shoes</i>—Museum at FIT</p> <p><i>Japan Fashion Now</i>—Museum at FIT</p> <p><i>His and Hers</i>—Museum at FIT</p> <p><i>Stephen Jones & The Accent of Fashion</i>—MoMu</p> <p><i>Black: Masters of Black in Fashion and Costume</i>—MoMu</p> <p><i>Leyendas del cine y la música</i>—Museo de la Moda</p> <p><i>Volver a los '80</i>—Museo de la Moda</p> |
| 2010 | <i>Une histoire idéale de la mode contemporaine</i> |
| 2011 | <i>Vol. 1 et 2</i> —MAD |
| 2011 | <p><i>Yohji Yamamoto</i>—Victoria and Albert</p> <p><i>Alexander McQueen: Savage Beauty</i>—The Costume Institute at MET</p> <p><i>Hussein Chalayan—Récits de mode</i>—MAD</p> <p><i>Future Beauty: 30 Years of Japanese Fashion</i>—KCI</p> <p><i>A vision of Fashion</i>—KCI</p> <p><i>Vivienne Westwood, 1980–89</i>—Museum at FIT</p> <p><i>Sporting Life</i>—Museum at FIT</p> <p><i>Daphne Guinness</i>—Museum at FIT</p> <p><i>Fashion, A–Z: Highlights from the Collection of the Museum at FIT</i>—Museum at FIT</p> <p><i>Walter Van Beirendonck: Dream the World Awake</i>—MoMu</p> <p><i>Unravel: Kniewear in Fashion</i>—MoMu</p> <p><i>What Will She Wear?</i>—Fashion Museum Bath</p> <p><i>Volver a los '80 II</i>—Museo de la Moda</p> <p><i>Body Map</i>—Museo de la Moda</p> |
| 2012 | <p><i>Kitty and the Bulldog: Lolita fashion and the influence of Britain</i>—Victoria and Albert</p> <p><i>Hollywood Costume</i>—Victoria and Albert</p> <p><i>Ballgowns: British Glamour Since 1950</i>—Victoria and Albert</p> <p><i>Schiaparelli and Prada: Impossible Conversations</i>—The Costume Institute at MET</p> |

(continued)

Table 2 (continued)

| Year | Exhibition—Institution |
|------|---|
| | <p><i>Louis Vuitton Marc Jacobs</i>—MAD <i>Fashioning Fashion: deux siècles de mode européenne 1700–1915</i>—MAD <i>Youthquake! The 1960s Fashion Revolution</i>—Museum at FIT <i>IMPACT: 50 Yars of the CFDA</i>—Museum at FIT <i>Fashion, A–Z: Highlights from the Collection of the Museum at Fit, Part Two</i>—Museum at FIT <i>Ivy Style</i>—Museum at FIT <i>Fashion and Technology</i>—Museum at FIT <i>Living Fashion: Women’s Daily Wear 1750–1950 from the Jacoba de Jonge Collection</i>—MoMu <i>Sport and Fashion</i>—Fashion Museum Bath <i>Íconos de la música III: Michael Jackson</i>—Museo de la Moda</p> |
| 2013 | <p><i>Club to Catwalk: London Fashion in the 1980s</i>—Victoria and Albert <i>Punk: Chaos to Couture</i>—The Costume Institute at MET <i>Alaïa</i>—Palais Galliera <i>The novel of a wardrobe: The chic of a parisian from the belle epoque to 30s (A exposição ocorreu no Musée Carnavalet)</i>—Palais Galliera <i>Shoe Obsession</i>—Museum at FIT <i>Boots: The Height of Fashion</i>—Museum at FIT <i>RetroSpective</i>—Museum at FIT <i>A Queer History of Fashion: From the Closet to the Catwalk</i>—Museum at FIT <i>Trend-ology</i>—Museum at FIT <i>La Mécanique des dessous, une histoire indiscreète de la silhouette</i>—MAD <i>Happy Birthday Dear Academie!</i>—MoMu <i>Silks & Prints from the Abraham archive: Couture in Colour</i>—MoMu <i>Glamour</i>—Fashion Museum Bath <i>50 Fabulous Frocks</i>—Fashion Museum Bath <i>Laura Ashley</i>—Fashion Museum Bath <i>Tennis III</i>—Museo de la Moda</p> |
| 2014 | <p><i>Wedding Dresses 1775–2014</i>—Victoria and Albert <i>The Glamour of Italian Fashion 1945–2014</i>—Victoria and Albert <i>Charles James: Beyond Fashion</i>—The Costume Institute at MET <i>Death Becomes Her: A Century of Mourning Attire</i>—The Costume Institute at MET <i>Dries Van Noten. Inspirations</i>—MAD <i>The 50s: Fashion in France, 1947–1957</i>—Palais Galliera <i>Fashion Mix</i>—Palais Galliera <i>Age of Crisis: Fashion of the 1930s</i>—Museum at FIT <i>Beyond Rebellion: Fashioning the Biker Jacket</i>—Museum at FIT <i>Exposed: A History of Lingerie</i>—Museum at FIT <i>Dance & Fashion</i>—Museum at FIT <i>MoMu Now: Contemporary Fashion from the MoMu Collection</i>—MoMu <i>Paradise: Plumes & Feathers in Fashion</i>—MoMu <i>Bellville Sasson</i>—Fashion Museum Bath <i>Georgians</i>—Fashion Museum Bath <i>Chile y los Mundiales</i>—Museo de la Moda</p> |
| 2015 | <p><i>Shoes: Pleasure and Pain</i>—Victoria and Albert <i>Alexander McQueen: Savage Beauty</i>—Victoria and Albert <i>China: Through the Looking Glass</i>—The Costume Institute at MET</p> |

(continued)

Table 2 (continued)

| Year | Exhibition—Institution |
|------|--|
| | <i>Jacqueline de Ribes: The Art of Style</i> —The Costume Institute at MET <i>Jeanne Lanvin</i> —Palais Galliera <i>Fashion Regained. The treasured dresses of Élisabeth, Countess Greffulhe</i> —Palais Galliera <i>Lauren Bacall: The Look</i> —Museum at FIT <i>Yves Saint Laurent + Halston: Fashioning the 70s</i> —Museum at FIT <i>Faking It: Originals, Copies, and Counterfeits</i> —Museum at FIT <i>Global Fashion Capitals</i> —Museum at FIT <i>Fashion Underground: The World of Susanne Bartsch</i> —Museum at FIT <i>Footprint: The Tracks of Shoes in Fashion</i> —MoMu <i>Dries Van Noten: Inspirations</i> —MoMu <i>Great Names of Fashion</i> —Fashion Museum Bath <i>Mad Men, Testemunho de uma Época</i> —Museo de la Moda |
| 2016 | <i>Undressed: A Brief History of Underwear</i> —Victoria and Albert <i>Manus x Machina: Fashion in an Age of Technology</i> —The Costume Institute at MET <i>Masterworks: Unpacking Fashion</i> —The Costume Institute at MET <i>Fashion Forward, 3 siècles de mode</i> —MAD <i>Anatomy of a Collection</i> —Palais Galliera <i>Fairy Tale Fashion</i> —Museum at FIT <i>Denim: Fashion's Frontier</i> —Museum at FIT <i>Uniformity</i> —Museum at FIT <i>Proust's Muse, The Countess Greffulhe</i> —Museum at FIT <i>Black Fashion Designers</i> —Museum at FIT <i>Rik Wouters & The Private Utopia</i> —MoMu <i>Game Changers: Reinventing the 20th Century Silhouette</i> —MoMu <i>Marilyn Monroe</i> —Museo de la Moda |
| 2017 | <i>Balenciaga: Shaping Fashion</i> —Victoria and Albert <i>Rei Kawakubo/Comme des Garçons: Art of the In-Between</i> —The Costume Institute at MET <i>Christian Dior, couturier du rêve</i> —MAD <i>The Elegante Other-Cross-cultural Encounters in Fashion and Art</i> —KCI <i>Balenciaga, l'oeuvre au noir (exibição no Musée Bourdelle)</i> —Palais Galliera <i>Dalida, her Wardrobe On and Off-Stage</i> —Palais Galliera <i>Spanish Costumes: Darkness and Light (Exposição ocorreu na Maison de Victor Hugo)</i> —Palais Galliera <i>Fortuny, a Spaniard in Venice</i> —Palais Galliera <i>Adrian: Hollywood and Beyond</i> —Museum at FIT <i>Paris Refashioned, 1957–1968</i> —Museum at FIT <i>Force of Nature</i> —Museum at FIT <i>Expedition: Fashion from the Extreme</i> —Museum at FIT <i>The Body: Fashion and Physique</i> —Museum at FIT <i>Olivier Theyskens—She walks in beauty</i> —MoMu <i>Margiela, the Hermès years</i> —MoMu <i>Lace in Fashion</i> —Fashion Museum Bath <i>Marco Correa: Identidad Nacional</i> —Museo de la Moda <i>Recordando a Diana</i> —Museo de la Moda <i>Gran Showman</i> —Museo de la Moda |

(continued)

Table 2 (continued)

| Year | Exhibition—Institution |
|---|--|
| 2018 | <i>Fashioned from Nature</i> —Victoria and Albert |
| | <i>Frida Kahlo: Making Her Self Up</i> —Victoria and Albert |
| | <i>Heavenly Bodies: Fashion and the Catholic Imagination</i> —The Costume Institute at MET |
| | <i>Margiela. Les années Hermès</i> —MAD |
| | <i>Kimono Refashioned</i> —KCI |
| | <i>Margiela/Galliera, 1989–2009</i> —Palais Galliera |
| | <i>Pocket to Purses: Fashion + Function</i> —Museum at FIT |
| | <i>Norell: Dean of American Fashion</i> —Museum at FIT |
| | <i>Fashion Unraveled</i> —Museum at FIT |
| | <i>Pink: The History of a Punk, Pretty, Powerful Color</i> —Museum at FIT |
| | <i>Fabric In Fashion</i> —Museum at FIT |
| | <i>Royal Women</i> —Fashion Museum Bath |
| | <i>Siando el Futuro: 1889–1918/1989–2018</i> —Museo de la Moda |
| <i>Sharon Tate: celebrando su vida</i> —Museo de la Moda | |
| 2019 | <i>Christian Dior: Designer of Dreams</i> —Victoria and Albert |
| | <i>Mary Quant</i> —Victoria and Albert |
| | <i>Camp: Notes on Fashion</i> —The Costume Institute at MET |
| | <i>Marche et démarche</i> —MAD |
| | <i>Dress Code: Are You Playing Fashion?</i> —KCI |
| | <i>Back Side/Fashion from Behind</i> —Palais Galliera |
| | <i>The Traphagen School: Fostering American Fashion</i> —Museum at FIT |
| | <i>Exhibitionism: 50 Years of The Museum at FIT</i> —Museum at FIT |
| | <i>Paris, Capital of Fashion</i> —Museum at FIT |
| | <i>Minimalism/Maximalism</i> —Museum at FIT |
| | <i>Textile as resistance</i> —MoMu |
| | <i>A History of Fashion in 100 Objects</i> —Fashion Museum Bath |
| | <i>Glove Stories</i> —Fashion Museum Bath |
| <i>Kurt Cobain: más allá de la música</i> —Museo de la Moda | |

- Author: Couturier, Designer, Creator;
- Concept: Theories, Psychology, Color;
- Body: Silhouette, Physical Body, Beauty Standards;
- Custom: Royalty, Sports, Occasion (party clothes, day/night, leisure);
- School: Institution, Education;
- Artistic expressions: Dance, Music, Literature, Theatre, Fine arts, Cinema, Television;
- History: Period, Chronology, Season, Historical Fact;
- Identity: Gender, Race, Creed, Subculture, Style;
- Materials: Raw material, Fibers, Textile;
- Types: Shoe, Bag, Hat, Gloves;
- Personality: Icon of style, Actress, Musician;
- Production processes: Creative process; Manufacturing, Production, Technology;
- Fashion System: Brand, Trend, Luxury, Sustainability;
- Territory: City, Country, World, Nature;

Table 3 Coding results

| | Author | Concept | Body | Custom | School | Artistic expressions | History | Identity | Materials | Types | Personality | Production process | Fashion system | Territory |
|------------------|-----------|-----------|----------|-----------|----------|----------------------|-----------|-----------|-----------|-----------|-------------|--------------------|----------------|-----------|
| V&A | 5 | 1 | 1 | 1 | 0 | 3 | 8 | 2 | 1 | 4 | 2 | 0 | 1 | 3 |
| MET | 4 | 2 | 2 | 1 | 0 | 2 | 2 | 4 | 1 | 0 | 2 | 2 | 2 | 2 |
| Palais Galliera | 7 | 0 | 1 | 0 | 0 | 1 | 6 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| KCI | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 1 | 0 | 0 | 3 | 2 |
| MAD | 5 | 2 | 0 | 1 | 0 | 1 | 4 | 1 | 0 | 0 | 3 | 0 | 0 | 3 |
| Museum at FIT | 8 | 5 | 1 | 4 | 1 | 3 | 25 | 9 | 4 | 6 | 4 | 2 | 7 | 6 |
| MoMu | 6 | 2 | 1 | 1 | 1 | 2 | 7 | 2 | 4 | 2 | 0 | 1 | 4 | 0 |
| Fashion Museum | 2 | 0 | 0 | 5 | 0 | 0 | 7 | 1 | 1 | 3 | 2 | 0 | 1 | 0 |
| Museo de la Moda | 1 | 0 | 1 | 4 | 0 | 7 | 7 | 3 | 0 | 4 | 7 | 1 | 0 | 1 |
| Total | 39 | 12 | 7 | 17 | 2 | 19 | 69 | 23 | 12 | 20 | 20 | 6 | 20 | 17 |

The categories were then coded by frequency in which they appeared in the body of the text descriptions (Table 3). In the coding process, the rule used was to mark a maximum of three categories per exhibition, so that these themes alone or together could summarise the core meaning of the description.

4 Findings

Two approaches were adopted for the treatment of the results. The first was to consider the themes from a global perspective, and the second to consider the themes used by each institution. It was decided to follow these two paths in order to have an in-depth knowledge of each institution as well as a universal point of view. When the categories were counted by their frequencies, in general “History” and “Author” were the most recurrent. “Identity”, “Types”, “Personality”, “Fashion System”, “Artistic Expressions” and “Territory” presented significant presence. “Customs”, “Concept”, “Materials”, “Body”, “Production Processes” and “School” were the less frequent categories.

From an individual institution’s perspective, in relation to Group I, the V&A has more often themes related to “Author”, “History” and “Typology”. The Costume Institute at MET works with a greater diversity of themes, even if it is one of the institutions that does not have a large number of exhibitions. The themes “Author” and “Identity” are the most representative. The Palais Galliera mainly explores the themes “Author” and “History”. The Kyoto Costume Institute (KCI) has the smallest number of exhibitions, and the most addressed themes are “History”, “Fashion System” and “Territory”. The Musée des Arts Decoratifs (MAD) “Author”, “History”, “Personality” and “Territory” are the recurring themes.

Respectively to Group II, the Museum at FIT is the institution that most presents exhibitions in this universe, totalling 51 in ten years, being the only place with frequency in all themes. The categories “History” followed by “Identity” are the most representative. The Mode Museum (MoMu) has the highest frequency of the categories “Author” and “History”. The other categories also have a wide variety of frequency. The Fashion Museum Bath has the highest frequency of the categories “History”, “Customs” and “Types”. And lastly, the Museo de la Moda presents a unique position in the field. The most frequent categories are “Artistic Expressions”, “History”, “Personality” and “Types”.

4.1 Result Analysis

Overall, it was observed that the fashion history and its creators are the themes to which institutions are most committed. Therefore, these two themes are the most frequent in six institutions (V&A, The Costume Institute at MET, Palais Galliera, MAD, MoMu). However, other institutions (Fashion Museum Bath, KCI, Museum at

FIT and Museo de la Moda) show how fashion history can be related to other themes such as identity, customs and personalities. Some examples are the exhibitions “Dress Code: Are You Playing Fashion?” at KCI and the exhibition “Pink: The History of a Punk, Pretty, Powerful Color” at Museum at FIT, in which both present issues that escape the traditional panorama and yet discuss fashion.

The exhibitions that start from a concept can be regarded as those that most enable the approach to fashion in an original way, because they start from concepts outside the field of fashion. For example, the exhibition “Camp: Notes on Fashion” at MET which relates fashion to the Camp concept—created by Susan Sontag—and the exhibition “Back Side/Fashion from Behind” at Palais Galliera, which deals with the social and psychological perception of fashion through people’s backs and consequently clothes. However, it is one of the less frequent approaches. Categories such as “Typologies”, “Artistic Expressions”, “Fashion System” and “Personality” had a similar average frequency, showing how these narratives are already representative in exhibitions. It should be noted that only one exhibition, “EcoFashion: Going Green” at the Museum at FIT, places the fashion system in the figure of sustainability as a central theme. “Materials” and “Production processes” are little recurrent themes, which reflects the rare contact that the public has with this particular aspect of fashion. The themes “Body” and “School” as the central axis of an exhibition are also low in frequency, although fashion is directly linked to issues such as silhouette, beauty models and education traditions.

From a geographical perspective, American museums (in addition of having a balance in the diversity of themes) most talked about “Identity”. French museums, on the other hand, have had a greater focus on authors, reflecting the tradition of French fashion and the importance of the names that are part of their history. British museums, on the other hand, do not have a defining characteristic. What stands out in the two institutions analysed is that the V&A presents a traditional profile before the whole, dealing mainly with history, author and typologies. The Fashion Museum Bath is the one that deals most with customs, so it can be a reflection of both its past as a costume museum and also of British society and its traditions.

The KCI, the only oriental institution, has a unique position in the field, because despite the few exhibitions presented, it has worked almost in its entirety on issues of territory and fashion system. It reflects the importance of Japan in fashion and the exchanges arising from this position, themes that are addressed in the exhibitions “The Elegant Other-Cross Cultural Encounters in Fashion and Art” and “Kimono Refashioned”.

The Museo de la Moda, the only Latin institution studied, focused on the exhibition of themes related to personalities, typologies and artistic expressions. What became apparent from the museum’s analysis were the subjects that mostly reflect the influences of American pop culture. On the other hand, when the museum decides to look at fashion in a local context, it stands out the exhibitions shown about soccer and only one exhibition about a Latin American creator. Therefore, the following question is raised: which are the fashion narratives in countries that not belong to the European and American fashion tradition axis and how can they reflect the context in which these countries are inserted?

5 Conclusion

The analysis of the narratives made possible to see, above all, how biographies on traditional actors are the most recurrent theme in fashion exhibitions. In addition, it was found that, in the universe of the nine institutions studied, there is a range of themes that encourage differentiated interpretations of fashion. Then, it is confirmed that this spectrum is wide and diverse, however, unbalanced. It is observed that the exhibits in the *mise-en-scène* between tangible objects and intangible meanings, still travel expected paths like the already printed past of the object through signs such as the signature of a designer or couturier, affirming the heritage of fashion as it is already understood.

However, what emerges from this study is that even the usual fashion-focused narratives and their links—such as body, artistic expressions, schools and the fashion system in the figure of sustainability—lack greater representation. So, in the search for the differentiation of the museum as a place of creative appreciation and critical thinking, these themes need to be broadened and explored in their full potential. As these themes also address fewer commercial aspects, it is believed that encouraging their approaches is important for the understanding of fashion beyond the system of production and consumption.

As a projection, it was perceived that fashion, despite being a global phenomenon, is still guided by the Euro-American context. In this way, the desire for future research arises regarding what are the narratives made by fashion museums in Latin America, in order to verify and analyse the main themes of their collections and exhibitions.

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Sustainable Fashion is Ethical and Circular



Fernando Moreira da Silva 

Abstract When addressing sustainability in fashion we can easily verify that there haven't been many studies besides the confrontation between fast and slow fashion, or fashion and cultural industries, or economic aspects in fashion. Reflections on aspects used in the creation, development and coordination adopted in fashion design, especially when we aim to achieve a holistic point of view of the products' several stages, to create a more sustainable fashion. In this paper, we focus on innovative sustainable strategies in fashion, such as the adoption of ethical concerns in nowadays fashion, the importance to respond to the principles for a circular fashion and to commonly attend the 4 R's in the fashion industry: reduce, reuse, repair and resale. These are competitive and advantage key strategies for the success in fashion industry. A literature review bridging and intersecting the different research topics was carried out with the aim to stimulate reflection and bring new perspectives on the addressed object of study, which can stimulate the industry, the professionals but also the students in fashion design by showing that there are solutions to face the now a day's challenges in fashion design and industry, balancing innovation and sustainability, like the use of the Sustainable Fashion Systemic and Integrated Model that resulted from the carried out research.

Keywords Sustainable fashion · Ethical fashion · Circular fashion · Fashion research

1 Introduction

There are different approaches to fashion sustainability. However, few studies establish the possible and pertinent relationship between innovation and sustainable fashion products whose vision can be applied to fashion industry.

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We believe that such research could be particularly useful for understanding innovation within the fashion area, where creative designers are constantly looking for new ideas and where design continues to dominate.

Sustainable fashion design is a concept that involves all phases of the process, from conception, development, production and consume of all and every fashion product. So, sustainable actions must begin at early stages. However, at the consumption phase, recycling is mandatory, as well as reuse. We are all aware of the interest that sustainability issues assume not only in fashion industry, but also in society. What seems easy isn't so! Specially at fashion design level where it is still very difficult to implement sustainable positions. Some already take into account at least two of the sustainability pillars: environment and socio-economic aspects. But sustainable fashion is much more than this, incorporating identity, cultural and emotional approaches, among other, when manufacturing clothing, shoes or accessories. Continuous work is needed to achieve a cradle to cradle of a fashion product, the product's life cycle, from a circular economy point of view, incorporating and bridging all product phases, from design, manufacturing, until its sale, not forgetting the product's use, and its possible reuse, or repair, or even the product and its components' recycling or upcycling.

In the current paper, we focus on innovative sustainable strategies in fashion, such as the adoption of ethical concerns in nowadays fashion, the importance to respond to the principles for a circular fashion and to commonly attend the 4 R's in the fashion industry: reduce, reuse, repair and resale. All these are competitive and advantage key strategies for the success in fashion industry.

Under a qualitative research, based on literature review methodology, the paper begins with a brief discussion on ethical fashion, bridging it with circular fashion and finally with sustainable fashion, where the research explores the new strategies in fashion design, framing our argument so as to contribute to understanding that innovation and sustainable fashion design can coexist. Integrating and interlinking the sustainable fashion several concepts it was possible to achieve a Sustainable Fashion Systemic and Integrated Model to support the creation and consume of sustainable products.

2 Ethical Fashion

V&A Museum points out that Ethical Fashion is a sort of umbrella term that is used to describe not only ethical fashion design, but also its production, retail and purchasing. To achieve a balanced position a lot of issues must be taken in account, such as the working conditions of the people involved, to attend all stages of a sustainable production, where environment and animal welfare are central (Albert Museum 2020).

While fast fashion describes clothing that is cheaply made and intended for short-term use, ethical fashion is the opposite and is sometimes even referred to as slow fashion. The fashion industry uses a constant flow of natural resources to produce fast fashion garments, constantly contributing to the depletion of fossil fuels, used, for

example, in textile and garment production and transportation. Fresh water reservoirs are also being increasingly diminished for cotton crop irrigation. The fashion industry is also introducing in a systematic way, and in ever-greater amounts, manmade compounds such as pesticides and synthetic fibers, which increases their persistent presence in nature.

Slow fashion takes into account the full lifecycle of the product—from the design, sourcing, and production processes—and looks at everyone and everything being affected by it, from the environment, to the workers and communities where it's produced, to the consumers who purchase it. Slow Fashion represents all things eco, ethical and green in one unified movement. It was first coined by Fletcher (2014), from the Centre for Sustainable Fashion, when fashion was compared to the Slow Food experience.

We could refer to Ethical Fashion when we talk about Slow Fashion and its three core values, which are: Planet Friendly; Social Good; and Animal Cruelty-Free.

In terms of fashion industry, being Planet Friendly means that it covers all environmental issues and values. It's never too much to underline that the second biggest polluting industry in the world is fashion industry!

The use of organic materials, like organic cotton or bamboo, among many other, is what ethical fashion brands are doing. One of the main reasons is because these materials use lesser water to grow and harmful chemicals aren't used in their production. Or the use of ocean plastic waste to create sustainable swimwear or the reuse to create new fashion design pieces is another innovative positioning assumed by many ethical clothing brands.

Social Good is because people are core in Ethical Fashion, where every and all workers are important, being farmers or fashion industry workers. It also means that there are good working conditions, where fair wages are payed, or fair-trade certifications exist. The brands adopting these principles are brands that embody socially good values, being more concerned with people than exclusively with profit (Compare Ethics 2020).

For example, *Vanesa Vinhas* is a Portuguese brand that uses natural and organic fabrics to produce collections in small batches to reduce the amount of wasted material. This way, the brand incorporates slow fashion principles, but also social values, using part of the company's profits to help nonprofit organizations empowering women that face poverty, violence and injustice (Vanesa Vinhas 2020).

Animal Cruelty-Free dimension puts animals in the center of the concerns, trying not to hurt them in anyway or use them in the fashion industry fabrics, such as leather production, once fortunately there are new alternatives to work with, i.e. vegan products.

According to Lucas (2015), tradition and innovation can join hands by collaborative design processes, promoting identity and cultural vitality, being effective in creating design proposals that adopt concepts intrinsic to sustainability, such as Co-design, Slow Fashion and Affectivity.

3 Circular Fashion

We cannot address ‘circular fashion’ without referring to ‘circular economy’. The circular economy refers to an industrial economy that is restorative by intention; aims to rely on renewable energy; minimize, tracks and eliminates the use of toxic chemicals; and eradicates waste through careful design (Ellen MacArthur Foundation 2020).

Circular economy is a concept which implies the use for as long as possible of all products, circulating, being environmentally effective and safe. There is another way of looking at waste is as a resource for other processes. It’s important to use virgin materials during production especially free of chemicals or other dangerous substances. The concept also incentivises the use of renewable energy sources and all needed resources must be used effectively during production and later, during consumption.

In circular economy there are two types of cycles: biological and technical. Biological cycle is possible when biodegradable components are used, which can later and naturally decompose in environment; this is the case of wool, silk, cotton, etc. Technical cycle when the process utilizes what we designate by technical components which can’t naturally decompose in nature and should be recycled separately, like nylon, polyester and plastics, among many more synthetically manufactured. Circular economy also underlines the importance of being aware of the type of materials used in a certain product, which can contribute to the product upcycling; so, if the product uses different types of materials, natural and synthetic, they must be clearly identified allowing the easy separation of each part. Now, there are several business and collaborative models to support the circular economy strategies. Design has an important role in this process because of its holistic and cross-pollination point of view (Fletcher 2014; Kering 2016).

Ellen MacArthur Foundation defend that circular economy implies the need for a ‘functional service’ model in which manufacturers and retailers increasingly retain the ownership of their products. It also states that, where possible, the manufacturers act as service providers, selling the use of products, not their one-way consumption (Ellen MacArthur Foundation 2020).

The proliferation of product and business model design practices generate more durable products, facilitating disassembly and refurbishment, by developing efficient and effective take-back systems.

There are several definitions for Circular Fashion, presented by some organizations or individuals. Anna Brismar presents a very simple one referring to Circular Fashion whenever fashion products, clothes, shoes or accessories, are designed, produced and provided already with the focus on a global and effective responsibility of usage and circulation for as long as possible in their most valuable form, and hereafter to return safely to the environment when human use is no longer possible (Brismar 2017).

Following the same principles of the concept of Circular Economy, Circular Fashion was used for the first time in 2014 in two different locations: by Anna

Brismar of *Green Strategy* and by *H&M*. The first one was spread out during a fashion event in Stockholm, being disseminated all over Europe and globally. The second one, also in 2014, coined the concept in its Swedish form - '*cirkulärt mode*'. This took place on Gotland, Sweden, during a public seminar on *Almedalen week*. *H&M* underlined the importance of creating circular economy, especially focusing on the benefits of innovation, job creation and economic development (Shumpert 2016).

When addressing circular economy, Ellen MacArthur Foundation stated that we all have to intervene within our planet boundaries, being governments, businesses or individuals. We are talking about a new way to design, make, and use things, by regenerating natural systems, designing out waste, reinventing everything in our cities or products (Ellen MacArthur Foundation 2020).

The *Green Strategy* identified the sixteen *Principles of Circular Fashion*, which concern the cradle to cradle of a product, from its ideation until sale, and after use its reuse or reutilization of the materials used in it. These principles point out the important steps that fashion and textile industry should follow to support a more circular and sustainable attitude, transmitting that fashion products should be *designed* with high longevity, resource efficiency, non-toxicity, biodegradability, recyclability and good ethics in mind, i.e. adopting slow and eco fashion directives. Similarly, these products should give priority to local, non-toxic, renewable, biodegradable and recyclable resources, being used for as long as possible, through good care, repair and sharing among multiple users over time, and when possible, giving the material and components new life. They also should attend efficient, safe and ethical practices (Brismar 2017).

In 2016, RSA stated that "Designing for a circular economy is complex. Gone are the days of 'sustainable' or 'eco' design, when a simple change of material to a recycled alternative would give a project environmental credibility. Now, in order to understand all the facets of the problem, we need to talk to each of the stakeholders involved in the lifecycle of a particular product" (RSA 2016).

But in this process of *circular fashion vs innovation*, we also have to take in account not only the material aspects, but also the intangible and immaterial ones, such as *identity* and *meaning*. About these important variables for fashion design creations, Sbordone and Ranzo (2019) stated that he processes of innovation in the fashion sector have a strong accent of immateriality. The new developments are not only of a technological nature; those concerning intangible contents play a fundamental role. They affirm that it is possible to underline the importance of the enrichment of the narrative, the meaning and the value that is implemented through design, the reorganization of processes and work commitment, marketing and branding. Within the process is core to attend the system of relationships involved in the production, training and research players, gathered according to an aggregative logic that follows the rules of networking.

The life cycle of products should contribute to a global positive development and attend the well-being of all humans involved in the system, having in mind that the circular way of thinking and working, in particular the circular fashion, brings not constrains but new opportunities for the fashion sector and the textile industry.

4 Fashion Sustainability: Reduce, Reuse, Repair and Resale

“Taking waste policy further can bring significant growth and job creation, reduced greenhouse gas emissions, direct savings linked with better waste management practices and a better environment” (European Commission 2015).

Contrary to the most common social and political clichés, moving towards sustainability is the opposite of conservation. In other words, the preservation and regeneration of our environmental and social capital will mean precisely breaking with the dominant trends in terms of lifestyle, production and consumption, creating and experimenting with new possibilities (Azevedo and Giuliano 2014).

Nowadays *Fashion Sustainability* is directly linked with what is called the *four R's*, which are to reduce, reuse, repair and resale. This is *Circular Fashion*.

Hill (2019) published an article where she explains the four R's and underlines the importance of taking them as guidelines for a more sustainable fashion. Reduce is more connected with the consumer perspective making him/her aware of the impact of our spending choices. She affirms that this is vital if we want to reduce fashion footprint, where thousands of tons of clothing end up in landfill every day. With this position everybody can reap the benefits of the savings. The consumer has to reduce the spending habits, utilizing everything he/she already owns, having in mind that, when retailers sell at very low prices, consumers are easily swayed to purchase more than what is needed. Adopting reduction, we'll notice that this attitude becomes much bigger than just in fashion industry, making us look at other areas of our life.

But reduce is also about the companies and the fashion designers, conducting them to adopt zero waste practices. Nowadays, zero waste fashion design is contributing to innovation and is no longer a niche market, due to the constant demands for more sustainable practices in the fashion industry, along with low waste production (Moorhouse and Moorhouse 2017).

According to Rissanen and McQuillan “Zero waste fashion design addresses inefficiency in fabric use by reframing fabric waste as an opportunity to explore the magic of fashion; just like all fashion, zero waste fashion celebrates experimentation and the discovery of new forms” (Rissanen and McQuillan 2016).

Zero waste design, more than fabrics, became a new philosophy, a new way of thinking, forcing us to challenge everybody involved in the design area. In terms of fashion, zero waste challenges the fundamentals of making clothing in a more intelligent way. But it is not only a matter of philosophical positioning or the understanding of sustainability principles. It requires the existence of know-how and skills in several and different areas, among which the patternmaking. We can say that anyone can drape a rectangle of fabric, but to adopt zero waste practices there is a need of smarter designers who can see beyond drape and cut. This is what some international fashion designers are doing, as Zandra Rhodes, Holly McQuillan, Timo Rissanen and Yeohlee Teng. They all share a passion for reducing waste, creating fashion products with little or zero fabric waste, not compromising design for the adoption of sustainable positions.

Reuse in the fashion perspective contributes to the conservation of our planet finite natural resources, allowing industry and humans to divert waste from landfills. The not-for-profit organizations have been alerting companies and fashion designers to adopt more sustainable attitudes, among which to divert materials from landfills and get items to be re-sold and reused. Shumpert (2016) states that the reuse industry handles about 3.8 billion pounds of textiles annually and fortunately many companies already keep a lot of reusable items out of landfills. However, there is a long path to do, because the numbers are still impressive: of the 15 million tons of textiles trashed every year, only 2 million are recovered through reuse or recycling. According to Hill (2019), 95% of the textile products that are thrown in landfill each year could be recycled. Reusing is fundamental to minimize the fashion footprint, though fashion industry is one of the most contributive to resources use such as water, but also waste, land clearing and materials, among many other. One of the solutions is to buy better quality clothing made to last, adopting slow and eco fashion principles rather than contributing to fast fashion, which is probably the larger contributor to fashion industry's pollution.

“Resources like *Good On You* provide a perfect launch pad for accessing garments that will serve you for longer, while trusting they are sourced responsibly and not harmful to the planet, people, or animals” (Hill 2019).

Another trend in many sustainable design brands is to repair. These brands are beginning to offer free repairs during product's lifecycle, making clear that they design products made to last, with high quality and superior levels of craftsmanship (Moorhouse and Moorhouse 2017).

Repairing is where fashion footprint gets creative, presenting new ways to extend the life of fashion products. This is not totally new, because this was something that previous generations knew too well.

This approach not only generates new possibilities for fashion items' life, but also contributes to save consumers' money, leading us to new possibilities of co-design or products customization.

The company *Honest By* founded by Bruno Pieters is a sustainable enterprise where transparency in all processes is fundamental. For this company, 3D printers will play a relevant role in future fashion industry. They have already produced a small collection of accessories, using biodegradable filaments which can be later recycled into new filaments. Developing 3D printing technology, we may be contributing to solve problems of fashion waste.

Resale is a sector of the secondhand market, being secondhand brands primarily online. According to Cernansky (2019), the resale platforms have been a major beneficiary of fashion's toward sustainability, underlining that just in 2019 many brands took a step ahead: the resale platform *StockX*, which resales sneakers, achieved unicorn status; the *RealReal*, luxury brand, went public; the *Vestiaire Collective* opened its first permanent bricks-and-mortar concession. She also suggests this is much more than a passing trend: the \$7 billion luxury resale market is projected to grow to \$11 billion by 2022. So, resale is an important sustainable fashion strategy that has residual benefits, attracting new customers at a lower price point, or knowing

if an item they purchase is expensive, there's a chance to sell it later for a significant price.

The impact caused by the acceleration of fashion systems, generating and fueling the increase in consumption, is one of the main challenges to move towards sustainability. Like the disposal culture, which society internalizes and understands as a simple mechanism of the system, it generates great concern and debate (Azevedo and Giuliano 2014).

Fashion brands and fashion business in general have to evidence social responsibility through a collaborative new approach with textile innovation and fashion designers to successfully produce sustainable unique products with minimal waste, constantly updating technology and design processes and strategies. The repositioning of the brands contributes to the visibility of their sustainable identity and the positive impact of their production, instilling consumers' confidence.

5 Sustainable Fashion Systemic and Integrated Model

The best way to face the problem of fashion and make it more sustainable is through a global and holistic view of the whole issue, not just adopting a single concept related to the theme but integrating and interlinking the different concepts that somehow define sustainable postures in fashion (Fig. 1).

It appears that many of these concepts have the same meaning, they only differ in time and place when they have been coined by different designers or organizations. One must understand how they interconnect and complete themselves.

After the analytical and critical study that we have been conducting for some years on Sustainable Fashion, we arrived at the conclusion that it is possible to adopt

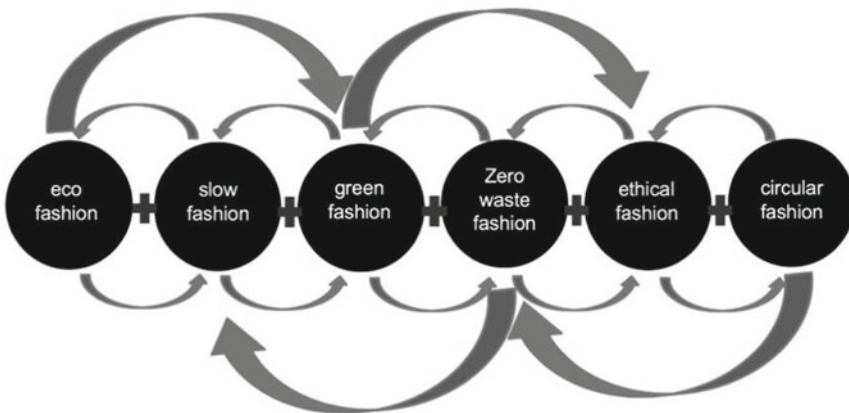


Fig. 1 Integrating and interlinking sustainable fashion main concepts Source: author

a Sustainable Fashion Systemic and Integrated Model to support Circular Fashion (Fig. 2).

To this end, fashion has to adopt global strategies together with a holistic vision in order to achieve the challenges of the new business paradigm. This systemic and integrated model will allow the implementation of knowledge management, which in turn will allow the mindset change and the change of attitude. This change will allow the incorporation of competence, intelligence and information technology as basic pieces of the entire system.

This model has several measures and characteristics to be optimized (Fig. 3): the adoption of a sustainable circular fashion; the consolidation of information flow; planning and integrating skills - strategic and operational skills; rationalization of resources by an effective planning, organizing, directing and controlling; control and rationalization of costs; improvement in the market competitiveness; and returning

Fig. 2 Sustainable Fashion systemic and integrated model Source: author

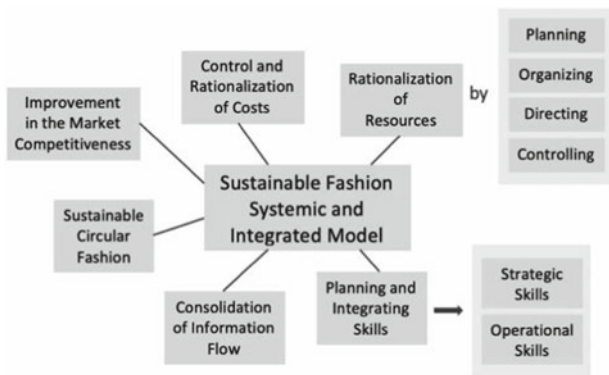
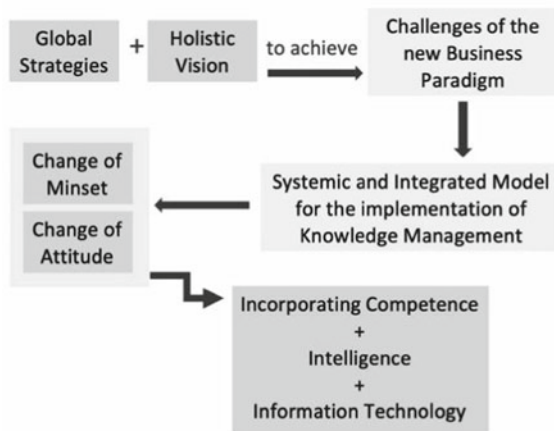


Fig. 3 Characteristics of the sustainable fashion systemic and integrated model Source: author

to sustainable circular fashion. This model could be a tool of great importance to support a vision of fashion in which Human Being is no longer the center, but a part of the entire environment in which he/she is integrated.

6 Conclusions

As Joy and Peña (2017) stated, the first step in discussing sustainability in fashion is to recognize that fashion is a polluting resource and intensive industry, and its future success depends on reducing, among other, its environmental and social imprint across the entire life cycle of the fashion production.

One current goal for sustainability in fashion is attending ethical principles and the creation of a circular product cycle and economy. Circularity, also known as the *Cradle to Cradle approach*, is the idea that products not only cause no harm, but actually benefit people and the environment along the entire product's lifecycle. Cradle to Cradle proposes a future "where design is a positive, regenerative force, producing effects that we want to expand rather than shrink." In addition to having positive impact, products create no waste - all materials are either infinitely recyclable or biodegradable.

Adopting waste reduction concepts, it is possible to increased economic value. Many brands are just beginning to acknowledge this reality. Sourcing ethically is also not easy: you have to work with suppliers in order to improve conditions within the workplaces they use or own.

Numerous design strategies exist that can lead to more sustainable practices and products, which then also lead to greater profitability. Slow fashion, or ethical fashion, is one of them, because fashion is not time-based but quality based. Adopting its principles, we are contributing to design, produce, consume and live better.

Slow fashion is about choice, information, cultural diversity and identity, being designers, buyers, retailers and consumers more aware of the impacts of products on ecosystems, workers and communities.

Conservation of natural resources, low environmental impact of the used materials, reducing the carbon footprint and respect for the economic and labor conditions of the workers who participated from raw materials to the selling point, are core aspects to achieve a sustainable fashion model.

Sustainable fashion can be achieved by a holistic vision, bridging perspectives of different concepts like green design, life cycle design, slow fashion, eco fashion, ethical fashion, zero waste design and circular fashion, among other. Fashion companies have an important role by facing the responsibility to adapt their culture and practices to nowadays challenges, implementing strategies to achieve sustainability. Companies also have the possibility to contribute to more sustainable and conscious consumption patterns, but also to provide fashion as second hand or initiated rental systems for leasing clothes and accessories, implementing systems to increased textile recycling.

This is a possibility of bringing together innovation and sustainability, using more friendly materials, redesigning products, using local labor, increasing the economy, fostering the valences of fashion design, changing individual attitudes and behavior, contributing to a general cultural change and a more inclusive and less anthropocentric society. One of the possibilities to achieve this position is by adopting a conscious attitude and the use of a sustainable fashion systemic and integrated model, like the one presented in this paper.

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Fashion for Visually Impaired Consumers: A Case Study Towards Inclusive Products



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Abstract Recently fashion brands and designers have been developing clothing having into account particular consumers, including individuals with some kind of disability. This paper has the main purpose of analysing fashion design product development through the research of elements, aspects, and concepts that can be useful for common and inclusive products.

During the research, scientific papers, informative articles, and reports were found to address inclusive design as a useful tool for the development of inclusive products for disabled individuals. However, specific guidelines, foundations or models that could help fashion designers to develop products for visually impaired (VI) consumers are non-existent on inclusive design.

Regarding the methods, from the literature review contents, were considered Inclusive Design concepts and user experience methods. These two main aspects were the foundation for the creation of the necessary questions of study, propositions, and units of analysis used in the case study.

The study offers an original approach considering fashion designers and inclusive concepts, unfortunately, the number of cases is too small. Due to online research, aspects related to the designers' products were not possible to comprehend, so in further studies could be important to interview these designers and understand the real product.

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Despite all the effort by designers and deserved merit the cases here presented are indeed specific projects with no projection within the global market. The contents and the findings will be an asset for the scientific community and the development of inclusive products in a fashion directed to VI consumers on a national and international perspective.

Keywords Clothing · Fashion · Inclusive · Design · Visually impaired

1 Introduction

For some disabled individuals, it is still a struggle to shop clothing (Ahmed 2017). Within the industry, design is increasingly valued not necessarily for solving problems but for making issues evident and tangible, thereby simplifying the discussion and decision making (Pullin 2009).

Individuals are considered disabled when they lack essential abilities (e.g., sight or hearing) in their daily life's that have been compromised (Heylighen and Strickfaden 2012). In fact, in October 2019, World Health Organization (WHO 2019) published that at least 123.7 million people suffered from moderate or severe distance vision impairment or blindness while 826 million were near vision impairment. Design for special needs is a patronizing way to describe design specifically for people with particular impairments (Pullin 2009).

By embracing several issues, design can operate as a technology-driven opportunity. It can operate with a sustainability approach (e.g. eco-friendly/sustainable brands) and it optimize the features of the product or service that are based firstly with a preconceived idea. Nevertheless, the visual communication of the brand itself is not possible with visually impaired consumers, so it is essential to analyse how fashion brands can create an emotional relationship with the individuals and what kind of approach are designers and brands currently using to create a bond with VI consumers. According to some authors, Inclusive Design is a concept that helps designers to develop products for disabled individuals but with the purpose of those products to be used by all consumers, whether disabled or not. However, and despite all the efforts, designers can be designing products that somehow are more exclusive rather than inclusive, once that they have been developed specifically for VI individuals.

Some fashion designers have been developing projects to improve the relationship with VI consumers enticing them to purchase and use garments with the main objective of helping them on a daily basis and to a certain point creating more accessible products and fulfilling the gap between consumers and fashionable clothes. So, if the main goal of a designer is, the creation of products that somehow fulfil needs, this study concerns the understanding of how inclusive products directed to fashion, such as clothing, have been successfully implemented in the market. Thus, three main research questions were created:

- Q1. Regarding product development concepts, aspects, and elements what differences exist between inclusive and common design on clothes?
- Q2. Within an inclusive approach, how many fashion brands exist currently developing products for VI consumers?
- Q3. What kind of approach these entities have regarding the communication aspects of products towards VI consumers?

Because it is mandatory to understand how product development occurs in fashion design, regardless it is inclusive or not, the literature review is mostly based on scientific papers, informative articles, books and complemented with video watching. From the literature review were found and considered essential elements (study questions, propositions, units of analysis) that supported the case study. For the development of the case study and the analysis of the garments of each designer/project, all aspects to be considered were first outlined. Internet (e.g. designers' websites and informative journals) was the tool for the garments' analysis. Once that was not found any scientific studies within this subject, this work is pioneer, considering fashion designers and inclusive concepts and regarding the type of clothing and designers examined.

2 Fashion Brands and Fashion Designer Responsibilities

As an expression, fashion communication is normally offered by the garment or the outfit that is the outcome of the development of the individual's idea (Barnard 2011). As consumers have to combine all the branding signals to express the experience as a whole, fashion brands are often described as uniquely "experiential" (Kim 2012). After all, fashion comprehends an intangible system of signification (Rocamora and Anneke 2015) while visual communication involves a spectrum of aspects that are exposed in a sensually way (Čuden 2017). According to (Giacomin 2014) 'design', involves initially the creation of a plan and sketches. With the main goal of produce the idea, the object or the service, it represents a purpose of fixing a look, function, or reedifying purposes within a system or society.

Defining fashion industry and all the individuals involved in the creation, production, promotion, and sales, is to recognize that creation of products involves: (a) the creation of products with new and distinct look and functionality, (b) the activation of psychological responses linked to desire and need in the consumers, and (c) product acceptance by individuals for a limited amount of time (Ruppert-Stroescu and Hawley, 2014). As Baxter (1998), explains, the fashion industry is relentlessly organized to impose differences every year and every season, where fashion trends and colours are massified in the form of spring-summer, autumn-winter, or mid-season collections. Consumers devoted to fashion trends are the greatest heritage of the fashion industry and consequently fashion brands. So, the dualism of fashion design remains in the desire that an individual has to be like someone else, but different from everyone else to fit in society. After all, being fashionable is about

having similitude and being distinctive at the same time (Rocamora and Anneke 2015).

Understanding the fashion designer's role through all the product development processes is to acknowledge their capabilities while individuals that are able to connect and facilitate, producers of quality, visionaries, future builders and co-producers (Manzini 2009). These professionals are in part aesthetic agents and anthropologists and they are constantly motivated to explore new concepts with the main goal of promoting the product meaning and improve the consumer's quality of life (Gobé 2002). According to McCann, Hurford et al. (2005), design research and product development processes require control and guidance while selecting elements for product development and production (e.g. selection and application of textiles, style appearance, appropriate technologies in product cutting, manufacturing and finishing methods). The next chapter focuses on the elements that a fashion designer must integrate into the collection and thereafter in the garments.

3 Fashion Designers and Support Elements in the Collection Development

Fashion collections are no more any less than the combination of silhouettes, colours, textures (Renfrew and Renfrew 2010), and woven and knitted fabrics (Jones 2011) connected with the designer aesthetics (Renfrew and Renfrew 2010) and brand DNA. They consist of a number of moments that are influenced by several factors (Chow et al. 2017). Each successful collection requires a vast quantity of investigation, analysis, and planning (Renfrew and Renfrew 2010), however, the first step is to analyse previously launched trend forecasts regarding the season that designers are working for.

The product development is a significant matter in fashion business (Chow et al. 2017) and the creativity is one of the main aspects for fashion product research and development, however, according to Jones (2011), clothing has primarily four practical functions: utility, modesty, immodesty, and adornment. The same author also defines the following practical values that a fashion designer must have into consideration when developing new clothing products: (1) Price, the most important aspect in purchase consideration; (2) Consumers tend to evaluate fabric and garment quality to perceive if the price is adequate to the expected product durability through cleaning and product care; (3) Fit of the garment, that is an important aspect because garment design must be functional and appropriate accordingly with the costumer's body and emotional expectations, otherwise clothing will remain unsellable; (4) comfort and emotional comfort relates to the garment fit and materials properties (e.g. aromatic or anti-creasing properties) but also transparency of ethical and sustainable production and waste disposable methods information about the products; (5) relevance, because clothes must be adequate to consumers lifestyles, work and leisure occasions; (6) the brand is the key point of fashion marketing and creates a link between consumer and

products, so, by advertising the product's unique qualities, brands satisfy consumer needs and expectations; (7) Convenience and service of brands, refers to the shopping as a pleasant and fulfilling experience for the consumer.

3.1 Creativity

Creativity in fashion design is a complex process of ideas combining several phases and gradual improvements (Baxter 1998; Bjögvínsson et al. 2012) that has to be stimulated (Baxter 1998) to lean products towards novelty and usability (Ruppert-Stroescu and Hawley, 2014). The creativity of new products assumes the additional requirement of creating value by inputting desire and demand for change (Kawamura 2005; Ruppert-Stroescu and Hawley 2014) but also 'the notion of utility should never be underestimated because consumers often choose clothes with concerns such as comfort, durability or ease of care in mind' (Jones 2011, p. 24).

So, conveniently, the function of fashion design is to "create a product with a practical function, while defining a product with unique characteristics that serve a purpose where consequently, the fashion designer's creativity serves to attend and to create the expected harmony in a product, that the consumer recognizes and connects too" (Ruppert-Stroescu and Hawley 2014, p. 20).

Regarding creativity concepts, Ruppert-Stroescu and Hawley (2014), elucidates the existence of Leadership Creativity, a process that requires a great investment in product research, exploration and experimentation, whereas Adaptive Creativity process is based on an already made product that is again being designed, oftenly gotten from previous seasons. In this case, research is limited to which products will be changed and how to change them accordingly with established trend forecasts. Yet, Bjögvínsson et al. (2012), defends that designers should be more into social and innovative design and less into the economics and that design is a collective effort. So, ideas must be conceptualized, "prototyped," and analysed in the early stages of the design process with resource to human-centeredness, affinity and optimism. Only then will be possible to communicate clearly with VI consumers in a well-succeeded manner regardless of product shape and its visual messages, and, the whole environment that surrounds them in a brick and mortar store.

3.2 Colours

Consumers respond to colour instinctively and emotionally (Pastoureau 1997). For example, as Heller (2007) explains, new colour pallets can be full of social and moral connotations (e.g. blue symbolizes harmony and satisfaction, violet, vanity, and self-centeredness while grey represents neutrality and black for instance denial and aggression). The author also mentioned that, in the world of fashion, colour is more than just a visual experience. It can be tactile. Fabrics are constituted with yarns

that can be crafted with similar or different fibres and compositions and consequently with different colours, so, when caressed, colours transform themselves into different perceptions, eliciting different consumer responses.

3.3 Fabrics Textures

Choosing textile materials accordingly with the brand, the product, and the consumer target is always a challenging task for a fashion designer, even more, when there are timetabled periods for marketing, research, prototyping, ordering, manufacturing, and sales (Jones 2011) that are very reduced. When fashion designers are choosing and collecting textile materials for the following collection, normally they have already notions of the trends (e.g. colours, textures, and key products) and materials that are more suitable for the garments.

For a VI consumer, Williams, Ringland and Hurst (2013) explains that it would be marvellous to make garments with different textures and consequently different feels. The surface of a textile material is often manipulated by the designer to create different textures (Jones 2005). Lau (2012), presents different ways of manipulation and finishing's that give the textile surface different effects. For example, the application of beads and sequins normally produces a luxurious sensation. It is pertinent to think about this aspects, because as Ruppert-Stroescu and Hawley (2014) mentioned, the most significant difference between higher priced and lower priced clothing is that consumers are willing to spend more for more original or unique clothes, so, products with superior designs are definitely a contribute for product and brand preferences by consumers and a determinant key of purchase satisfaction (Bloch et al. 2003). What is more is that the consumers availability to pay for a design changes with utility, and, the act of buying the garment will depend on the number of consumers that already have bought it (Coelho et al. 2004).

3.4 Seams, Trims and Other Aesthetic Aspects

According to Malcolm Barnard (2002) and Čuden (2017) when the garments are covered with slogans, and names of brands, the meaning of clothing is not just confined in its slogans. The meaning of a garment is something above that, meaning that when communicating through clothes, no verbalisms or written words are used. In fact, there has been a crescent use of trims and clothing personalization with visual elements (e.g. engraved button; printing lining; coloured ribbon; placket and binding in the interior with the brand symbol) to reinforce the brand identity in the products. However, these visual aspects can be a constraint for consumers because of the increase in prices on fashion goods comparatively with the individual's income (Coelho et al. 2004).

3.5 Shapes

While materials and trims are the touchable aspects of clothing, the immaterial or the intangible refers to the sensations, meaning or value (Heylighen and Strickfaden 2012) where purchase clothing can be included. In fashion products, it is possible to have inferences about sensory experiences. For example, the look of a long fur jacket on sales in an autumn/winter collection may suggest softness and/or warm sensations (Bloch et al. 2003).

To achieve an effective and successful design on clothing and outfits, there are pivotal elements (silhouette; line and texture) and principles (repetition; rhythm; graduation; radiation; contrast; harmony; balance and proportion) that Jones (2005, 2011), mention and that fashion designers must consider when developing new products successfully. The inspiration to develop new designs sometimes emerge through the research of 'old' styles that will be influenced by global trends, though, through the unification of new trends and new predictions of the sales analysis of that particular style, the designer continues to achieve brand goals without losing identity (Renfrew and Renfrew 2010). This kind of creative thinking of the fashion designer is in accordance with Ruppert-Stroescu and Hawley (2014) principles and the appliance of Leadership Creativity and the Adaptive Creativity methods on product development.

4 Fashion Thinking and Inclusive Product Development

Design and aesthetic aspects are important for commercial elements and sensory channels (Bloch et al. 2003). It is extremely significant to recognize the relationship between the designer and the consumer and be aware of the importance of the consumer experiences including the consequence of these experiences in the development of new products. When questioning and provoking creative thinking, the future of designs will be potentially influenced by inviting designers to design and reach more senses (Heylighen and Strickfaden 2012). Product aesthetics (e.g. garment) can include a range of important nonvisual elements such as fabric textures and trims (Bloch et al. 2003), so, VI can purchase clothes due to the possibility of tactile, sound and smelling experiences, thus, perhaps the purchase can be also influenced by smells, sounds and from others sensations (e.g. aroma, music, lights and staff attitude) coming from the brick and mortar store space.

The product experience is considered an intricate phenomenon that involve several feelings and reactions, whether physiological, expressive or behavioural (Desmet and Hekkert 2007). The UX framework (Fig. 1) shows an interesting approach based on a fashion thinking approach presented by Pals et al. (2008) that is a tool to better appraise, interpret and build up innovative products success, where the sense-making process involves a conscious cognitive process, while others are the result of product perception and sensation. The cognitive processing and product perception happen simultaneously or sequentially.

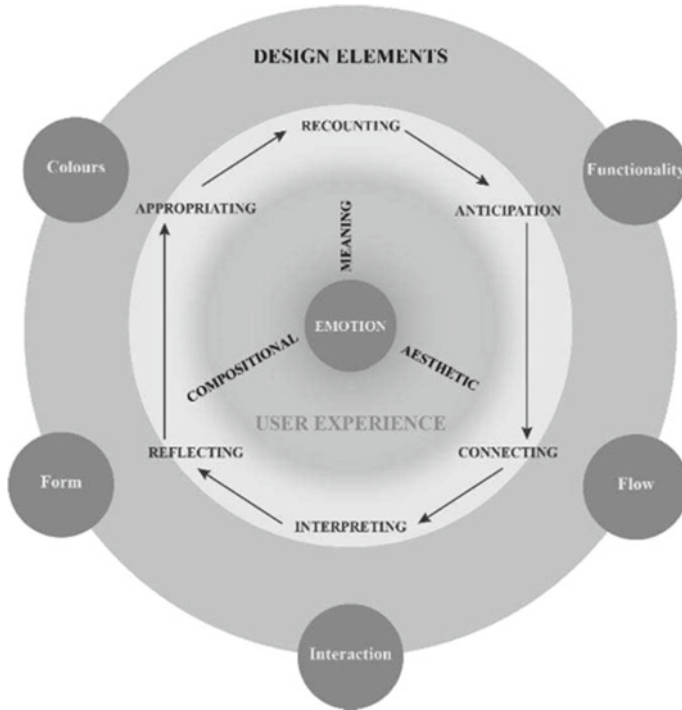


Fig. 1 UX experience circle for the creation of new fashion products based on Pals et al. (2008)

This last perspective, ‘draws attention to all sorts of socio-cultural processes that occur between users and technology and between different users and to the need to take these into account in research and design’ (Pals et al. 2008, p. 290) what, in a certain way, reflect the basis of product development on inclusive design, where the product is directed for the disabled individual to aid those who are less able in achieving some goals but also to facilitate tasks for the able ones (Heylighen and Strickfaden 2012).

Design elements are the product features (e.g. knit or woven fabric) ‘which a designer can manipulate such as form, colour, interaction, flow, and functionality’ (Pals et al. 2008, p. 290). The design elements are filled also with aesthetic aspects that can trigger unpleasant or pleasant emotions (Desmet and Hekkert 2007). Compositional aspects are based on the possibility of use, pragmatic and behavioural aspects of the product that can also activate emotions related to (mis)understanding of how a product works.

A great example of clothing market is that VI consumers may have some difficulty on manage or wearing a certain feature or garment due to the difficulties of dressing that garment, affecting its (un)predictability and behaviour. The attribute meanings are related with the customer and to a ‘user’s higher-order goals, cognition, the ability to recognise metaphors, assign or assess personality or symbolic significance and can

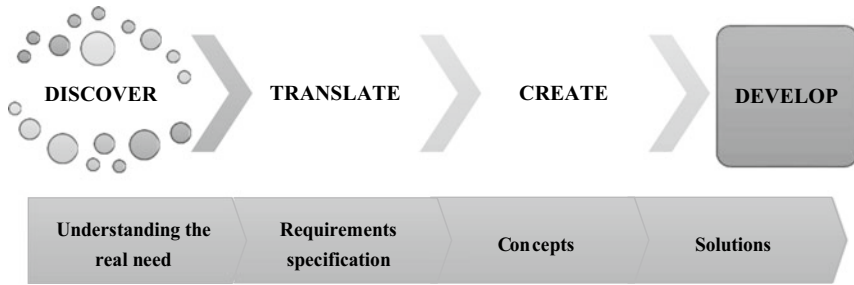


Fig. 2 Product development stream in the inclusive design process and concept

result in emotions such as anger, joy, satisfaction, fulfilment, fun, bliss, closeness to one’s own identity or image, inspiration or regret’ (Pals et al. 2008, p. 286).

The user experience and the design elements are linked through six different aspects related to the experience per se and the resulting emotions are created via sense-making. Based on prior consumer experiences comes anticipation; connecting is when the first contact with a certain product happens without giving meaning to it; then, consumers tend to interpret the product according to related hopes, fears, goals, and desires; reflecting, is when costumers evaluate a certain experience and then appropriate experiences and transform that experience to as their own. Recounting is the remembering of that experience and possibly finding new definitions to it. Some of these sense-making processes involve a cognitive process that is conscious, whether others are the consequence of perception or sensation and can happen simultaneously or sequentially.

Regarding Inclusive Design, Clarkson et al. (2007), also exposed that Inclusive Design processes of products or services are developed by starting from a problem, captured most of the time as a perceived need. It is necessary to transform that need into a possible solution that can satisfy society successfully, so, this requires an appropriate design process. The same authors explain that inclusive design connects four different approaches (Fig. 2).

Firstly, it concerns to a nonstop search and exploration of the need for addressing the correct design issue, with due consideration of all stakeholders, that leads to the understanding of the need; secondly, it translates, meaning that it is defined into a description of what the design wants to achieve, leading to the second output, the requirements specification; thirdly, it is mandatory the formulation of initial concepts that are assessed against the requirements leading to the third output, concepts, and, fourthly and lastly, the product or service are ready to be produced or used, leading to the final output, solutions (Fig. 2).

What is more, Dong et al. (2015), sustains that Inclusive Design concepts are based on two different perspectives. First, it will allow understanding the users, in this case, fashion customers, and, not only in terms of ergonomics, and second, allows a better understanding of the information received from the many groups involved in the problem solving and creative processes.

Within a general approach Manzini (2009), describes that every good complex design project is based and requires good design research. Inclusive Design can be related, regarding its objective similarities with other design approaches on the accessible field, such as: “universal design”, “design for all” (Persson et al. 2015), “lifespan design” and “design for the diversity” (Moreira and Almendra 2007) and also human-centered design (Giacomin 2014). Clarkson et al. (2007), also proposed several aspects to consider when developing new products based on the creation of a persona.

According to (Persson et al. 2015), to increase the number of consumers that can eagerly use a product, infrastructure, or service, the design of those must follow traditional consumer requisites. Although, the needs of older or disabled people should also be taken into consideration. However their needs have been considered in niche products such as disability aids, this often provides separation and stigmatizing solutions for these users (Hannukainen and Hölttä-Otto 2006). So, the User experience framework and inclusive design concepts are indeed important tools that when combined, can improve product development and enhance better product results.

5 Case Study of Inclusive Brands in Fashion for VI Consumers

5.1 Methods

It is known that some designers have been developing projects in order to strengthen the ‘bridge’ with VI consumers by encouraging them to buy and use garments that somehow support their days and are to a certain point more accessible. During the literature review were found and analysed scientific articles, informative articles, and reports that present inclusive design as a concept and a helpful tool on product development, but in a general perspective (Clarkson et al. 2003, 2007; John Clarkson and Coleman 2015).

It was also analysed the user experience framework presented by Pals et al. (2008) that is directed specifically to fashion, however, for the units of analysis, were considered elements from both concepts: inclusive design and UX experience. These two different approaches are the propositions on the case studies (Yin 2009). This chapter focuses on the analysis of products considered by their creators as inclusive. It is also the objective of this study to determine if the inclusive products explored by these designers have been successfully implemented in the market and survived over time.

‘The design of all research requires conceptual organization, ideas to express needed understanding, conceptual bridges from what is already known, cognitive structures to guide data gathering, and outlines for presenting interpretations to others’ (Stake 1995, p. 15). The motive for the selected method is related to the

need for understanding inclusive fashion brands collectively (Marconi and Lakatos 2011).

A case study research can incorporate several entities (Gerring 2007) individuals, organizations, processes, programs, neighbourhoods, institutions, and even events (Yin 2001). Within a qualitative methodology (Fortin et al. 2009) the case study method (Gerring 2007; Stake 1995; Yin 1993, 2009) consists of a complete and detailed examination of a phenomenon linked to a certain entity. It is appropriate to use it when there is no information about the phenomenon in particular (Fortin et al. 2009).

Regarding the entities selected, two or more cases can be designated for the same study (Yin, 1993) to achieve a single set of conclusions (Yin 2009). All the studied cases have inclusive products and from those were selected the five most pertinent in terms of choice of methods for product development by the designers, its relevance in the fashion community, and its exposure and available contents on the internet, on their webpage, on social media, and online informative articles. Two other cases were found, but they are very particular because the products were developed by VI designers/individuals and not by sighted designers. So, for that reason, and due to brands and companies usually work with sighted professionals, they were excluded from this study.

With a descriptive and exploratory approach (Yin 1993), the design for the case studies are embedded with multiple units of analysis (Yin 2009). Table 1 will provide the necessary information about it.

Due to the impossibility of conducting physical and individual interviews with the designers, the study was conducted through an online analysis context, which made it difficult or impossible to analyse some elements previously established. The observation and the specific content used in the study was collected through

Table 1 Case Studies research components

| Study's questions | Propositions | Unit(s) of analysis |
|--|---|---|
| Within an inclusive approach, how many fashion brands, exist currently developing products for VI consumers, specifically? What kind of approach these entities have been using regarding the communication of their products towards VI consumers? What kind of differences exists between inclusive design and common design of fashion clothing products? | a) Product development within an inclusive design approach | 1. Concepts 2. Solutions |
| | b) Product development regarding the user experience approach | 3. Creativity Type (Leadership and/or Adaptive) 4. Colours 5. Textiles (woven and knitted textures) 6. Form (Shapes) 7. Interaction (Manipulations) 8. Flow (Focused on principles and elements of Fashion Design) 9. Functionality (trims and other features) 10. Relevance |

Table 2 General overview regarding designers and product aspects

| Project/Designers | Country | Relevance | Products | Sales channels | Range of Prices |
|---|--------------|--------------|-------------------------------------|-------------------------------------|-----------------|
| (Designer website 2020) Camila Chiriboga (Ve° Project) | USA | Casual | Men's outerwear | N/A (*) | N/A |
| (Informative website 2020) Rugilė Gumuliauskaitė | Lithuania | Casual | Women's outerwear | Atelier | N/A |
| (Informative website 2021) Balini Naidoo | South Africa | Casual/Sport | Mixed (men's and women's outerwear) | N/A | N/A |
| (Informative website 2020) Maria Sol Ungar - Brand "Sonar" | Argentina | Casual | Women's outerwear | Brick Mortar Store and social media | N/A |
| (Informative website 2020) Alexa Jovanovic Brand "Aille Design" | Canada | Casual | Women's outerwear | N/A | N/A |
| (Informative website 2020) Babette Sperling | Germany | Casual | Women's outerwear | N/A | N/A |

(*) information not available

websites. So, the information might not be 100% reliable. However, it was a great start to understand the effectiveness of the products. Regarding the list of designers and products and considering a general overview approach, Table 2 has the most important aspects of each one.

Table 3 describes the concepts and the solutions that each designer came up with, considering the product development within an inclusive approach.

Tables 4, 5, and 6 describe the user experience elements developed by each designer focusing on the way how these particular garments communicate with the consumer.

6 Discussion

After the analysis of the designers and their inclusive products, some conclusions can be drawn. Considering the first question of the study, concerning the differences in the product development concepts, aspects and elements on common and inclusive clothing, it is clear that all the designers studied adopted a leadership creativity

Table 3 Product development within an inclusive design approach

| Project/Designers | Concepts | Solutions |
|--------------------------------------|---|--|
| Camila Chiriboga Ve° Project | Integrative sensorial experience regarding textiles. Assistive smartphone technology—Garment Identification, Interaction, and Safety Features through clothing tags | New language system communication through patches and symbols in relief (allowed the user to know how the garment looks like, how to wear it, and how to care it). Different materials were chosen by the designer and evaluated by VI regarding textures and possible garment association. Changing drawing sketches to textural on the design process, so VI are able to feel it and understand shapes. Expansion of designers' descriptive vocabulary |
| Rugilė Gumuliauskaitė | The cognitive process helps VI to understand what kind of energy is created through clothes | Catalogue contents and sketches in relief with product specifications and dyed cut pattern allowed VI to understand the design of the product before they try it |
| Balini Naidoo | Braille system as a tool for clothing information | Product information in Braille applied on the surface of the textile material |
| Maria Sol Ungar Brand “Sonar” | Braille system as a tool for clothing information | Product information in Braille applied on the surface of the textile material and in tags |
| Alexa Jovanovic Brand “Aille Design” | Braille system as a tool for clothing information | Product information in Braille applied on the surface of the textile material |
| Babette Sterling | Application of text in Braille using FDM 3D (Willowflex organic filament) | Information in Braille applied on the surface of the textile material creating customized and secret messages |

approach through their development process (Pals et al. 2008). The designers worked closely with VI individuals in order to understand their needs and preferences, to achieve plausible solutions to their issues that are mainly related to choosing, wearing, and caring for the garment. Regarding colours and materials, there is no information regarding the chosen palette and no congruency in the five cases explored. In fashion, the colour palette on a collection is most of the time selected having into account trend forecasts (Baxter 1998). However, this aspect does not appear in the inclusive design product development, once that the explored designers tend to implement a

Table 4 Product development regarding the user experience approach

| Project/Designers | Creativity | Colours | Form |
|---------------------------------------|------------|---|--------------|
| Camila Chiriboga Ve° Project | Leadership | Dark Palette Navy blue, Olive green, and black tones | Regular/Wide |
| Rugilė Gumuliauskaitė | Leadership | Smooth palette Light colours: Grey, sand and white tones | Regular |
| Balini Naidoo | Leadership | Smooth palette Light colours: White and sand tones | Regular |
| Maria Sol Ungar Brand “Sonar” | Leadership | Contrast palette: Dark and Light Tones White, Navy Blue and Black | Fit/Regular |
| Alexa Jovanovic Brand Aille Design | Leadership | Contrast palette: Dark and Light Tones White, Black and Electric Blue | Regular |
| Babette Sterling | Leadership | Contrast palette: Dark and Light Tones White, Navy Blue; Soft Pink | Regular/Fit |

colour palette accordingly with their taste and logic of clothing appearance and VI preferences.

Regarding the second question, concerning the number of designers and fashion brands existing currently developing products for VI consumers, five cases were found and studied.

Regarding the third question, concerning the approach that entities have regarding the communication aspects of products towards VI consumers, features such as functionality and interaction appear as being the most appealing. Fashion comprehends an intangible system of signification (Rocamora and Anneke 2015) while visual communication involves a spectrum of aspects that are exposed in a sensually way (Čuden 2017). The application of different features, such as Braille system application through studs, embroideries, beadings, and 3D printing is considered not only an ornamental aspect but also interactional. The creation of a language code system and QR code that can be read through a mobile application (e.g. Camila Chiriboga), allows VI to understand and to be aware of the garment specifications. Located volumes, reversible sides, velcro tapes, zippers, and pockets strategically positioned, are easy to use attributes that simplify the way of wearing the garment. However, the cost of these applications on the garment can be expensive for the brand or the designer, even more, if a business is being started. Not to mention, the time implicated in the application of each feature, especially on the beading application, considering each model's specifications.

The studied designers created specific products for VI individuals, focusing essentially on the product itself regarding aesthetics and functionality aspects, alienating its integration into the fashion market and its relationship with the brand. Once

Table 5 Product development regarding the user experience approach (cont.)

| Project/Designers | Textile/Textures | Interaction |
|---------------------------------------|--|--|
| Camila Chiriboga Ve° Project | Woven Fabrics. Different textile manipulations regarding volumes and textures | Intuitive to wear (e.g. Pockets placing with easy location and security features). Reversible. Velcro as an element for closing and open the garment. Codded tagging system on the clothes allows VI to better understand the garment with tactile and hearing perceptions. Garments with different bodylines created by curving cuts. Padded applications with asymmetrical topstitches |
| Rugilė Gumuliauskaitė | Knitted and woven fabrics with different structures, textures, and located volumes | Product perception/recognitions through textures and volumes recognized through tactile perception |
| Balini Naidoo | Knitted and woven fabrics with different structures. Studs applicated as braille messages | Tactile perception regarding messages in Braille |
| Maria Sol Ungar Brand “Sonar” | Woven and knitted fabrics with different structures. Lace. Application of local embroideries made with tacks, paillettes, beads, and other materials | Tactile perception regarding messages in Braille. Morphologies |
| Alexa Jovanovic Brand Aille Design | Beading application (sew) in the form of braille messages | Tactile perception regarding messages in Braille |
| Babette Sterling | Eco friendly (Tencel, Cupro, Cotton) woven and knitted fabrics with different structures | Tactile perception regarding messages in Braille |

these products are not adapted to the taste of all consumers, they do not subsist in the fashion market, becoming merely exclusive and non-inclusive. So, there is a difference between common and inclusive products.

According to Ruppert-Stroescu and Hawley (2014), Leadership Creativity requires an enormous investment in searching and developing solutions. Camila Chiriboga developed a universal language system applied to the tags that can be interpreted by VI but also by other consumers due to the simplicity of scanning the symbols with a smartphone. This is a pertinent feature on the product, even more, when is known that some VI do not know how to read Braille, but they are perfectly capable to manage a smartphone. The complexity of Braille requires time to be learned and interpreted and it can be an issue regarding the perceptive process on clothing with this kind of language system, even more, when they are applied in the

Table 6 Product development regarding the user experience approach. (cont.)

| Project/Designers | Flow | Functionality |
|---------------------------------------|--|--|
| Camila Chiriboga Ve° Project | Located textures and applications such as padded on specific points. Repetition and contrast principles and asymmetric elements | Fashion thinking directed specifically for VI individuals with several inclusive features on the garments due to the inclusive elements created on the garments. Reversible clothes. Pockets with zippers, buttons, or snaps |
| Rugilė Gumuliauskaitė | Knit structure and located volumes. Harmony and balanced principles | Fashion thinking and product development methods directed to VI but also a wider public with no specific functionalities |
| Balini Naidoo | Located textures due to the application of studs Harmony and balanced principles | Application of braille with the specification of the garments regarding colour, size, style, and care information. Reversible |
| Maria Sol Ungar Brand “Sonar” | Located textures due to the application of studs. Repetition, contrast, principles, and symmetric elements with geometrical forms | Application of braille with the specification of the garments regarding colour information. Specific pockets for walking cane placing |
| Alexa Jovanovic—Brand Aille Design | Located textures due to the application of studs. Contrast and balanced principles. Symmetric elements | Application of braille with information about the garments size, fit, colours, care content, and colour |
| Babette Sterling | Located textures and applications of 3D printing. Contrast and balanced principles. Symmetric elements | Tactile perception regarding messages in Braille |

garments with a certain ambiguity (e.g. Babette Sterling). Though, due to the non-availability of e-commerce, there was no information regarding the intrinsic aspects (e.g. fibre composition) of the garments per se. Only the L3-C2 jacket, created by the designer Camila Chiriboga and the garments created by Babette Sterlin presented compositional specifications online but no others provided that kind of information. So, it turns out that in the greater majority, specific technical properties of the fabrics used for the product conception were impossible to ascertain.

It is important to emphasize that nowadays, consumers want to know more about products. Currently, there are interesting textile products in the market that simplify consumer’s life (e.g. eco-friendly, anti-stain, easy-care, and anti-crease properties). Other fibers maintain the colour effectively and there is a greater variety of sustainable materials as well, that were still not properly focused in previous studies and were

not evaluated by VI individuals. However, the interesting features created by the designers are pertinent and eligible for the study. Rugilė Gumuliauskaitė products are more commercial and the designer offers a personalized service to her costumers on her atelier, but only there. Whereas, the designer Maria Sol Ungar garments are specifically created for a niche of consumers.

7 Conclusion

In general, because of its particularities that just satisfy the needs of VI individuals, the products analysed do not satisfy the fashion market, globally. The brands and designers only act locally with no e-commerce availability. Currently, inclusive design methods are used through clothing development, but these methods are too generic. Thus, the solution is not to praise the product itself, but rather to understand the whole: product, the brand, and the fashion designer. For example, the designer Alexa Jovanovic, co-founder of the start-up AilleDesigns sought to work with VI and sighted individuals in order to create an emotional connection with the visually impaired but also with all consumers. What is more, is that due to the complexity of details and aesthetic aspects these garments are more difficult to be combined with other pieces.

Today, designers and products must survive in the market, so they need to understand the foundations of inclusive design in the fashion business allied with user experiences and emotions. Not only clothing connects the brand to the costumers, but, to also achieve customer needs successfully, designers and brands must think outside the box to provide more information regarding their products, otherwise, they will not be able to subsist in the market and they will be just one more inclusive project lost in the multiplicity of products that the fashion market already has available. For further studies it could be important to interview these designers and analyse the real products.

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Usability Attributes for Fashion Design of Functional Wool Leisurewear



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Abstract The development of trends of activewear in the everyday life of consumers has been described as emerged as a new trend called athleisure. With comfort characteristics reflected in a sophisticated, yet a relaxed lifestyle (Adorable and Bradbury 2016), Petro (2015), in this way, inspiring the development of leisurewear. For the present research, it is essential to evaluate consumer perception regarding the developed clothing, matching the trends and the satisfaction of the user's expectations of leisurewear. In this sense, it is purposed to make a process that will be divided into two phases which include a focus group each. This paper aims to build an insight into the consumer satisfaction opinion, related to the most relevant twenty-five factors that characterised this kind of apparel.

Keywords Usability attributes · Fashion design · Wool leisurewear

1 Introduction

Consumer behaviour research is the scientific study of the process consumer's use to select, secure, usage and dispose of products and services that satisfy their needs. Consumers make a purchase decision considering different aspects of apparel attributes such as price, quality, design, brand image, fashion, and so forth (Jin and Bennur 2015).

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Thus, the understanding of consumer behaviour could appeal to a set of different areas of knowledge, such as psychological, cultural social-psychological, physiopsychological, genetics and anthropology.

This study results from an activity of the I&D project TexBoost—Less Commodities more Specialities—PPS2 (New Materials and Advanced Applications of Natural Fibres), whose leader is the wool company FITECOM. With this project is intended to combine trends in fashion, with new materials, technology, and advanced use of wool fibres in tri-laminate fabrics with functional membranes, for improving clothing performance, considering the consumer demand.

In this context, the progress of current trends for outdoor activities, sportswear and activewear has been consistently presented in the life of consumers. Because of the consumer demands on a healthier lifestyle, that is reflected on leisurewear for low-performance sports, protection, wellness, work and leisure.

In this work, we seek to present the Q Method as an alternative for the study of the importance of attributes in clothing, in particular the analysis of consumer's perception concerning clothing attributes.

It is purposed to make a process that will be divided into two phases which include a focus group each. The first phase, the object of this paper, is to create an insight about the consumer satisfaction opinion, related to the most relevant 25 factors that characterised this kind of apparel. For this purpose, a focus group was created. This first part of the study will lead to a second phase with a second focus group, aiming to validate the usability of this clothing by wearing in a real environment, considering the above twenty-five factors chosen by the first focus group.

2 Fashionable and Functional Wool Leisurewear

Regarding textiles and clothing, considering social change, that is focused on a healthier lifestyle, which is reflected in activewear and leisurewear rise demand. With more alert and demanding consumers, current trends are focused on increasing the technicality of products, looking for products such as workwear, sports or everyday clothing, which combine aesthetics and innovation, design, protection, comfort, multifunctionality, ease of maintenance, sustainability and competitive price.

Following this new trend, the focus of research is the development of new proposals for functional wool-based fabrics. This project aims, through the long experience of the FITECOM company with traditional wool fabrics, with the introduction of technological innovation, to promote textile innovation combining the classic and casual, conventional, and technological. These innovations are based on the development of simple, bi or tri-laminate fabrics, with the possible introduction of functional membranes. Lamination techniques have wide application in all areas of technical textiles, allowing greater functionality and durability, which may include waterproofing and breathability, higher resistance to abrasion, UV/IR protection and antimicrobial radiation.

3 Fashion Attributes

According to Jackson (2007), clothing has several attributes that can be manipulated to reflect changes in fashion. Each attribute can reflect a dominant fashion trend in its own, such as colour, fabric, silhouette, style details, among others. Modern fashion markets are very fragmented and, as such, a season can carry many different colours and fashion stories to satisfy the diversity of tastes among the various consumer segments.

Through the research, for this investigation, it was possible to identify several studies about attributes in clothing, among them (Jin and Bennur 2015; Lee and Nguyen 2017; Davis 1987; Dutton 2006; May-Plumlee and Little 2006; Azevedo et al. 2009; Pedroso 2009; Sproles 1979; Valaei and Nikhashemi 2017; Jegethesan et al. 2012).

Considering Davis (1987), in the purchase of clothing, the attributes most used in the evaluation of the garment by the consumer, which the consumer-preferred: style, price, fabric, store and fit (cut).

May-Plumlee and Little (2006) classified as universal criteria in the evaluation of a clothing product the next attributes: brand/label, price, colour, model, style/design, fabric, fashion, appearance/attractiveness, treatment care, manufacturing, durability, cut, quality and comfort.

According to Dutton (2006), the attributes that have a significant effect and that affect consumers intention (15 to 25 years old) to buy a clothing product from a group of attributes used are intrinsic: style, colour, model, fabrics/fibres, appearance, fashion, durability, comfort, quality, fit (cut), treatment (care); extrinsic: price, brand, country of origin, store, seller rating, approval of others, conjugation with personal wardrobe; abstract attributes (Based on attitudes): fun, entertainment, satisfaction, need and occupation.

Azevedo et al. (2009) study, considered the evaluation of advertisements in fashion magazines influence the following attributes in clothing and affect consumer behaviour: materials used, style, durability, cutting, treatment, quality, satisfaction, necessity and function were the most important attributes for the consumer.

Nevertheless, like (Olson and Jacoby 1972), among other researchers (Dutton 2006; Azevedo et al. 2009; Abraham-Murali and Littrell 1995; Eckman et al. 1990; Forney 2005), began to divide the attributes into two categories: intrinsic and extrinsic. The group of intrinsic products means that each attribute belongs to and is inseparable from the product, such as style, colour, and fibres. In the category of extrinsic products, attributes are granted and added, such as brand, price, store, among others. In this context, the authors already mentioned, later in their respective investigations, can assess which attributes are, more and less important in the consumer's purchase decision.

More recently, other studies have been developed considering apparel attributes, but also consumer buying behaviour. In research developed by Valaei and Nikhashemi (2017), found that brand, style, price and social identity are the most influential factors of consumers purchase intention for fashion apparels. Through a focus group as data

collection, Jegethesan et al. (2012), conclude that style, price, brand, country of origin and ethics are essential attributes, but also fit, fashionableness and colour influenced the purchase decision of the consumer. Yet, Bennur and Byounggho (2015) found that in US fit, quality and fabric are more important. At the same time, in India price, value for money and social acceptance is vital, which shows us that the evaluation of attributes by the consumer of clothing is different from country to country.

4 Methods

Regarding qualitative research, the methodology of a focus group was considered as an organised way of data collected directly from consumers opinion, and an approach to have more informative details than surveys to know about the current consumer (Bader and Rossi 2002). In this process, a Q-Sort method is combined, improving not only the data collection as well as the quality of data. The Q-Sort process forces respondents to distribute factors on a value scale evenly, as there are twenty-five factors that must be grouped into each of the nine categories ranging from “most important” to “least important” (Bastarz 2008; Bigras and Dessen 2002).

Therefore, the respondent’s attempt to distort responses and mislead the evaluator is considerably reduced by the Q-Sort forced-choice procedure. To classify the twenty-five factors (Fig. 1), concerning clothing, the respondent must read the set of factors first, then review the remaining factors and then categorise each one (Bastarz 2008; Bigras and Dessen 2002; Fairweather 1990).

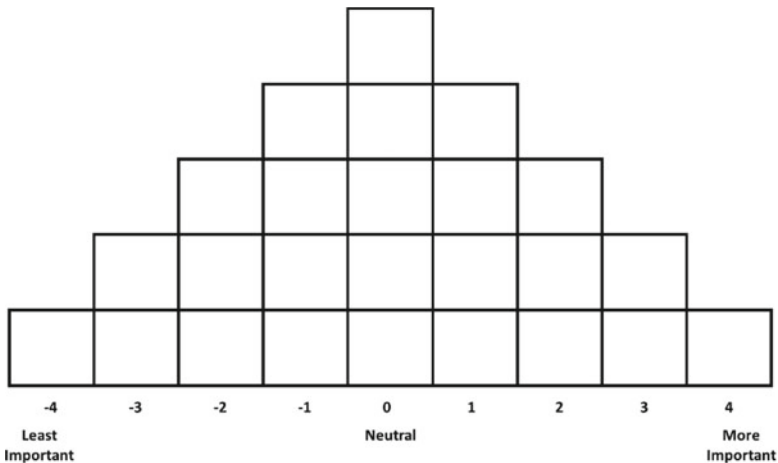


Fig. 1 Q-Sort used in the focus group. Adapted from Hawthorne et al. (2008)

4.1 Focus Group

Focus groups are group discussions organised to explore a specific set of issues to a particular topic (Kawamura 2011; Kitzinger 1994).

It is defined with an interview-style designed for small groups. Using this approach, researchers strive to learn by discussing conscious, semi-conscious and unconscious psychological and socio-cultural characteristics and processes among various groups. A typical focus group consists of a small number of participants. The informal group discussion atmosphere of the focus group interview structure is designed to encourage subjects to speak freely and entirely about the behaviours, attitudes and opinions they may have (Kawamura 2011).

The group is 'focused' in the sense that it involves some collective activity - such as viewing a film, examining a single health education message or only debating a particular set of questions. In this specific case, the debating is about fashion clothes attributes considering leisurewear.

4.2 Q-Sort Method

The Q-sort method is part of the qualitative research methodologies and is relatively unknown among researchers (Bastarz 2008; Bigras and Dessen 2002; Hawthorne et al. 2008; Watts and Stenner 2005).

Q-methodology is a robust method and useful tool for researchers wishing to combine qualitative and quantitative data collection approaches. This methodology is typically used to explore participants perspectives on the research topic (Brown and Rhoades 2019).

This method originated in the mid-1930s when theories of statistical analysis were developing through debates among scholars. In one of these debates, about the interdependence of two approaches when describing the same set of data, that is, when they related the differences between individuals (Method Q) and between individuals (Method R) (Bastarz 2008). The psychologist and physicist quantum, William Stephenson, did not believe that Method R could be applied to any sample of individuals to be tested in the totality of their characteristics and personalities, and this is a determining condition for an analysis of inter-individual differences. Thus, Stephenson then proposed the Q Method, which, under individual control, would overcome this limitation, since the presence of a particular personality trait, even if in a reduced degree, would appear in the analysis (Bastarz 2008).

In Q-Method, the researcher seeks to analyse the relationship between the comparison of individual perception and a group of clothing consumers. Thus, through Method Q, the researcher can establish relations between the opinions of the respondents, considering a particular sample of variables. This method can consist of a group of statements, figures or photographs (objects) on a topic predetermined by the researchers; for example, in this case, we are considering the attributes in clothing.

From this, respondents are instructed to classify these objects in categories ranging from “most important” (+4) to “least important” (−4). The resulting classification is then called Q-Sort (see Fig. 1), and the classification procedure is called Q-Sorting (Bastarz 2008).

To extract the classifications of the Q-Sort the respondents are invited to organise statements, figures, or photographs in a meaningful way, according to their personal opinions and impressions. Each one of these objects occupies a place in the pyramid. Typically, these objects are placed by respondents in the columns according to the values assigned to them (exemplified by the numbers below the columns), which vary from positive to negative. At the end of the individual Q-Sort, objects receive the values corresponding to their place. At the end of the general Q-Sort, of all respondents, each object has its value assigned by the respondents added up, generating the score and the final classification of each object. The correlations established in Q Method are between people and not between tests or measures, which mean that those people who similarly classify items are correlated with each other. Based on individual correlations, groupings of associations are extracted, called factors that, in turn, show the views shared by people. Therefore, using this method, one can identify people who are similar and different from others in each factor (Bastarz 2008).

Using the Q-Sort method does not entail a denial of microlevel communicative pragmatics, nor macro-level social structures. Instead, it involves a focus on subjectively expressed, socially organised semantic patterns, whether these are subsequently grasped as discourses or representations (Curt 1994).

Such as Bastarz (2008), the Q-sort method was adapted for the present research. The Q Method can then help to analyse whether there is an agreement between the respondents’ opinions, how and why this occurs. The comparison of convergent, complementary or, at times, contradictory opinions can be extremely valuable for research and decision-making regarding clothing attributes.

The analysis stage is typically followed by another form of data collection method, such as a focus group further to explore the results of the Q-sorts (Brown and Rhoades 2019). Therefore, a focus group was organised in a process that took place in two phases.

Focus Group and Q-Sort Practice

First, an introduction to the current project was made about the general purpose of the present focus group. The main goal is to understand which are the most and least important attributes in the evaluation of a leisurewear garment relating to a better understanding of the reality to be studied and the possibility of improving the quality of the review of clothing attributes by the contemporary consumer. For the evaluation by the focus group with the considered attributes, the fibrous composition of the clothing is not relevant.

The focus group was formed by six participants (three women and three men), with ages between 29–60 years old, with and without higher education. The participants perform professions such as: technicians in the public sector, university professors and researchers. The criteria of choice were made, that should be people as a regular

consumer and were not graduated in fashion design, so that there is no bias in results, considering the attributes of clothing.

At the first phase, they were using the Q-Sort method to organise the given clothing attributes in a pyramid. The attributes were writing in individual post-its, for the participants, arranged them in the pyramid, which was made individually, to identify which are the most and the least important attributes. A sheet with Q-sort pyramid and clothing attributes (individually separated) was given for each participant.

Similarly, in the second phase of the focus group, using the Q-Sort method to organise the attributes of clothing given in a pyramid, which was made and discussed between the six members of the group (with audio recording), to identify which are the most and least important attributes. A sheet with Q-sort pyramid and twenty-five clothing attributes (the attributes were writing in individual post-its, for the participants, arranged them in the pyramid) was given for the group debate.

5 Results

After the conclusion of the focus group, the data were transcribed to an excel sheet for later analysis of the mean and standard deviation were calculated from the individual classification retrieved from the focus group. From the analysis of results presented in Table 1, it was observed that 13 of the attributes analysed. In the focus group and based on the assumptions, presented at the beginning of the methodology (for wool leisurewear), showed positive values on a scale of -4 to 4 .

6 Analyses and Discussion of Results

The relationship between the mean of responses and responses resulting from the group debate can be seen in graphic 1. It can be seen that the relationship is linear, as can be understood from the trend line. There is a correspondence between individual analysis and group analysis, as it can be seen that the group debate does not differ in this tendency from individual responses (there is not a very large distortion despite some fluctuations in values).

To justify the difference in the overlapping of individual responses with group responses, the significant differences that exist are due to the dispersion of individual evaluation translated by the high value of the standard deviation (see Fig. 2 and Table 1). To convert the values shown in Table 1 into the q-sort pyramid, a pyramid in Fig. 3 was constructed.

The 'Ethic' and 'Conjugate with personal wardrobe' attributes had the ratings improved from the mean of individual ratings to the ratings of group analysis, from 1 to 3 and from 0 to 2 respectively. This improvement in attribute ratings is possibly due to the high dispersion of individual ratings (high standard deviation), with the

Table 1 Mean of individual classification, standard deviation and group debate classification for each attribute

| Attributes | Mean | Standard deviation | Group debate |
|------------------------------------|------|--------------------|--------------|
| Quality | 3.2 | 0.69 | 4 |
| Comfort | 2.0 | 1.15 | 1 |
| Necessity | 1.5 | 1.89 | 3 |
| Satisfaction | 1.3 | 1.49 | 2 |
| Appearance | 1.0 | 0.82 | 0 |
| Function | 1.0 | 1.41 | -1 |
| Ethic | 1.0 | 2.16 | 3 |
| Durability | 0.8 | 1.07 | 1 |
| FIT (Garment cut) | 0.8 | 1.46 | 2 |
| Price | 0.7 | 1.70 | 1 |
| Multi-functionality | 0.3 | 1.25 | -1 |
| Conjugation with personal wardrobe | 0.3 | 2.49 | 2 |
| Fashion | 0.2 | 1.34 | 0 |
| Model | 0.0 | 1.00 | 0 |
| Style | -0.2 | 0.69 | 0 |
| Fabric | -0.2 | 1.57 | -1 |
| Used materials | -0.5 | 0.96 | -2 |
| Brand | -0.5 | 1.80 | 1 |
| Store | -1.0 | 1.00 | -2 |
| Colour | -1.0 | 1.29 | -1 |
| Clothing treatment (Care) | -1.2 | 1.07 | -2 |
| Manufacture | -1.3 | 1.49 | 0 |
| Country of origin | -2.0 | 1.00 | -3 |
| Approval of others | -3.2 | 0.69 | -3 |
| Seller evaluation | -3.2 | 0.90 | -4 |

focus group participants who assigned the highest ratings managed to persuade the rest of the panel members.

For the attribute 'Ethic' and 'Conjugate with the personal wardrobe' the values present a high dispersion in the individual responses (high standard deviation).

The group debate, when evaluating the 'Conjugation with personal wardrobe' and having dropped the 'Appearance' (individually valued), this can be translated that the contents perceived for the attribute 'Appearance' were included by the attribute 'Conjugation with personal wardrobe' in a broader way.

The improvement in the classification of the 'Ethic' attribute from 1 to 3 in the group analysis made it possible, in our opinion, to improve the classification of the 'Brand' attribute (classification 1), which was not considered decisive in the average

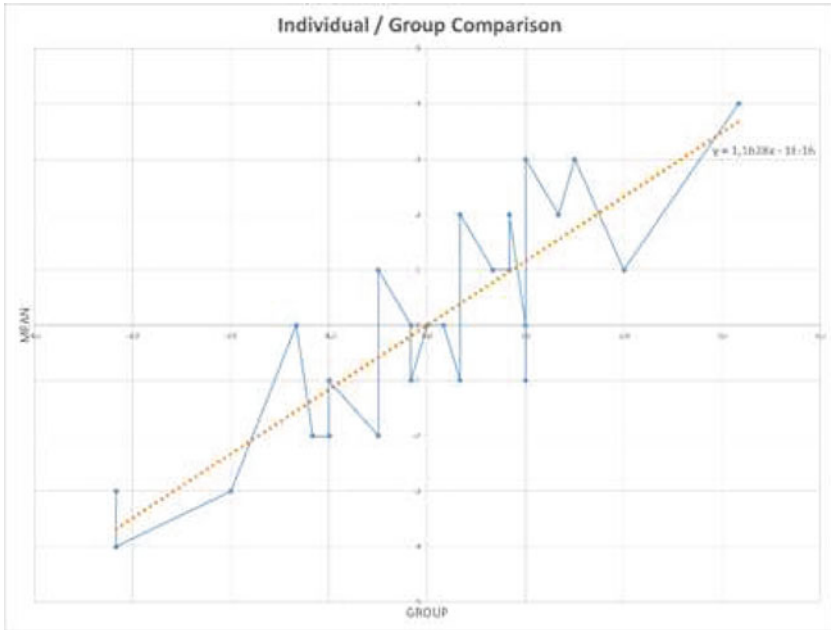


Fig. 2 Individual and group comparison

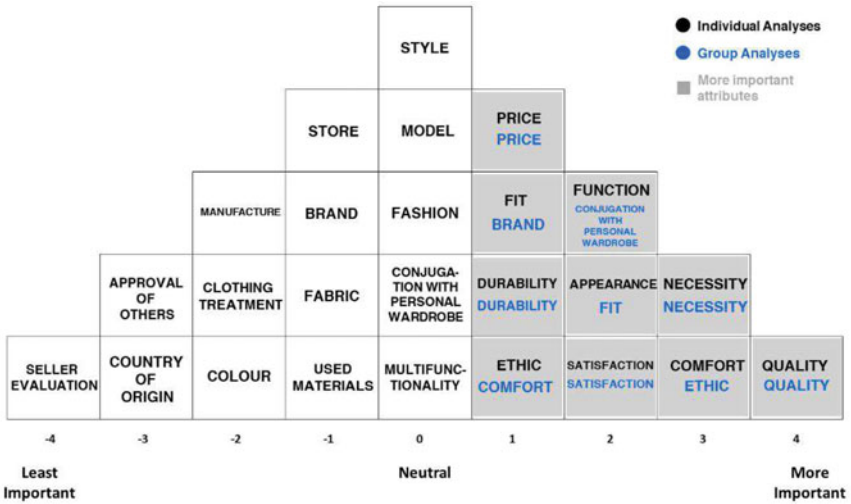


Fig. 3 Q-sorting considering the mean of the focus group (individual and group analyses)

of the individual ratings. This is due to the current trend of relating brands to ethic. The 'Function' that was relatively well classified in the individual assessment, in the group debate was no longer considered, possibly because its representativeness started to be represented by the valuation of 'Fit', since it went from 1 to 2, and perhaps by the consideration of the 'Conjugation with personal wardrobe'.

Thus, in order of importance, the attributes of the individual analysis of each participant in the focus group, most notable were quality, comfort, necessity, satisfaction, appearance, function, ethic, durability, fit and price.

For group analysis, the trend is similar, but with a differentiated order for a set of attributes and by the degree of importance, as follows: quality; necessity, ethics, satisfaction, fit, conjunction with the wardrobe, comfort, durability, price and brand.

From the analysis of the results, it can be understood that individuals make their choice of attributes directed to the type of clothing/fashion product that is informed to them: wool leisurewear giving great importance to attributes such as quality and comfort individually.

In terms of attributes, there is a difference in these two most important attributes and the results obtained by Azevedo et al. (2009). These differences are primarily due to the application of the fashion product (wool leisurewear), compared to the study by Azevedo et al. (2009) that was not referred to a specific product associated with a segment that appeared in recent years. Another factor may be due to a greater awareness of consumers and with a more sequential sustainable thinking with the priority objective of quality products, which will increase the product's durability and life cycle (Table 2).

However, is possible to identify between the studies that most of the attributes referred as the most important are common and only differ in colour, style, model materials and care, compared to the survey carried out.

Table 2 Comparison between individual and group analysis with a previous academic study

| | Individual analysis | Group analysis | Azevedo et al. (2009) |
|----|---------------------|------------------------------------|-----------------------|
| 1 | Quality | Quality | Satisfaction |
| 2 | Comfort | Necessity | Comfort |
| 3 | Necessity | Ethic | Function |
| 4 | Satisfaction | Satisfaction | Necessity |
| 5 | Appearance | Fit | Quality |
| 6 | Function | Conjugation with personal wardrobe | Style |
| 7 | Ethic | Comfort | Model |
| 8 | Durability | Durability | Fit |
| 9 | Fit (Garment cut) | Brand | Colour |
| 10 | Price | Price | Materials |
| 11 | – | – | Durability |
| 12 | – | – | Treatment (Care) |

7 Conclusions

From a practical point of view, this study contributes to exploratory results for fashion designers, who develop leisurewear collections can design products with the attributes that the consumer most values today. Facing the changes in the market, society, policies and cultures of each segment of product categories associated with new forms of current lifestyles.

From a theoretical point of view, this study contributes to the validation of the importance of the attributes of fashion design products in the three different categories of Dutton (2006) and Azevedo et al. (2009) as intrinsic, extrinsic and abstracts, as well as the rise of new attributes to be considered as ethics.

Through this study and Azevedo et al. (2009), it is possible to see an evolution in the choice of attributes by the clothing consumer. There is a choice in the order of importance that differs, namely the preference for 'quality' of the clothing product.

Attributes such as 'ethic' appear in both individual and group analysis, however in Azevedo's study (Azevedo et al. 2009), it is not considered, and attributes like 'model', 'style', 'colour' and 'materials' also drop considering the current consumer. It is also noteworthy that the contemporary consumer gives more importance to the 'durability' of the product.

In a general way, it is possible to conclude that there was an evolution in the valuation of the attributes of clothing by consumers considering an increase in awareness of sustainable consumption.

The 'price' attribute that appears in the individual and group analysis still has some relevance too. In this context, the attributes to consider for the second focus group would be the first ten attributes (mean individual responses), and to consider two attributes introduced by the group debate that is the 'Conjugation with wardrobe' and the 'Brand'.

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Design for Health and Wellbeing: Innovative Medical Garment Design



Merve Balkış, Emine Koca, and Ana Margarida Ferreira

Abstract This paper is the initial part of Ph.D study is to contribute to innovative designs for fibromyalgia patients improving, as result, their health and well-being. A flat design process which is customized is presented. The solution is supported in previous research data including interviews with patients and professionals for a better understanding of fibromyalgia issues and patients. It has also allowed determining a better design approach to the problem (Balkış et al. 2019). Fibromyalgia is a widespread rheumatologic syndrome recognized by muscle pain. It is more common in stressed or perfectionist people. Demographically, however, the syndrome is commonly observed in age groups between 30–60 years, and in women (Nazlıkul 2014). In this framework, the authors intend to help fibromyalgia patients through a non-pharmacological method but as a garment solution, presented here as a case study in a modeling stage. According to interviews with a doctor and patients, applying heat to “tender points” is relaxing and diminishes the effects of fibromyalgia syndrome. Most patients visit thermal baths for remedy. Also, they state that using heat packs are not a sustainable solution and prohibitive in daily routine. Thus, an innovative garment design was modeled and material selection was planned for a fibromyalgia patient’s tender points. The model is highly customized to meet the patient’s needs. In the future research phases, electronic nanocomposite materials will be applied to garments in accordance with the patient’s needs to obtain the desired heat release and clothing comfort properties. This new design approach is complementary to traditional and more invasive pharmacological solutions.

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Keywords Innovative garment design · User-Centered design · User-oriented design · Health and wellbeing

1 Introduction

Technological developments create changes in the way people live. Industrial Revolutions mainly caused by breakthroughs in the transformation of energy resources have changed the production methods and design approaches. Product-oriented production systems have been replaced with human-centered systems and human-centered design approach has developed over time. User-Oriented Design is an interdisciplinary approach to meeting user expectations and needs with ergonomic features of the product (Chammas et al. 2015; Mao et al. 2005; Sanders 2002). In user-oriented design, the designer's task is to orientate the design in line with the needs or experiences of the user and to ensure that the user can use the product as intended with minimal effort (Sanders 2002; Abras et al. 2004).

The concept of 'Design for Wellbeing' (DfW) which serves as a user-oriented design, focuses in helping people to make a transformation from an actual state of being to a desired state of being. Also, DfW focuses not only in improved physical conditions but in people's mental states also (Larsson et al. 2005).

1.1 *Design for Health and Wellbeing*

Brey 2015 mentions that 'wellbeing' has been studied in the context of hedonist theories by philosophers since the ancient Greeks and the definition of well-being has improved in the 20th century. He implicates that the relationship between social sciences and well-being has gained popularity unlike the relationship between technology and well-being studies in recent years (Brey 2015).

Wellbeing is an important subject that aims to improve human's living conditions and it is working area is wide and diverse.

States' efforts to improve the living conditions of people and legal arrangements; individual efforts for better life (religious rituals, sports and nutrition habits, etc.), group support activities to help people, studies on the freedom to express and live cultural and individual phenomena, architectural structures designed with physical and ecological consideration of human and nature harmony; various products designed for the well-being of people (designs made for elderly or disabled individuals, etc.) are the samples of wellbeing studies.

The relationship between 'technology' and 'wellbeing' is seen mostly in health products at the present time. Kaptı and Kurulay 2012 designed a biomechanical energy generator for active prosthesis. They have explained that one of the factors restricting the functions of active prostheses is limited charge times and weights of the batteries, and have modeled a new battery to overcome these challenges (Kaptı and

Kurulay 2012). The Company ‘SENSOREEs’ designs therapeutic, bio-responsive clothes for wellbeing. Their Inflata Corset Design monitors the heart rate and when the heart elevates to an excited state and it inflates pressure to hug the wearer and comfort them (SENSOREEs 2015). Jenny Tillotson designed a dress which release specific aromas in order to generate emotional reactions by using aromatherapy. Using scent to improve health and general wellbeing is a medically proven therapy method used by millions of people (Pailes-Friedman 2016). Balkış 2014 designed electromagnetic shielding garment by using copper and silver filaments for children using pacemakers (Balkış 2014). Matos et al. 2015 designed an endoskeleton prosthesis for lower limbs (Matos et al. 2015).

With the advances in technology, wearable electronics provide more comfort properties to clothing. Joyce 2019 mention that smart textiles change the delivery and experience of medicalisation because, when the medical device is woven into clothes, the technology becomes perceived as invisible, mundane and familiar (Joyce 2019). Using microcapsulation of aromatic scenes or drugs or using thermochromic materials for following temperature or flexible displays which are embedded to textiles etc. can use for health and well being. In the future people can follow their biological measurements on it via sensors. Printed electronics are good solutions for measuring conditions of body for health and wellbeing. Agarwala 2019 stated that printed electronics holds promise to seamlessly integrate electronic systems into textiles, thus replacing rigid components with flexible and conformal circuitry (Agarwala 2019). Sriraam et al. 2019 designed a comfortable wearable textile electrode belt for ECG recording and they emphasized that the smart textile technology is growing in the field of remote healthcare (Sriraam et al. 2019).

Smart watches or applications on smart phones are good examples for technology/health and well being correlation, which are used prevalently on these days, to measure heartbeats or sleeping time. These devices also have hydration reminder or implementer applications of breathing techniques for wellbeing.

2 Innovative Medical Garment Design

2.1 Problem

Fibromyalgia

The focus of this research study is the fibromyalgia syndrome, which is now characterized by chronic pain and has a negative impact on the quality of life of individuals. Although pain is the dominant symptom in fibromyalgia, other symptoms such as fatigue, non-restorative sleep (NRS), mood disturbances, and cognitive impairment are common (Macfarlane 2017; Franco et al. 2019). In 70–80% of patients, the fatigue continues throughout the day, more intensely in the morning (Dönmez and Erdoğan 2009).

According to USA's National Fibromyalgia Association (NFA) Report 2018, fibromyalgia is one of the most common chronic pain conditions (NFA 2018). Neumann and Buskila 2003 reported the prevalence of fibromyalgia (FM) in the general population to a range from 0.5% to 5%, and up to 15.7% in the clinic (Neumann and Buskila 2003).

Branco et al. 2010, investigated the prevalence of Fibromyalgia in 5 European Countries (Portugal, Spain, France, Germany and Italy) to estimate the prevalence of fibromyalgia in general population among rheumatology out patients. For the pain symptoms criterion, the highest rate was found in Portugal and the lowest rate was found in Italy (Branco et al. 2010).

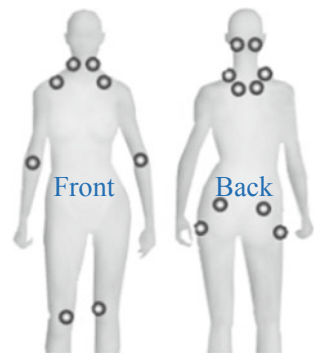
According to American College of Rheumatology (1990), the classification of fibromyalgia widespread pain was defined in five main body regions: the right side of body, the left side of body, the upper part above the waist, the lower part below the waist, and the axial skeleton, e.g. cervical spine, anterior chest, thoracic spine or low back (Wolfe et al. 1990; Chowdhury et al. 2016). Fibromyalgia patients have 18 tender points on their bodies with pain. Fibromyalgia is diagnosed on the basis of the presence of at least 11 of 18 well-defined tender points (TP) in musculoskeletal structures near the tendons, together with widespread pain. TP are also found in persons with fewer (Alfvén 2012) (Fig. 1).

Treatment Methods of Fibromyalgia

For the treatment of fibromyalgia, pharmacological and non-pharmaceutical methods (sauna, visiting thermal springs, doing physiotherapy and aerobic exercises, yoga or meditations, applying heat) are used together (Altınbilek et al. Altınbilek et al. 2018). Although the effectiveness of pharmacotherapy has been demonstrated in the short term, there is a general acceptance that non-pharmacological methods are more effective in the long term (Dönmez and Erdoğan 2009).

Heat therapy, such as saunas and hot tubs, has been used historically for its presumed therapeutic benefits, and emerging research highlights the benefits of heat therapy (Nicol 2011).

Fig. 1 Fibromyalgia Tender Points (TP) on the body (Shiel 2016)



In a preliminary study (Balkış et al. 2019), according to the interviews with patients and a doctor, it was found that the patients apply heat to sensitive points for treatment. Also Langhorst et al. (2014), shows that many patients with fibromyalgia use complementary and alternative therapies to cope with their disease. A recent consumer report indicated that 67.0% of German FMS patients used heat application or thermal baths (Langhorst et al. 2014).

2.2 *Design Approaches*

This study is a preliminary phase of a doctoral study. For this reason, flat design has been made in this paper. In the next steps of the study, clothing designs will be developed by taking into consideration the patient needs and well-being (being healthy, continuing daily life, looking stylish) will be taken into consideration. Findings from interviews, pre-tests and post-tests with patients and doctors will improve designs and guide their methods and materials.

A sustainable design approach has been adopted as it will serve as an alternative to disposable products (such as heat pads). Sustainable approaches are important for the continuation of all living things and resources. In addition, since the problems and demands of the patients will be taken into consideration, a user-oriented design approach has been adopted.

3 Method

Presented as a case study, this doctoral research is based on preliminary findings from interviews with patients and a doctor, as a needs analysis, in building an effective design approach that addresses the challenges of fibromyalgia patients. According to the main collected data, applying heat to strategic body locations was considered a good solution (Balkış et al. 2019).

Based on that previous study, a patient diagnosed with fibromyalgia has selected and a special garment design was made. Heat applying method has been used as a non-pharmacological method and heat releasing garment has been designed for the patient using the interviews findings as references (Table 1).

The materials that will be used for heat release properties were chosen based on an interview with Dr. Mustafa Erol from Dokuz Eylül University Department of Metallurgical and Materials Engineering, in Turkey.

Table 1 The applied methods for heat releasing garment design to fibromyalgia patient

| Design for Health and Wellbeing | Methods |
|---|-------------------------------|
| <p>*The main purpose is helping people to adopt to their daily lives</p> <p>*Fibromyalgia is; common syndrome with muscle pain and reduces patients' quality of life</p> <p>*Using heat application helps to people</p> | <p>Preliminary interviews</p> |
| <p>To Design heat releasing medical garment</p> <p>* Every patients can have different tender point on their bodies</p> | <p>Case study</p> |
| <p>A model design for the patient</p> <p>*Material choosing *Interview with a patient</p> | <p>Interviews</p> |



4 Findings

In the previous stage of the study, three patients were interviewed for their needs, symptomatic problems, and the therapy methods they use for diminishing the effects. Some interviews were applied to some patients in the previous study (Balkış et al. 2019). The patients stated that they usually used heat pads or hot water bags. They emphasized that a garment design which have heat releasing can help them have a more comfortable and pleasant daily life. They stated also the design must be tight around the tender points as the pressure relaxes the pain.

Each patient can have different tender points, as shown Fig. 3. For this study a singular patient diagnosed with fibromyalgia has been selected for the appliance of customized garment design approach.

The patient states that cold weather in particular causes aggravation of pain and she has more difficulty in adapting to daily life as pain attacks increased in winter. She stated that the pain points in her body are sensitive to cold and the pain increases. She points out that using of the existing heat treatments such as hot water bags are not possible in daily life especially in the working areas. So a customized dress, designed to keep the tender points warmer than the rest of the body could be helpful.

Table 2 Patient’s information

| | |
|---|---|
| Gender | Woman |
| Age | 58 |
| Job | Academician |
| Tender Points of patient | |
| Front | Back |
|  |  |

The clothes, to be designed and tested with the information obtained from the patients, are divided into two main parts as lower and upper body clothes, taking into account the pain points of the disease and one-to-one contact with the body. In the research process, form features and the positions of heat zones designed for the upper body were determined.

For heat releasing, electronic nanocomposite materials have been chosen according Dr. Mustafa Erol’s recommendations. It is desired to design a garment that is comfortable and has good heating features. Conductive textile surfaces are obtained by using electronic nanocomposite materials. Therefore, there is no need to use cables once electronic nanocomposite materials can be applied to the desired area of the garment. Further, heat releasing can be adjusted according to the desired temperatures presented by Erol 2013, who designed a portable home sauna and heat releasing carpet by coating textile material with electronic nanocomposite materials (Erol 2013).

5 Results

This study is the preliminary research of A PhD study for helping fibromyalgia patients' health and wellbeing. The problems of the patients were examined, and, as a result of the study, a customized flat design was made for a patient by determining the suitable material and method to be used for desired properties. In future studies, electronic nanocomposite materials will be applied to different parts of the garment that cover the pain points of the body, and advanced designs will be made in terms of materials, methods and models for the states and styles of different patients. Also depending on the creativity of the designer and tender points of patients, the heat releasing fabric part of the garment can be divided or contrasted by different methods such as texture, cup, cut, decoration methods. Thus, the design enables patient to not only use the garment for its health and symptomatic benefits, but also improve his/her quality of life based on the design choices that eliminate daily-life challenges of the garment.

5.1 Design Modeling

According to patient's tender points (shown at Table 2) a highly customized design model was made. Heat release can be achieved by applying electronic nanocomposite materials to the marked areas of the garment. For this case study, marked areas and design are shown in Figs. 2 and 3.

Fig. 2 Designing for patient tender points

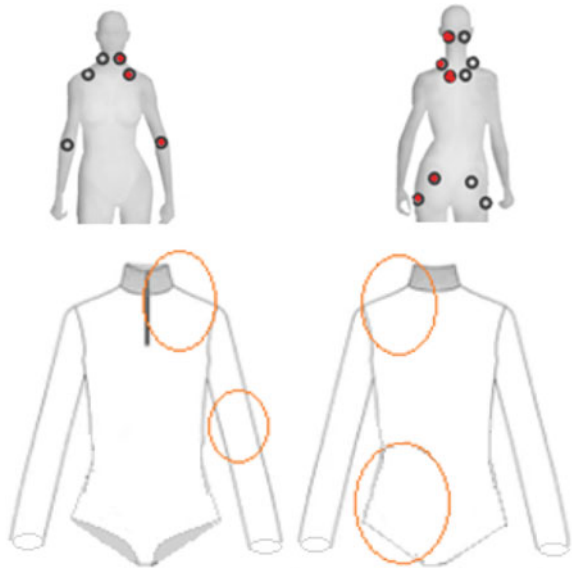


Fig. 3 The heat releasing garment design for the patient



6 Discussions

In this research study, considered as a pre-test exercise, a medical garment proposal was designed to reduce the pain symptoms of one patient. In future studies, by expanding the scope of this research, different and customized clothes designs with different usage areas will be made, based on more patients' opinions and in a bigger sample of population under study. The designs will go from basic clothes to daily clothes, evening dresses or sports clothes. It also can be produced based on current fashion trends by using different fabrics, colors or models. But, more importantly, it can be a good solution for the wellbeing of patients. Each patient's tender points can be distributed differently throughout the body and the possible TP zones. So, supported by a user centered design, each solution will be highly customized according to each patient's needs. For example, if the patient has TPs (tender points) on her/his knees; pants or tights can be designed. If there is no sensitive point on a patient's arm, a sleeveless garment can be proposed. Also, a general design can be made for the most commonly observed tender points in fibromyalgia patients by collecting data by interviews with many patients and doctors in addition to the existing statistical data, envisioning a more standardized solution to society and being aware that individual production is more expensive than mass production. The personalized temperature release could also be explored and tested, making adjustments to design based on the results of closer observation and more detailed correspondence and investigation with the physiotherapist and patient.

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Case Study - Clothing Design with Castelo Branco Embroidery Focusing on the Symbology of Embroidery



Ana Fernandes and Isabele Lavado

Abstract The Castelo Branco Embroidery is full of decorative grammar, it is endowed with symbolism, both in design and in what concerns the application of embroidery stitches and the colour palette. Here the typical embroidery of Castelo Branco is applied to a garment and studied from the design of the piece to the symbolism and history of the typical embroidery. A non-interventionist and interventionist action research methodology was used, and the following hypothesis was formulated: Is it possible to create new pieces of clothing respecting the symbolic load attributed to the embroideries of Castelo Branco? This investigation reinforces the importance of preserving and identifying the tradition of embroidery, giving it an innovative character, focusing on examples of pieces already created where respect for traditional materials and symbols allowed for the development of innovative garments. The reality is that in real terms the Embroidery never actually became extinct. A further note is made to recent uses of the embroidery in clothing and accessories which demonstrate its versatility in enhancing the creativity of designers.

Keywords Design · Embroidery · Symbology · Clothing

1 Introduction

As the Castelo Branco Embroidery is one of the cultural icons of Portugal, considered as one of the most important and aesthetically interesting elements of the Castelo Branco heritage, it is mostly recognized as a craft art where its application to clothing has been developed in the last 20 years. In this context, design intervention has been highlighted, creating differentiating products. The garments and accessories

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have been embellished by these images in forms that have been interpreted by the designer, who by nature, as an artist, seeks inspiration for their ideas and imagination. The characteristics of the technique and motifs capture the eye of those who appreciate them: the enormous variety of stitches and techniques, the composition of the drawings, the associated symbology, the rich colour palette, as well as the valuable raw materials applied, all these entice the designer, the artist to creativity. It is in this context that the research intends to extend in analysing the symbolism of the motifs and how these are applied to new pieces of clothing that are the new trends in fashion and which are increasingly forming part of our daily lives. These initial garments are the base for an ongoing study in the application of the embroidery on new pieces. It becomes evident that the process from the development of the application on clothing, progresses to the world of accessories in a natural and coherent manner, maintaining the integrity, beauty and traditional importance of the Castelo Branco embroidery. And likewise encouraging the sustainability of the products and materials. Zhong and Chudasri (2019) point out that traditional crafts have qualities that are in accordance with sustainability principles (Walker 2016), and gives the example of the Walker's Quadruple Bottom Line of Sustainability (QBL) comprising: practical meaning; social meaning; personal meaning; and economic means (Art of Silk 2020). This is an essential component to the development of new products in cooperation with artisans. It is a point that will be referenced further on.

In real terms the Embroidery never actually became extinct. In times when there were less demands for the traditional large pieces, artisans continued to make small pieces with the same exquisite and remarkable craftsmanship as in Fig. 1. This certainly demonstrates the ability of traditional crafts to adapt to circumstances and in the long-term preserve the art as well as continue to innovate and create while maintaining its integrity and symbolism. Its beauty and craftsmanship is undisputed in the sense that it requires dedication and time to elaborate the pieces (Fig. 2).

2 Historical Background

2.1 Artistic Heritage

As an artistic heritage, the Castelo Branco Embroidery has been preserved over the years by several regional entities, as well as by individuals who recognize the historical and symbolic value of these pieces. In light of the numerous and diverse references that exist about the Embroidery of Castelo Branco, it seems possible to collect and mention a historical and symbolic framework about what has been done with the traditional embroidery of Castelo Branco. Maria Clementina Carneiro de Moura wrote in one of her works (Moura 1966) "In the annals of artistic creation of the Portuguese people, the traditional «loose embroidery» of the region of Castelo Branco appears to us as a dazzling expression of ornamental beauty. Portuguese women were always exceptionally gifted for manual work. To weave, to sew, to embroider, to make



Fig. 1 Picture frame with embroidery of a tree with flowers with birds. Made by C. Moucito with an enlargement of the details of a bird and flower that exemplifies the fine details



Fig. 2 Picture frame with a tree and a bird and a picture frame with a bird and flowers Made by Helena Morera

lace - these are her favourite occupations and, at all times, they have constituted for her, in addition to housework or field work, that grateful “devotion” to which she cannot be exempt, in obedience to the her destiny as a tireless worker!”

The Embroidery of Castelo Branco finds its maximum expression in the so-called “Engagement Bedspreads”. Essentially reserved for quilts, the fate of serving in the newlyweds’ bed on a wedding day, became the most important piece of trousseau and the new home.

2.2 Origins and Production of the Embroidery

It is common to say that the bedspreads in Castelo Branco have their “genesis” in oriental embroidery. At the very least, it was deeply influenced by them, which is proven by both technical and iconographic affinities. Despite having as its only certainty the fact of being linked to the East. Moreover, as our universe of the decorative arts, it becomes complicated to prove where and how this art would have arisen since most of the hypotheses are neither particularly substantiated, nor is there additional new documentation. Marcelo (1993) ventures to say that this contact was made possible with the Discoveries, which took many men from this region to the East, some due to appointments/deployment or missions that had been assigned to them by kings and others because of his evangelical mission. In this context, names like Afonso de Paiva, born in Castelo Branco and Pêro da Covilhã, born in the city of Covilhã, whose mission was to reach India by land and whose information about the Orient were very important; Pedro Álvares Cabral, born in Belmonte and discoverer of Brazil; Father Manuel Dias, born in Castelo Branco and Frei Bartolomeu da Fonseca, among many others.

Maria Júlia Antunes in *Rendas e Bordados da Beira* (1974) goes so far as to affirm: “The first works started from the humble class of Castelo Branco and its surroundings, until at the beginning of the seventeenth century the gentlemen of Albufeira, focusing on this famous product of popular art, proposed to cultivate it and, aided by the solid education they possessed, took advantage of this art, adding new models copied or inspired by the ornamentation of furniture and oriental embroidery...”.

There are researchers who argue that there was a production in Lisbon in the 17th and 18th centuries. As stated by Luísa Arruda (ADRACES 2008) “The reason for the attribution of this group of pieces to Lisbon, to manufacturing intended for courtly taste is also related to simple questions of knowing the fate of the quilting manufacturers’ workshops in the city, referenced in the 16th century and whose quilts would be used in the great palaces and recreational estates, both in Lisbon and in its area of influence (...) In my opinion you should distinguish a production for the courtesan order, probably made in Lisbon. From this origin, more antique, more luxurious, of large dimensions and in which the presence of several embroidery stitches are detected (...) The Lisbon and Castelo Branco productions should be considered (...)”

In the middle of the Baroque period, embroidery takes on a new decorative grammar, where its technical and design perfection stands out, not only at the level of Castelo Branco Embroidery, but also religious and civil embroidery, throughout the country. There was an influx of wealth in the Kingdom, coming from Brazil. This is the golden period of quilting creation, according to Manuel Calvet de Magalhães in his 1995 work (Magalhães 1995) The examples from this period served as a model for the quilts that were elaborated later, already in our century, when the “resurgence” of this art occurs. However, at the end of the 19th century, this activity, which had been so intense until then, almost disappeared. The reasons behind this fact remain somewhat obscure, but there are two currents: that of those who relate the crisis of the silk industry in that same century to its disappearance [9] and, on the other hand, those who argue that there was a change in tastes that caused its extinction.

2.3 The Castelo Branco Revival

The 1900s saw the quilts of Castelo Branco stored in chests, from which they only came out on festival days, namely at Easter and saint’s days, when they decorated windows and balconies during processions or parades.

In 1929, during the IV Beirão Congress (in Castelo Branco), Maria Júlia Antunes stands out, presenting her first thesis on quilts, defending the existence of two production lines defined by the members of the embroiderers, that is, popular quilts from simple composition and erudite quilts with a more elaborate composition. It also gives, for the first time, the designation of Castelo Branco embroidered bedspread. Congressmen are interested in this issue and ask the authorities to promote the restoration. This was the first step towards the revaluation of the traditional embroidery of Castelo Branco.

In 1950, Elísio José de Sousa took the initiative to create an industrial firm (known as Casa-Mãe, a headquarters) aiming at achieving an industrial production of quilts and contributing to the employment of female labour. Professor António Esteves Lopes, from the Industrial School of Campos Melo (Covilhã) ensured artistic direction. This ended in 1969 with the death of its founder. Some embroiderers moved to the Centre for Regional Industries of the Portuguese Female Youth (MPF), which had been created in 1956 with the artistic and technical direction of D. Purificação Carneiro. This centre was designed to provide vocational training to young people “unprotected by the media” and to preserve regional embroidery. There, an attempt is made to breed the silkworm that failed, forcing them to buy linen from factories in Guimarães and to import white silk from Switzerland, having it dyed later in Porto. In spite of everything, he bought some linen in the surrounding villages, to encourage production. This demonstrates that the handmade production of linen and silk at this time was insignificant.

With the extinction of the Portuguese Female Youth and the Revolution of April 25, 1974, the embroidery centre is closed. During these two years, there was a

huge lack of production or there are no known works carried out during that period (ADRACES 2007)

In April 1976, the interest of the MPF Liquidation Commission, of the then General Directorate of Cultural Affairs of the embroiderers themselves and of the museum, made it possible to create the Workshop-School of Regional Embroiderers within the scope of the Francisco Tavares Proença Júnior Museum in Castelo Branco, with two auxiliary technicians, two masters and twelve embroiderers. This was the start, of a workshop-school, which still remains, that has the following objectives: “The production, conservation, restoration and dissemination of regional fabrics and embroidery”. The Museum is also responsible for the study and improvement of embroidery techniques and art and provide collaboration and support to the official activities and works of Castelo Branco teaching establishments.

The Pavilhão de Portugal at EXPO98 presented the “Nas Margens” fashion show. In 1998 at the Serralves Foundation and before the Queen of Spain and the wives of the Presidents of the Republic present at the Ibero-American Summit, the Presidency of the Republic chose the fashion show of these models to demonstrate the excellence and vitality of traditional culture. Thus, new models were created, some using Castelo Branco Embroidery. Portuguese fashion conceived from traditional materials and new attitudes, with good taste, modernity and innovation, where the fragments of the tree of life stand out where the symbolic charge is a strong constant, linked to the representation of life which is reborn and slowly develops and bears fruit.

The revival of this art has only been possible because it has had the support of local powers, who have promoted several initiatives to publicize the Embroidery of Castelo Branco, thus creating a brand image, identifying this city and which have persisted until today.

The “Ex-Libris” project, made up of several local entities, was carried out and aimed at reconverting, preserving and promoting the Embroidery of Castelo Branco, in addition to addressing its current threats and mischaracterization. It was taken as the most global and broad objective of this project, to guarantee the preservation of it regarding its genuineness, authenticity, aesthetic and technical quality. In this context, the necessary instruments were created for the certification process and consequently its fair regional, national and international valorisation capable of restoring the patrimonial value of Bordado de Castelo Branco and requalifying the economic activity that, in the region, developed over the years on the same throne.

More recently in 2016, designers Luís Buchinho and Alexandra Moura were invited to design two pieces of clothing for “Castelo Branco Moda 2016” fashion show, with the Embroidery of Castelo Branco. The students of Fashion and Textile Design, from the School of Applied Arts of the Polytechnic Institute of Castelo Branco, presented two pieces in flax, namely a lady’s backpack and a handbag with the Embroidery of Castelo Branco, having been conceived within the scope of a workshop promoted by the Municipality, in 2015, with designers José António Tenente, Nuno Gama and Maria Gambina. This event later leads to the initiative of the local council to organize a competition in the area of fashion design, on the application of the Castle Branco Embroidery in fashion, in footwear and accessories, the “Castelo Branco Moda”. This was done to promote the Castelo Branco Embroidery:

to contribute to the awareness of the importance of enhancing endogenous products in affirming the identity of the territories, to promote the use of natural raw materials, to contribute to the introduction of design in products as a factor in promoting added value, to motivate and support national designers, to contribute to the strengthening of the cooperative relationship between designers and craftsmen or artisans. This initiative has already had three editions and is in its 2020 edition presently. Most importantly, is the participation of young designers and artist, as well as students who are rewarded for their creativity and artistry.

3 Symbolism

“The history of the symbol demonstrates that any object can acquire a symbolic value, be it natural (stones, metals, trees, flowers, fruits, animals, fountains, rivers and oceans, mountains and valleys, planets, fire, lightning, etc.) or abstract (geometric shape, number, rhythm, idea, etc.)” (Chevalier and Gheerbrant 1994). Signs, in the form of written or spoken words, images or gestures are part of human communication. Aware and clear representations of reality are established - of objects, actions and concepts of the world around us (Fontana 2004).

While symbolism may provide universality to the images and the themes of a piece of embroidery, it also evokes an interest in those who visualize it, providing an opportunity to get an insight into the meaning of how these common images have a broader meaning.

3.1 *The Chinese Connection*

Certainly when taking into consideration the “origin” of the embroidery or at least the influence from the East, it becomes apparent that the symbolic implications of the images is very important. It had several antecedents and received influences from multiple regions where the charm of the Orient is clearly visible in terms of composition and decoration. In the Specifications Booklet of Castelo Branco Embroidery (ADRACES 2007) it can be read that the motifs used in the design of Castelo Branco Embroidery result from different influences from the drawing and engraving from the 17th and 18th century Europeans, Portuguese tiles, Indian textiles and Chinese textiles and porcelain.

With regards to symbolism it would not be wrong to say that the Chinese use of symbols is one of the most recognized and influential worldwide (Chudasri 2015). The hand embroidery is made with fine silk thread displaying wonderful colour and sewn to produce dazzling artistic effects and dates back to the Neolithic age with production reaching its peak in the 14th century (Art of Silk 2020). It is an integral part of China’s cultural heritage, adorning the vestments as well as the palaces of the Chinese Emperors and their family. The embroidery was used on clothing such

as robes and in decorative art as if it were a painting on a wall in the form of wall hangings, screens and even pillar decorations (Art of Silk 2020). Embroidery went further in its use as its symbolic meaning gave it many more uses in society, an example of this is its use in the badges to show the ranking of soldiers. As clothing was an indication of role, social position and military rank, the badges feature patterns of flying birds to indicate the lower ranks, while officers would bear the mark of a tiger, horse or other powerful beast (Art of Silk 2020). All of the patterns and images be these animals or plants and even imaginary creatures like dragons and unicorns have great meaning. The piece of embroidery itself; partitions, quilt covers, pillowcases, bedsheets, cushions, tablecloths, handkerchiefs and clothes; a variety of fibres used in combination as primary materials, such as silk, wool, gold thread, peacock feather and horses' tails; other fibres can be mixed in the fabrics, such as silk, satin, fibres from silken cloth and other textiles the threads (Zhong and Chudasri 2019); always have bright colours and symbolic meanings (Lin 2004).

The same can be said for most, if not all embroidery, that its symbolic meaning gives it meaning far beyond the simple decorative use. The importance of the embroidery on the garments and particularly in the use of materials such as silk cannot be underestimated in its symbolic implications which have continued to influence designers (Wang and Zheng 2011; Sau and Hau 2018).

3.2 The Portuguese Experience

One of the principle differences however with the Castelo Branco Embroidery is that it really did not develop as a form of decorating, adorning clothing. The specificities of the motifs and the materials used did not lend itself to this application. It is full of decorative grammar, the Castelo Branco Embroidery, both in terms of design and with regard to the application of embroidery stitches and the colours used is an exquisite example of craftsmanship that can be seen in Fig. 3. Having crossed several decades, its decorative grammar comes from the encounter between different cultures, from all eras and from knowledge of the theme and know-how. The reasons, when transferred, were changed from their symbolic values or even lost their original meaning. The author Ivo (2007) in her work "O Bordado de Castelo Branco - History, Art, Collecting and Musealization", says that it is possible that the first pieces of Embroidery had been produced at an erudite, religious, conventual level, where the making of embroidery was a common practice in the 17th century. Assuming that pieces of the genre were already being produced in the early 1600s, it is necessary to understand the Portuguese culture of the time and the intention of the motifs used, without neglecting that some were just due to a pleasure of copying the beauty of other objects.

On the other hand, there are those who try to look for a symbol in these embroideries that directly links them with their usefulness and practice. Following this logic, several authors consider that the motifs of the Embroidery of Castelo Branco are focused on the theme of engagement since the piece with the greatest expression



Fig. 3 Decorative wall Panel of the “Tree of Life” based on a 19th century bread spread, demonstrating the exquisite work, with close-ups of the details of the bird and flowers. Both the colours and the stitching are evident

are the bedspreads. In essence, the destination of serving in the newlyweds’ bed on their wedding night, is an objective that has been considered unique in the world of embroidery (Catalog of the Embroidery Exhibition of Castelo Branco, sd). Even the stitches applied (such as the Castelo Branco stitch, as we will see later) have stitches that symbolize the union of the bride and groom in a deep love, sacred to the church through marriage.

Some of these symbolic attributions are conferred by the embroiderers who apply their own reading of the motives, having conceived from an early age the idea that the products themselves can come to gain value through this reading. If the different works reorganize meanings from the most diverse sources, also the embroiderers, in the plastic specificity that is known to them, are able to elaborate new meanings, not always close to the archival documents.

4 The Castelo Branco Embroidery

Among the many motifs shown in the pieces embroidered in Castelo Branco, those that are most frequently represented were selected (and are identified because the

drawing does not always give us an understanding of what appears due to its high stylization and lack of rigor in the layout). There is an attempt to give indications about their interpretation in the reading of the performers (embroiderers), making the comparison and verifying their similarity according to the various authors and literary sources. To facilitate understanding, motives were organized into several categories: plant, zoomorphic, anthropomorphic, mythological and specific and inanimate symbols.

4.1 Plant

The Castelo Branco Embroidery is an example of the taste for naturalist representation where the flora is constant and diverse. It refers to plants, fruits, leaves and flowers. The vegetal motifs are not realistic representations, but stylized, sometimes assuming strange and always very fantastic forms and in the words of Clementina Carneiro de Moura, bizarre (Moura 1966).

The most common motifs that can be identified are:

1. Flowers: carnation, rose and peony, artichoke
The Greeks believed that paradise was full of flowers, all carpeted. The Chinese imagined that for every woman in this world, one flower would open in the other. These two ancient beliefs exemplify the most common symbolic meanings of flowers: the paradisiacal state and feminine beauty. The opening of the flower bud represents the creation and energy of the Sun. Flowers are universal symbols of youth and vitality, but due to their ephemeral character they are also associated with fragility and transience (Fontana 2004).
2. Fruit: fig, pomegranate, apple, acorn
Symbol of abundance, which overflows from the horn of the goddess of fertility or cups at the banquets of the gods. In the literature, many fruits acquire a symbolic meaning (fig, pomegranate, apple), becoming the expression of sensual desires, the desire for immortality, or prosperity (Fontana 2004).
3. Vegetation: leaf, ivy, palm leaves, pinecones, grapevines and leaves
The vegetation has the symbolism relating to the colour green for vitality and strength as too the meaning of life and royalty (Fig. 4).

4.2 Zoomorphic

Several zoomorphic motifs are identified: horses on the bedspreads on which the riders also appear; in the representation of hunting, dog figurines, winged animals, reptiles and other quadruped animals (ADRACES 2007).

The rider in the anthropomorphic category and the horses in the zoomorphic can be analyzed separately. The most frequent motif, however, is the bird that is found



Fig. 4 Picture frame of a centre piece based on 19th century embroidery with birds with a close-up of the bird that details the stitching and colours. Made and owned by Helena Morera

in a wide variety of typologies. They are commonly exotic or domestic, and the principle of styling the motif continues to prevail.

1. Bird: sparrow, cockerel, hen, pigeon, peacock

It usually serves as a symbol for the relationship between Heaven and Earth. It is synonymous with message. The fact that a band applied to the neck appears in the figuration of birds may be the result of a Mudejar legacy (Chevalier and Gheerbrant 1994). In the tree of life, each bird can represent a member of the family, and is positioned hierarchically according to the importance of the family member.

2. Animals: gazelle, deer, serpent

The animals have very distinct interpretations, but these are not unique to the Castelo Branco embroidery as is the example of the serpent that can have both good and bad meanings and the gazelle which takes its meaning from its natural animal features like speed and grace.

4.3 Anthropomorphic

Many examples stand out, very stylized and without clear correspondence with the real world, but which are recognized as being representations of human beings. The Specifications (ADRACES 2007) make reference to male and female elements. These two elements usually appear hand in hand (few specimens are known where the man, mainly, appears alone). The male figure appears mounted on horseback, as

a hunter or with a flower in his hand. The female element, usually in the centre of the bedspreads, appears to pair with a male figure, but there are examples in which the centre of the bedspreads is composed of two female elements.

4.4 Mythological

The only mythological motif found in the design of the Castelo Branco Embroidery is the double-headed eagle. There are several types of double-headed eagles, of unusual shapes, such as the design of the eagle with a heart pierced by an arrow (ADRACES 2007). The historical origin of this element goes back to the ancient civilizations of Asia Minor and symbolizes the supreme power. Resumed in the Middle Ages by the Seljuk Turks, reproduced by the Europeans at the time of the Crusades, to indirectly reach the imperial arms of Austria and Russia. Thus, it seems more correct to say that double-headed water (sometimes also referred to as two-headed water) symbolizes royalty, and it is not very correct to use it with the heart pierced by arrows (it is allusive to the order of Saint Augustine), treating it as a symbolic fusion of different origins (Chevalier and Gheerbrant 1994). Specific and inanimate symbols.

This category has the specific motif of the tree of life and the heart, with the inanimate motifs being divided into palmettes, shells, ribbons, bows, pottery/vases and elements that resemble architectural ornaments (ADRACES 2007).

4.5 Colour

Colour is an element of daily life in which symbolism is most readily apparent. Colours have an immediate impact on our perceptions and emotions, having the power to excite or calm, to cheer or depress. Colour symbolizes all aspects and energies of life itself, in such a way that death, for example, is seen either as black (the total absence of colour), in the West, or as white (the totality of colour, symbolizing the conclusion of life), as in the East (Fontana 2004). The most significant of these are white, red, yellow, blue, green, gold, white and violet.

There are less frequent motifs that the embroiderers give meanings, most of them turned to the engagement. This is the case of lilies, a symbol of the bride's virginity; of forget-me-nots, small, beautiful flowers, very discreet, full of candour. They are alike to the kisses that lovers sneak among themselves; the royal crown, a sign of patriarchal authority; from jasmine, meaning purity for the embroiderers, very much associated with psychological aspects; represents the virtue and intellectual gifts of the future bride. There is also reference to the nests, which represent the hugs or tendrils of the vine (hugs of the bride and groom), because they tighten the support and help the new branches; the flowering mounds as an awakening of new life and the three horsemen as the three wise men.

5 The Garments

The “Nas Margens” fashion show at the Pavilhão de Portugal at EXPO98 demonstrated the excellence and vitality of traditional culture. Portuguese fashion conceived from traditional materials and new attitudes - linen, felt cloth, embroidery from Castelo Branco, Vila Verde, on handlooms, tasteful, stylish seeped in modernity and innovation, interpreted in the publication “Contradições”. There you can find models that resulted from the work of several people. They set out to find the authors: Artisans from different mountain ranges, O CEARTE, the Aliança Artesanal, the Bobbin Lace Museum in Vila do Conde, the Castelo Branco Embroidery Workshop, Associação Pedras Brancos in Covide, in a collaboration with stylists Ana Salazar, Luís Buchinho, Olga Rego, Helena Cardoso, Fernando Nunes/Lígia Ferraz, Filipe Faisca and Helena Loermans. Well-known stylists lent their talent to the traditions of our culture and designed models with a very strong presence in Portuguese textile manufacturing, linking this traditional universe with the aesthetics of modernity. The contradiction here is not to ignore the tradition of its forms but to recon textualize it in the contemporary world.

5.1 *From Traditional to Contemporary*

This work is based on a reflection on the culture and traditional habits of Portuguese brides where design intervenes mainly in terms of the fusion of raw materials, in the design and finishing (Felgueiras 2006).

When it comes to design, it is not a matter of fabric manufacture, but of how to combine the different raw materials and interweave the threads according to their design, together with finishing, to achieve fabrics with great presentation and pleasant to the touch.

With this aim, great attention is paid to the art of combining colours, so that the fabrics result in a harmony of various tones and matrices that are pleasant and attractive to the final consumer. Underlying this work, there is a reflection on the culture and habits of the people, related to the pieces that are intended to be created.

Together with other areas, design emerges as one that may allow the establishment of links with tradition, redesigning it, thus emerging as the methodology presented as a way to provide the necessary development.

As inspiration for the development of this piece, the main inspiration fell on the traditional tree of life, which is present in Christian traditions as a divine manifestation by analogy with the “Tree of Genesis” (Rosa 2007). It grows, loses its leaves and recovers them and, therefore, regenerates itself: it dies and is reborn again and again.

The tree is one of the richest and most widespread symbolic themes, across many cultures including the Judeo-Christian one (Chevalier and Gheerbrant 1994). As a universal theme and, according to the situational diagnosis of Bordado de Castelo Branco, it was transported to Bordado de Castelo Branco representing life that is

reborn and slowly develops and bears fruit; so is the marriage in which love is a constant rebirth and growth (ADRACES 2005) (Fig. 5).

The new composition is simple, with light and expanded motifs, centred on a strong element with a symbolic charge in the centre of the piece. On St. John's night, the single girl burned the artichoke and left it out in the open. The next day, if he was green, it was a sign that his love "wants him from the heart" (Chevalier and Gheerbrant 1994).

In the final piece, open points will be applied, mainly nets, with some fillings to the point of Castelo Branco. Having the application of traditional Carnations.

That it is related to living and pure love, so will its symbology, but always around passions (Chevalier and Gheerbrant 1994).

In the case of Bordado de Castelo Branco and as listed by Margarida Ivo (Rosa 2007) "The carnation appears as a dominant element, flat or sideways, with separate petals and serrated edges, it is a sturdy, erect flower, a symbol of provocation, of



Fig. 5 White felt coat with a skirt with the embroidery of Castelo Branco embroidered with silk thread and gold thread (Photographs by the author)

virility (...) It evokes sweetness and obedience (...) it alludes to the Passion of Christ, to the nails or nails with which it was nailed to the cross.”

There are those who associate them with the male figure; man as manly love. When red means provocation, bloody, violence or marriage; and white, heraldry of purity, innocence and chastity. The carnation, of significant perfume, is identified with conjugal fidelity, together with the carnation symbolizes pure love (ADRACES 2005). In Portugal, specifically, the red carnation also symbolizes freedom because we associate it with the Revolution of April 25, 1974.

The materials the base are traditional where there is a thread is woven (Fig. 6).



Fig. 6 A burgundy dress with motifs embroidered in a single-color made with silk thread (Photograph by the author)

5.2 *The Materials*

The garment uses silk thread and wool and what is used on the cape is non-fibres that uses the waste from the cocoons. The importance of silk is paramount to the understanding of the pieces, not only for its value and scarcity but also for the difficulty in its use. Used in Chinese clothing and embroidery it was a status symbol as too was the Castelo Branco Embroidery in the 18th century and even today it is expensive due to its materials and artesian complexity.

There is research into consumer demand and propensity (Chen 2014) that can provide some insight and orientation for designers to modern aesthetic demands and a move to designing not just clothing but accessories and textile products too.

6 Conclusion

Throughout the periods that the Castelo Branco embroidery is being made, the artisan appears to not only dedicate their time to the bedspreads and quilts, but they also made smaller decorative pieces that would be used as wall hangings and framed as pictures. Despite the high prices for the larger pieces that made it difficult for the common person to purchase a quilt and certainly limited the number of pieces being made, the handicraft was not lost. In many homes in the interior it was common and prestigious to own a piece of Castelo Branco Embroidery even if it were just a bird or a flower in a picture frame. Moreover, Portugal and other Mediterranean countries have had a longstanding tradition of the trousseau which also meant that decorative pieces could also be included in this and certainly a piece of Castelo Branco Embroidery could be seen as prestigious as well as particularly beautiful. Moreover, people visiting the area from other parts of the country would also purchase these pieces from small local artisans and even in haberdashery shops that continued to sell these pieces. Examples of these can be seen in the images above (Figs. 1, 2 and 4. While Fig. 3 is a decorative wall panel these pieces were less common as they were more expensive. Nonetheless, these larger decorative pieces were still sold).

The development of a piece of clothing or an accessory in terms of design has its obvious practical design features, but with the introduction of adding an element of embroidery to the piece implies a specific rationale of composition. The motif may serve a decorative purpose and with it comes the form and artistic background as well as the symbolism. The placement of the embroidery, the elements chosen: be these the stitches or the material, are all taken into consideration. Once the piece is made what is its visual aspect? What is the importance of finding a market that will value these skills? The visual aspect that is being created produces an identity that may be killing the product. Making this a visual point and merchandising will not benefit the artisan. The knowledge behind the embroidery, the artisan skill and the collaboration is the sharing of the knowledge creating new stories between the designer and the artisan. The collaboration between the two.

This research is the foundation and initial background work to the elaboration and development of other new pieces of clothing as well as accessories and textiles.

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Jewels Design Innovation—Van Cleef & Arpels as a Case Study



Ana Moreira da Silva

Abstract This case study about the jewelry design innovation in the renowned Van Cleef & Arpels was triggered by the visit to the exhibition *Van Cleef & Arpels—Il Tempo, la Natura, l'Amore*, held in Milan earlier this year. To investigate the design innovation brought by VC&A to the high jewelry is one of this research main objectives. Since its foundation in 1906 in Paris, VC&A never stopped to innovate both designing new forms and introducing new handicraft methods for the jewels creation. This French *Maison's* style evolution has always known how to interpret the spirit of the times, maintaining a creative and execution quality of excellence. Van Cleef & Arpels has always kept up to date with events in the world of art and with innovations in the field of creation in general. The main aim of this research was to understand the roots and the developments of the Van Cleef & Arpels innovative path. This research was based on a specific literature review and on the direct observation of the jewels and their original drawings.

Keywords Design innovation · Jewels · Crafts technique · Van Cleef & Arpels

1 Introduction

It all started with two families, the Van Cleef, from Gand in Belgium, and the Arpels, from Amsterdam in Netherlands. Both families worked in jewelry and moved to Paris around 1865, and in 1895, with the marriage of Estelle (Arpels' daughter) and Alfred (Van Cleef's son), the two families start a long lasting family and business union. An alliance made not only to last but also to revolutionize the world of High Jewelry.

On June 1906, Alfred Van Cleef and the Arpels inaugurate the atelier and the first shop located in the famous Place Vendôme in Paris. The choice of this address was carefully made taking into account the location directly opposite to the Ritz. The Hotel Ritz had opened in 1896 and attracted Russian and European aristocrats and

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Fig. 1 The first Van Cleef & Arpels logo with the simplified image of the Vendôme column in the middle, shows the importance of this Paris location for the *Maison*.
Source Author



Fig. 2 The *Roses* bracelet for the 1925 Exhibition. *Source* Author

royal members, along with American magnates of business and industry (Cappellieri 2019). Place Vendôme was a symbol of Parisian luxury and the new reference point for international elegance. Van Cleef & Arpels *Maison* and the main atelier still exist in Place Vendôme, besides a large number of stores in all continents (Fig. 1).

2 Van Cleef & Arpels Innovation in High Jewelry

The root of the word innovation comes from the Latin word *novus* meaning new. Innovation definition is the development of new products, designs, or ideas¹, the introducing or discovering of new ideas and methods². Since the beginning the Van Cleef & Arpels jewels have incorporated innovation both in their design creation and in the craft techniques used for their production.

The *Exposition Internationale des Arts Décoratifs et Industriels Modernes* held in Paris in 1925, marked the high point of the first phase of *Art Deco*. The purpose of this Exhibition was to establish the excellence of French taste and luxury products along with the formal repertory of the *Art Deco* movement (Terraroli 2001). Van Cleef & Arpels won the Grand Prize of this Exhibition with the exquisite *Roses* bracelet and brooch (Fig. 2).

¹<https://dictionary.cambridge.org/dictionary/english/innovation>, last accessed 2020/03/12.

²https://www.oxfordlearnersdictionaries.com/us/definition/american_english/innovation, last accessed 2020/03/12.

At those times, this Exhibition had a direct and worldwide impact, which would enhance Van Cleef & Arpels’ international fame. In fact, VC&A won this Grand Prize with a set that would become historic: the magnificent *Roses* bracelet and brooch created in 1924 especially for this Exhibition. The bracelet represents red and white roses, illustrating the floral style based on Nature and *Art Déco* simplicity. Nature is a constant inspiration for VC&A. This fabulous bracelet is composed of 463 round diamonds, 293 rubies, and 108 emeralds mounted on platinum (Cappellieri 2019).

The *Maison*’s exquisitely Parisian style consolidated in the following years thanks to the creative duo formed by Renée Puissant, daughter of Alfred and Estelle, and the designer René Lacaze, whose extraordinary collaboration is evidenced by an archives heritage of hundreds of drawings and projects (Geoffroy-Schneiter 2004). An extraordinary creative duo, where the artistic ability of Lacaze interacts perfectly with the of Renée Puissant creative and innovative vision (Fig. 3).

During the late 20s and early 30s, Van Cleef & Arpels was inspired by the recently acquired fashion freedom showed off by modern women to create more audacious jewels with richer colors to complement these bolder fashions. Not limiting the production to wearable jewels, also cigarette boxes, lighters, *minaudières* and other

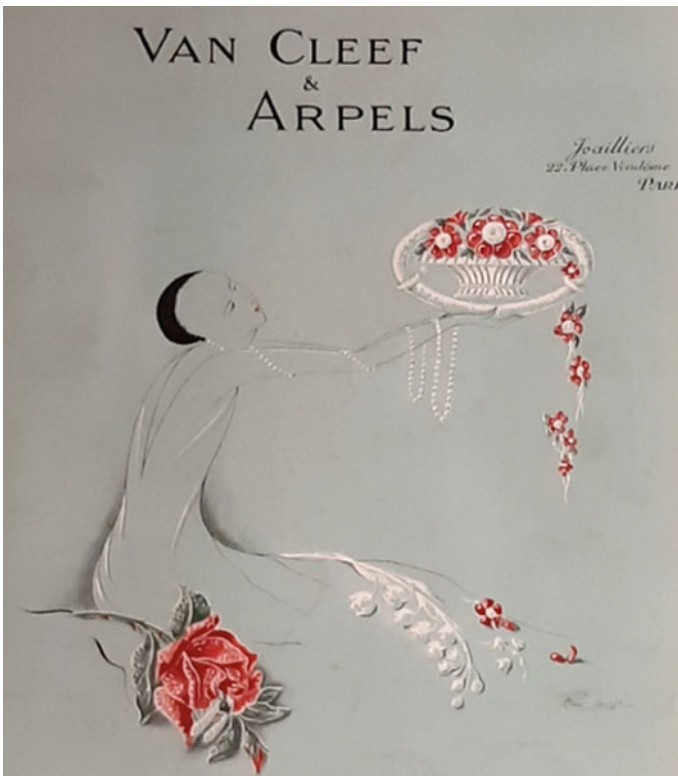


Fig. 3 René Lacaze signed drawing for a Van Cleef & Arpels catalogue, 1927. *Source* Author

Fig. 4 The *Volutes Minaudière* precious case with a retractable watch, 1935. *Source* Author



accessories were magnificently crafted, becoming authentic works of art. Experimenting new exotic materials, their incomparable work with lacquer and enamel and their fearless gemstone color combinations led Van Cleef & Arpels to the apex of the jewelry world³.

The *minaudière* is one of the main innovations of this period of time, a small precious case that contains the indispensable objects for elegant ladies. It was invented by Charles Arpels in the early 1930s as a jewel case to hold small objects such as a lipstick and other makeup accessories, cigarettes, mirror, etc.

This *Volutes Minaudière* precious case has small compartments for the various items of an elegant lady: make-up, comb, mirror, dance card, cigarette holder, and even a retractable watch (Fig. 4).

In 1933, Van Cleef & Arpels patented an innovative technique named Mystery Set (*Serti Mistérieux*). The setting is named for its appearance, because gems are invisibly set with this technique, so it appears as if nothing is holding them in place: no prongs, bars, or bezels are visible. In reality, the gemstones are secured on their undersides by a metal grid into which each stone is fitted and held in place by small grooves (Raulet 1997). Setting gemstones in this way allowed for a new aesthetic in jewels design (Fig. 5).

The level of expertise required makes Mystery Set can be only executed by a few number of master jewelers. The technique is so intricate and delicate that producing a single clip takes more than 300 h work. Each faceted stone is thoroughly inserted onto thin gold rails less than two-tenths of a millimeter thick. Once the procedure is

³<https://www.langantiques.com/university/van-cleef-arpels>, last accessed 2020/03/08.

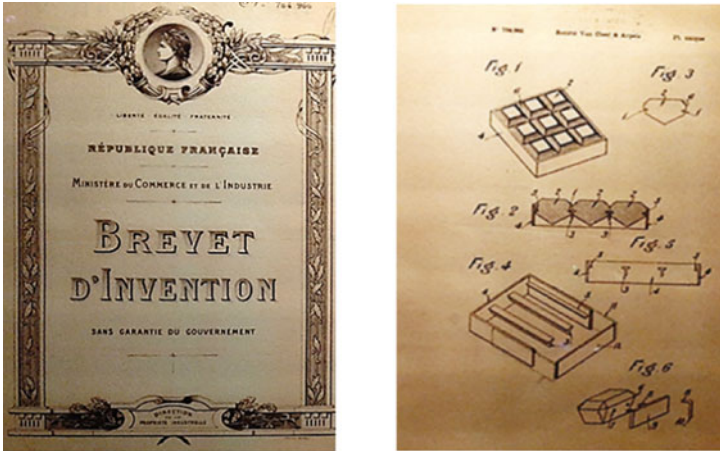


Fig. 5 The Mystery Set invention patent presenting the new technique scheme, 1933. Source Author



Fig. 6 *Serti Mistérieux* bracelet (gold, diamonds and rubies) showing the intricate work and the flexibility this technique can achieve. Source Author

completed, the gems appear to be entirely free-standing⁴. Because of the complexity of the process, Mystery Set pieces are extremely rare.

After inventing the *Serti Mystérieux*, Van Cleef & Arpels continued to follow the path of innovation, this time with the aim of innovating the flexibility of the metal and the softness of the metal mesh. The metal submitted to the hand of the goldsmith becomes softer, it is worked as a mesh to create an elegant and flexible ribbon (Cappellieri 2019) (Fig. 6).

⁴<https://www.vancleefarpels.com/ru/en/la-maison/spirit-of-creation/innovation/the-mystery-set.print.html>, last accessed 2020/03/19.



Fig. 7 *Serti Mystérieux* diamonds and rubies *Chrysanthemum* brooch, 1937. *Source* Author

For naturalistic creations, the *Serti Mystérieux* technique makes flowers and leaves even more likely. Created in 1937, the clip *Chrysanthemum*, where this technique is used for the baguette cut rubies and diamonds, is a particularly complex creation to make, its subtle interplay of curves and counter-curves entirely embedded testifies the *Maison's* craftsmen know-how (Fig. 7).

This innovative technique was mainly used in floral themes with fantasy, invention and creativity. The importance of fantasy as a source of creative inspiration and innovation is explained by Bruno Munari who distinguishes between fantasy, invention and creativity. Fantasy is the ability to think of everything that does not exist physically, while invention is the making of something completely new. Creativity is used to combine the two faculties described above, that is, a concrete application of the imagination (Munari 1977). Van Cleef & Arpels achieves innovation through the successful intersection between fantasy, invention and creativity.

Nature is one of the Van Cleef & Arpels main inspirations. Since its origins, VC&A pays particular attention to the floral world and produces a generous quantity of jewels made with the aesthetics of flowers and plants as evidenced by the *Roses Bracelet* created for the *Exposition Internationale des Arts Décoratifs et Industriels Modernes* held in Paris in 1925.

Jewelry has an intimate and primordial link with nature. The earliest 'jewels' were made of shells, leaves, berries, pebbles, perhaps strung on vegetable fibers or the tusk of an animal. Nature crosses the History of the Arts and excels among all the

inspirations (Becker 2019). Of course also gems and minerals, the jewels themselves, are material treasures on earth and the most elementary expression of the essence of Nature. Since the beginning of its existence that VC&A has given new impetus to the relationship between jewelry and nature, revealing the sublime balance between the artistic process and fascinating materials and innovative techniques such as *Serti Mystérieux*. Setting gemstones with this technique allowed for new forms of creation in jewelry design. Many of Van Cleef’s pieces show this technique (Fig. 8).

Through times Nature continues being Van Cleef’s main inspiration, innovating the jewels creation with the use of different materials, beyond the precious stones, such as wood or lacquer in 2004 famous *Butterflies* or coral carved like small sculpture in unusual and delicate shapes (Fig. 9).

The design innovation continues with the *Zip Necklace* where creativity and the highest goldsmith skills bridge with the functionality of the industrial zipper initially used for the soldiers uniforms. It is a masterpiece of design, combining innovation, creativity and technique to be discovered in every detail of this iconic Van Cleef & Arpels creation.



Fig. 8 Drawing for a leaf brooch and the jewel in *Serti Mystérieux* (platinum, emeralds and diamonds), 1951. *Source* Author



Fig. 9 Coral, gold and diamond flower ring, 1978. Black wood, gold, and diamonds and wood, lacquer, gold and diamonds butterfly clips, 2004. *Source* Author



Fig. 10 Gouache drawing of the *Zip* necklace commissioned by the Duchess of Windsor, 1938.
 Source Author

According to Alba Cappellieri, the VC&A symbol of the close relationship between fashion and jewelry is undoubtedly the *Zip*, this iconic necklace represents the perfect synthesis of creativity and innovation, being one of the most significant jewels in the history of the twentieth century jewelry, which the most surprising and innovative aspect is its transformability (Cappellieri 2019) (Fig. 10).

Wallis Simpson, Duchess of Windsor, commissions a precious zip, initially designed to close an evening dress with a deep neckline on the back. It was 1938, the war loomed and the technical complexity of a zip that in the meantime had to be transformed from a simple closure to a necklace required many years of experimentation and attempts. After the many constraints motivated by the Second World War Van Cleef & Arpels achieves it in 1950.

The VC&A *Zip* necklace is a true masterpiece of creative genius and goldsmith skills as well as a twentieth century jewelry icon not only because of the innovative design but also for its shape and possibilities of transformation.

To ensure the jewel a perfect fit, be it worn on the wrist or around the neck, the VC&A goldsmiths paid particular attention to the metal flexibility and the movement fluidity. Gold becomes the material to create herringbone links that flow into diamond-studded filigree hearts, an ornament of a beautiful and well-made project that allows the zip to open to take the shape of a V necklace that culminates in a precious tassel, but also to be worn as a bracelet by sliding the tassel upwards performing the zip closures. The tassel itself can be worn as a pendent (Fig. 11).



Fig. 11 Yellow gold and diamonds *Zip* necklace, 1951. *Source* Author

The zip slider really works thanks to a very complex craft technique as it brings together very small gold gears, the zipper teeth, arranged at equal intervals on a tin in order to fit with those of the other side, thus allowing easy opening and closing and making the protrusions perfectly match the recesses.

This innovative technique allows the necklace to be transformed into a bracelet through the zip closures (Fig. 12).

Since the first *Zip* creation on the fifties Van Cleef & Arpels has made numerous variations in terms of finishing and gems colors.

The *Zip* represents an icon in the history of jewelry for its technical and transformability innovation but also a triumph for the goldsmith by the mechanical prowess of its hinge with interlocking gold teeth and the adjustable size of its opening (Cappellieri 2019).

Fig. 12 The necklace transformed into a bracelet through the zip closures.
 Source Author



The named ‘dancing diamonds’ is another innovation developed by Van Cleef & Arpels in the 1950’s. Some of the diamond jewels of that period seem to ‘dance’ which is achieved through small and invisible springs placed at the base of each diamond and so the slightest movement cause them to oscillate and consequently makes the incidence of light to vary and highlight the diamonds’ shine and sparkling.

3 Design Process at VC&A

The design process of creating a VC&A jewel is complex and organized to the smallest detail, characterized by a series of phases which allow the goldsmith to work in a precise and coordinated way.

In the first phase the *Maison’s* designers create a new jewel by reconciling its new ideas with the VC&A’s identity, style, renewing it without ever distorting it. The design of a jewel starts from an idea or a thematic inspiration that the creative team defines and elaborates by reinterpreting the existing artistic heritage, made of transformable elements, secret mechanisms, extraordinary forms, high quality gems and always based on innovation. From this starting point, several sketches are created developing the idea and exploring several alternatives to achieve the final design. Then refined and thorough final drawings are executed showing the details and the future jewel exact form and colors. Then, the respective technical drawings are made containing all the essential information for those who will execute the pieces. Particularly precise drawings with all the small details of the piece and all the specifications about the techniques to be used but also the clear description of the metals, the precious stones and other materials to be used for its execution.

Subsequently, the project passes into the hands of the prototype creators, which is fundamental for understanding the volumes of the jewel, studying its ergonomics and anticipating any technical problems. The *maquette*, literally a prototype, also plays an important role for the *Maison’s* archive, as it represents the historical memory of

the jewel and allows to redo it, if necessary. This prototype is made exactly like the future jewel in less precious materials, for instance the gold or platinum is substituted by nonprecious metals or silver; instead of diamonds *cubic zirconias* or *Swarovski* crystals and the other stones by similar semi-precious ones are used, performed at full scale with all the future jewel's small and intricate details. Van Cleef & Arpels are the only ones producing this kind of innovative prototypes which are exactly like the future jewel, so similar that, sometimes, only experts can find the difference.

The prototype is then studied by the jeweler, who evaluates the shapes and volumes and works to create the metal structure, which must be light and solid at the same time, to support the stones, withstand shocks and give stability to the jewel. The jeweler works closely with the smelter, who is responsible for checking the feasibility of the structure of the jewel, which is also responsible for making all the metal parts.

The next stage is the setting of the stones in the lodgings previously created by the jeweler, which requires a very high dose of precision, skill and manual expertise. The precious stones are cut and polished by the lapidary artisans and after the setting of the stones the jewel is almost complete, only the polishing is needed, necessary to make it shine with its own light. Everything must be bright, even the hidden corners and the very small or invisible parts, but no less important: to make all the scratches disappear and make the finished jewel sparkle.

So it is a precise design process, fully studied, projected, organized and managed in the smallest details, always searching for innovative solutions for the realization of each new jewel.

4 Conclusions

Based on the several examples presented, we can conclude, that Van Cleef & Arpels brought innovation to the jewelry design not only by the creation of new forms and new precious objects but also inventing new goldsmith techniques.

VC&A creations are timeless not only because such is the art of jewelry using long lasting precious materials, but especially because the *Maison* has crossed decades developing incessantly according to a unitary and coherent path, it is itself the basis of its timelessness. Its real strength is this ability to focus on certain types of craft skills, applying a coherent approach to his style and incorporating innovation.

From this emerges the multidisciplinary nature of jewelry, its understanding of both technical and scientific as well as artistic and cultural aspects, drawing alongside gemology, design innovation and process alongside manufacturing.

Van Cleef & Arpels has created a legacy encompassing exceptional craftsmanship with designs that are innovative, daring and bold, no wonder that the French *Maison* has long been considered the jeweler of choice to society's elite. Each piece boasts elaborate constructions and an abundance of gemstones, presented in a variety of styles to create striking innovative settings. The brand can rely on a rich heritage made of imagination and genius, sagacity and inspiration to renew each theme and

tell its story in every era and style. VC&A jewels also crystallized the spirit of the time with creative freedom and innovative approaches.

We can conclude that Van Cleef & Arpels represents the perfect synthesis of creativity, innovation and crafts technique in the jewelry design.

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The Design Method Applied to Jewelry Development: From the Concept to the Final Product



João Carlos R. Plácido da Silva, Jhonatan Withaker R. Francisco, Fabio A. Moizes, Valeria Ramos Friso, Luis Carlos Paschoarelli, and Jose Carlos Placido Silva

Abstract Goldsmithing is an age-old art that, every day, innovates and allows us to transform the metal into great arts of affection and meaning that transcend from generation to generation. The objective of this work is the creation of a line of jewelry made in silver, with earring, choker and ring inspired by the plant of the closed biome through the relation between the design and the bionics. The natural elements allow us, through their shapes and structures, to generate shapes to apply them in the product design. Understanding the material and applying it properly provides a design tailored to the user's needs.

Keywords Jewelry · Closed biome · Bionic · Product

1 Introduction

Nature, its mode of adaptation, movement, defense and preservation mechanisms, its colors and shapes, can guide the creation of the most diverse products and solutions, in order to solve existing technical problems. This nature can be interpreted in several ways, serving as a source of inspiration and creativity for the designer. And yet, it can be said that design and nature are interconnected, as both areas develop projects, through planning, concept and creativity. Its values are a wide field to be explored and transformed.

The cerrado biome goes back in time more than 30 million years ago, it has a unique characteristic, that is, it has reached the final limit of its evolution, therefore, having acquired its status as climax vegetation. This means that the cerrado has its own botanical, morphological and physiological mechanisms, different from other national biomes.

It has a rich biodiversity in animal and plant species distributed by the heterogeneity of its biotas. Suffice it to say that of the almost eight hundred species of

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woody plants, trees and shrubs in the cerrado region, more than four hundred are typical of the cerrado habitat.

Unfortunately, at present, half of the Cerrado's vegetation cover has already been extinct, and what remains is threatened with extinction. The successive annual fires, usually caused by man, causing the degradation and destruction of several gradients of the cerrado.

Therefore, it is proposed the development of a line of products, based on the plants of the cerrado biome, relating aspects of the bionics, which it will present, by means of attributes offered by nature, being able to develop an innovative product.

For the development of the jewelry set, the following characteristics were defined: usability, comfort, simplicity and lightness. It seeks to reach the female target audience, that is, women between 20 to 60 years of age, referring to social classes A, B and C who like conceptual and significant ornaments. The general objective of this study is to develop this line based on a design development method, which will make it possible to integrate the concept of the cerrado biome plant into a new jewelry product.

2 Jewelry Design

According to Santana (2015), the international fashion universe working with jewelry is now essential and very profitable financially. This generates an aura of enchantment and originality around the jewelry designer, leading people to believe that he lives immersed in the sphere of stardom. However, the real context experienced by him is quite different.

Although there is an extreme demand in Brazil for this specialist, generating a highly disputed field of action, the designer must be able to face new challenges, to reveal his personal brand, thus demonstrating to be extremely creative, to have a particular way of expressing himself and the mastery of the processes required for the production of jewelry (Santana 2015).

However, it is noteworthy that, recently, jewelry producers did not seek their designers in Brazil, but in Italy, the radiating center of design. Gradually this context was transformed, and the first Brazilian designers began to appear, elaborating their products with a more national profile, even winning important awards and international legitimacy. The industries captured these changes and started to give more importance to the original designs.

The jewelry designer must always be able to give special meaning to the signs and linguistic codes latent in everyday life. In addition, it is not enough that the professional only knows how to draw, he must be constantly attuned to the latest market inclinations, with the demands and ambitions in vogue.

The specialist needs to know in depth the different production techniques, so that he can meet the requirements of each industrial establishment and be prepared to work in the jewelry sphere in general, also collaborating in the improvement of

personalized collections. Without forgetting that this professional can even set up his own studio (Santana 2015).

In any case, it is up to the specialist to implement projects aimed at jewelry stores, developing personal and even experimental plans, covering from the moment of gestation of the product until its sale in the market. He is also responsible for drawing up plans with aesthetic and cultural objectives, proving to have a good command of colors, association of stones and a deep ethical sense, preserving the creation of other professionals in the same area.

The designer's field of action covers any jewellery establishment, the sphere of improving jewelry, the production of original formats, among other professional paths. Jewellery design colleges offer a wide range of knowledge, an integral and renewing development, in tune with the demands and inclinations of the labor market.

3 Fashion Design/Clothing Jewelry

Ornaments have always been present in the expressions of clothing and according to some scholars they even claim that ornaments precede clothing. And yet, they bring with them some meanings and, like clothing, are a form of non-verbal language (Aguiar 2006). Clothes and jewelry are elements that have great importance for the development of fashion. Thus, the use of jewelry has always been dictated and related to styles of clothing used in different times, an example of this occurred in the 19th century with empire dresses that promoted the use of pendants to attract attention to the woman's lap valued by low necklines and high waist so volga at the time.

Another relationship between jewelry and fashion is linked to the pleasure of seeing, and of being seen, of showing off in the eyes of the other. To this pleasure mortal are added the new norms that exalt the idealization of women, good speech, good manners, a taste for beautiful language and beautiful objects. And yet the cult of love has instituted transformations in the seductive relationships between men and women, making men to please women for their good manners and must likewise refine their appearance, expanding the female taste for ornaments and for everything that emphasizes its beauty (Aguiar 2006).

4 Jewel - Origin

According to Pedrosa (2015), the adornments/ornaments are actually symbols, a form of language, a way to stand out. The peoples of the Paleolithic periods already knew this. She also points out that since ancient times, stones, shells and other materials have been used as ornaments for the purpose of talisman or symbol of status and power. However, it is not possible to search when the history of jewelry began.

Between the Stone Age and the Metal Age, with the mastery of the still rudimentary foundry techniques, materials such as copper, bronze and iron leveraged

human development and gained prominence in jewelry. Between 1,400 and 600 BC, new metal smelting techniques emerged, mainly in Europe and Asia. Twists to make bracelets, stoning to illustrate stripes and lines and high temperature fusions to sculpt engravings are part of this phase.

However, she still points out that, between 1.00 and 700 BC, another leap in history: the development of bronze pus in Luvistan, in the mountains of southwest Iran. From there, other pieces were created, such as chokers, brooches and earrings, in harmony with the ideals of beauty at the time.

The people who inhabited the territory that comprised China, on the banks of the Danube and Russia in 700 BC, were nomads and excellent knights and architects. Recently discovered evidence allows us to identify them as one of the first Indo-European peoples and as the greatest goldsmiths in the ancient world. In the Americas, metallic ornaments were made not only of gold, silver, copper or platinum, but of combinations between them. This is because the purity of certain metals was only allowed for high-level societies (Pedrosa 2015).

In the Middle Ages, art suffered a great religious influence. God is the center of the universe and the Church, as the representative of God on Earth, had unlimited powers. This marked influence in the life of society, also influenced jewelry. The goldsmiths combined intricate shapes with gold filigree arabesques, diamonds, emeralds, pearls, rubies, sapphires, turquoise and topaz.

The Byzantine Empire stood out for its jewels. After the iconoclastic era (from 730 to 787 and 813 to 834), which prohibited the cult of images, gold was fused with enameled glass, a technique that soon became his specialty. Crossing the borders of the Empire, the Byzantine jewelry conquered vast territories with its gold ornaments and its icons with the cloisonné enamel (Pedrosa 2015).

In the Renaissance period, jewelry was no longer sponsored by the clergy and started to be sponsored by the bourgeoisie. The goldsmith's craft began to gain status as art as did painting and sculpture. At the end of the fourteenth century, the goldsmith gave way to the jeweler, who introduced new fashions, with elegant and poetic designs, flirting with nature themes for his cameos.

At the end of the 17th and 20th century, the Baroque style was marked by the spiritual conflicts of humanity. Man placed himself between paganism and Christianity, as well as between matter and spirit, anthropocentrism and theocentric. Curved lines and nature themes were used as a new language. Inspirations came from the flowers and birds of the Americas. Another theme very present in jewelry of this time, were the ties. Asymmetrical in shape, they were worked in gold or in fabrics joined with pendants.

With the end of the war, Europe again opened its doors to glamor and women, anxious to show a renewed aspect, waited anxiously for the news. Gold continued to enjoy popularity, now with textures on the surfaces and gems in combinations of turquoise and coral colors. However, the favorite gem of women remained pearls. Until the 1950s, there were two forms of jewelry making, industrialized ones, made with rare gems and handmade jewelry, made with more accessible materials and aesthetics and art were more important than materials. In the 60s and 70s, form was

valued more than materials. The design starts to be valued for the concept and the use of plastic and even paper was used in the making of the pieces.

The 90s, unlike previous decades, are characterized by a return to minimalism in relation to jewelry and clothing. The jewels are inspired by the styles of the past: Greek and Roman civilization, Art Nouveau and Art Deco, in the quarantine, fifties and sixties. White gold almost always combined with diamonds, while yellow gold reappears especially in the second half of the decade. The gems in general, in very small or large cabochon cut (Pedrosa 2015).

4.1 Jewellery

Jewellery is the art of working with precious metals (specifically silver and gold), in the manufacture of jewelry and ornaments. It is a very old art, having been found the first archaeological evidence in the Aegean Sea, dated around 2500 BC, in which they are made of gold. In Ancient Egypt highly detailed works were already produced, it is considered an art of great acceptance around the world, being, in the Modern Age, professionals of illegible prestige before kings and the whole court (Pedrosa 2015).

In ancient times, gold was used not only as an ornament, but also served to distribute wealth. Rulers and temples could accumulate great treasures in general in the form of vases or similar objects and in the form of jewelry. Gold was kept as a sign of power and wealth, and Ra was used in business and to finance wars and pay ransoms.

Over the years, jeweler has developed a lot in the technological field. Equipment, laser machines, prototyping and three-dimensional software, contribute better to the creation and development of jewelry today. Even with all this sophistication, manual (handcrafted) work cannot be left aside, as the value of a handcrafted jewel is not far removed from that produced by machines.

Jewelry throughout its history has always been an expression of art, and art is nothing more than a way of showing our feelings and emotions and thoughts. Despite having adornment as its main function, it brings other values. It tells a story, marks a moment (Santos 2013).

4.2 Material Silver

Silver has been known to man since prehistory, and it is estimated that its discovery was made shortly after that of gold and copper. The oldest known references to the element are the book of Genesis. The Egyptians considered gold to be the perfect metal, giving it the symbol of a circle, while silver was considered the closest to gold in perfection, so it was given the symbol of a semi-circle. The Romans called silver *argentum*, keeping it as the element's international name, from which its chemical symbol derives (Bardi 1979).



Fig. 1 Ornaments after the appearance of silver in Brazil *Source* Cabral Moncada Leilões

Silver artisans were transformed into true artists, who often combined creation with making. It has always been used for making ornaments and objects of use, it could be used for religious purposes called sacred pieces and in common use such as cutlery, ink cartridges, among others. Approaching the aspect of sacred pieces, we must highlight the great relevance of Brazilian pieces of the 18th century, obviously influenced by Baroque and Rococo art.

The 18th century silver in Brazil, as can be seen in Fig. 1, did not normally present a contrast, as our silversmiths were not recognized, which only happened in the first half of the 19th century, about two decades of our independence (Bardi 1979).

Silver is a precious metal, matt white, shiny, very ductile and sonorous, but also of great historical, cultural and artistic importance. Virtually all ancient civilizations knew and used silver in utensils and adornments.

5 Cerrado Biome

The cerrado goes back in time more than 30 million years ago, today the cerrado is considered to have reached its limit of evolution. The Cerrado has its own botanical, morphological and physiological mechanisms that no other existing biome has, this means that after these thousands of years, no other biome, except the Cerrado, could withstand so many climatic and morphological changes arriving today in perfect condition. vegetation state (Santana 2015).

Today, the cerrado is largely modified due to the actions of man, who behaves in a way backwards with nature. In the present, much of the vegetation of the cerrado has already been extinct and what remains is threatened with extinction, this is the great successive fires generated by man, causing the degradation and destruction of several magnitudes of the cerrado.

Gomes (2008) highlights the important consequences caused by fires:

- Drastic reduction and destruction of animal and plant biodiversity - specimens and species from the Cerrado in genetic terms, in terms of species, niches and ecosystems;
- Increasing silting up of the drainage network of the geographical territories, reducing and contaminating the surface and underground aquifers;
- Contamination of environments by pesticides, labeled pesticides;
- Water contamination by industrial chemical pollutants, non-biodegradable water pollutants, water and sewage networks compromised by solid waste;
- Biopiracy practiced by mercenary individuals and by alien companies that appropriate the knowledge of indigenous peoples, the peoples of the cerrado and patent our natural products etc. ...;

According to Ribeiro and Walter (1998), there is no homogeneous flora in the cerrado biome, but thus a vegetational mosaic, with characteristic floras for each area, resulting from the interaction between biotic and abiotic parameters that determine qualitative and quantitative changes in the composition of the vegetation.

According to Martius (1973), the first quotations and descriptions about the characteristics of the cerrado were made by the pioneers who entered the backlands of Brazil in search of precious minerals and Indians to enslave. On these trips, they were usually accompanied by a scholar and/or scribe responsible for describing and reporting the trip. Subsequently, foreign travelers began to enter Brazilian landscapes, collecting species and making detailed descriptions of the landscape aspects that made up the Brazilian space.

Martius (1973) reports some aspects of the cerrado, perceived from the landscapes where his expedition passed:

The higher, drier regions were covered with scrub, partly without leaves, and their varieties had a patch of fine grasses, all in bloom, among which scattered groups of palm trees and lush bushes appeared. [...] On the other side of the small stream, the Borrachudo, we left the limestone formation, and found reddish granitic soils, with a small portion of mica. The vegetation rises in low grass; in it we can distinguish many trunks of cachaporra-do-gentio (*Terminalia Fagifolia*), a tree that secretes from the inside of the bark of a gum - resin similar to the real gum gut, although more reddish.

As for conceptualization, the term Cerrado is a word of Spanish origin that means “closed”. This term tries to translate the general characteristic of dense shrub-vegetation that occurs in this formation. However, the lack of homogeneity in its landscape and of thermologies has been generating discussions and difficulties in defining concepts.

In this context, Souza (1973), makes the following definition for the Cerrados:

They are formed by spaced, gnarled, low trees, with tortuous branches and thick, rimous or cracked barks. Between the arboreal part forming the bottom, there is a dense population of grasses and field plants. In Central Brazil, the savanna is wooded or, more frequently, shrubby. Such elements are inhabited by dry, very sandy, or hard soils, such as “toa”. The density and size vary widely depending on the soil, but above all, according to the degree of devastation to which they are subjected. The flora of the cerrado fields is heterogeneous and exhibits strong local variation.

6 Bionics, Perception and Creation

Bionics is a tool used by Design, which studies nature looking for the characteristics of different natural species. According to Ramos and Sell (1994), the formalization of bionics as a science is quite recent, however, man was already studying life and its return to create something he needed, just as Leonardo Da Vinci did when studying the flight of birds to create one of the first flying machines.

According to Ramos and Sell (1994), nature, its mode of adaptation, movement, defense and preservation mechanisms, its colors and shapes, can guide the creation of the most diverse products and solutions, in order to solve existing technical problems. This nature can be interpreted in several ways, serving as a source of inspiration and creativity for the designer, Fig. 2. And it can also be said that design and nature are interconnected, as both areas develop projects through plans, concepts and creativity. Its values are a wide field to be explored and transformed.

According to Hsuan (2002), this science offers the designer not only opportunities to expand the morphological knowledge and measures of natural tact, but also the possibility of “examining” natural processes and, further deepening, including the



Fig. 2 Bionics, plant structures of plants *Source* Eco Sk8, (2007)

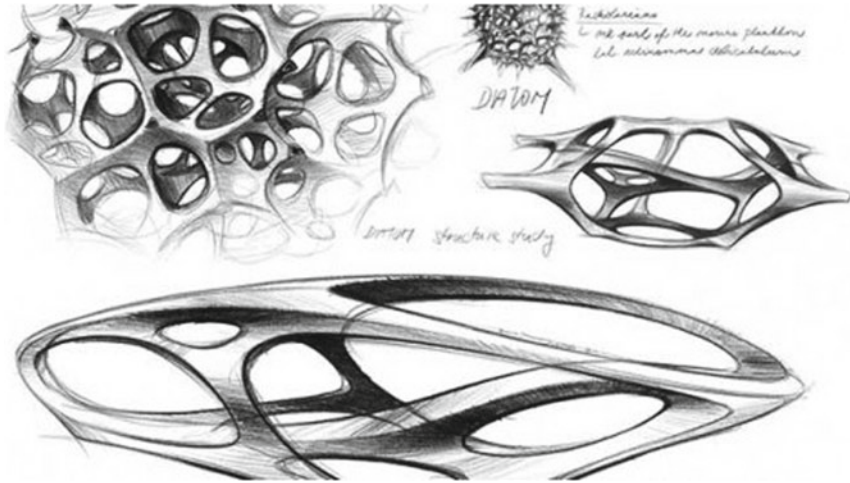


Fig. 3 Bionics, creative process through nature *Source* InteriorGid, (2008)

laws that govern molecular structures, which, in their laws of composition and growth, constitute a vast gestalt universe.

In addition to being beautiful and perfect, nature shows us solutions and design forms that we can transform into great functional products for static and functional well-being, that is, it offers stimuli on how to improve and revolutionize products and people’s lives, as it can be verified in Fig. 3.

7 Development Method

For the development of this project, the methods of Löbach (2001) were used, which he states that the whole design project is both a creative process and a solution to problems at the same time, as seen in Fig. 4.

In the entire design process, it is necessary to develop a list of requirements to identify important needs in the creation of the jewelry set, this survey comprises exploring the needs of users. Understanding the needs of users is essential in developing solutions, as involving the user from the beginning of the development process ensures that the product meets the identified needs, Fig. 5.

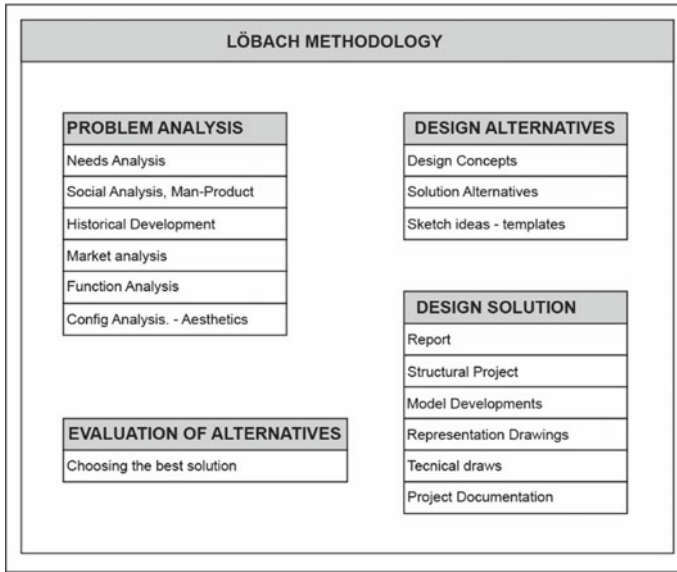


Fig. 4 Löbach’s methodology *Source* Prepared by the author

| Requirements | Objective | Classification |
|---|--|---------------------|
| Jewel based on plants of the cerrado biome. | - Environment - Deforestation | necessary |
| Pleasant aesthetic, attractive look. | - Natural Feature - Organic Forms | necessary |
| Practicality | - Lightness - Comfortable | necessary |
| Durability | - Long-term resistance | necessary |
| Ergonomic | - Adequate size for the public-target - Rounded finish and not pointed | wanted |
| Low Cost | - Cost reduction in production - Labor - Profit minimization | necessary wanted |
| Material | - Silver, extracted from nature - Easy cleaning - Cheap material, low cost | necessary |

Fig. 5 List of Requirements *Source* Elaborated by the author


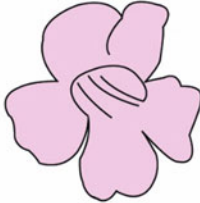


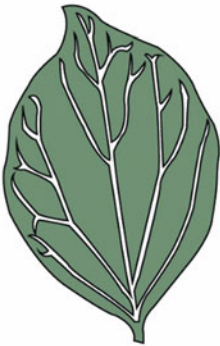

| Part of the studied natural element | Parameterization | Parameterization |
|---|---|---|
|  |  |  |
|  |  |  |

Fig. 6 Simplification of Form *Source* Elaborated by the author

7.1 Simplification of Form

The parameterization of the analyzed natural elements constitutes a simplification of shapes and details from the images obtained. These were obtained with the aid of the vector software, as can be seen in Fig. 6.

7.2 Inspiration

The cerrado biome has numerous plant species, for the development of the jewelry set, only one species was defined whose scientific name is *Arrabidaea Brachypoda*, the choice of this plant was due to the fact that it is more suitable for my jewelry project in the middle of different types and species of plants that exist in the cerrado biome. *Arrabidaea Brachypoda* has harmonic characteristics that contribute a lot to



Fig. 7 Inspiration *Source* Flickr Maurício Mercadante, (2008)

the realization of this product. According to Garcia (2008), it is popularly known as “cipó-una”, “tinteiro” or “Cervejinha do campo”.

According to Garcia (Garcia 2008), *Arrabidaea Brachypoda* is a shrub native to the Brazilian cerrado, it is between 1.0 and 2.0 m tall, abundantly branched, with simple leaves and pinkish-purple flowers and terminal inflorescences, as can be seen in the Fig. 7.

7.3 Generation of Alternatives

According to Lobäch (2001), the generation of ideas is the stage in which the motivations and needs of the final consumer are identified and the concepts are generated, perhaps through brainstorming to meet these motivations and needs (Fig. 8).

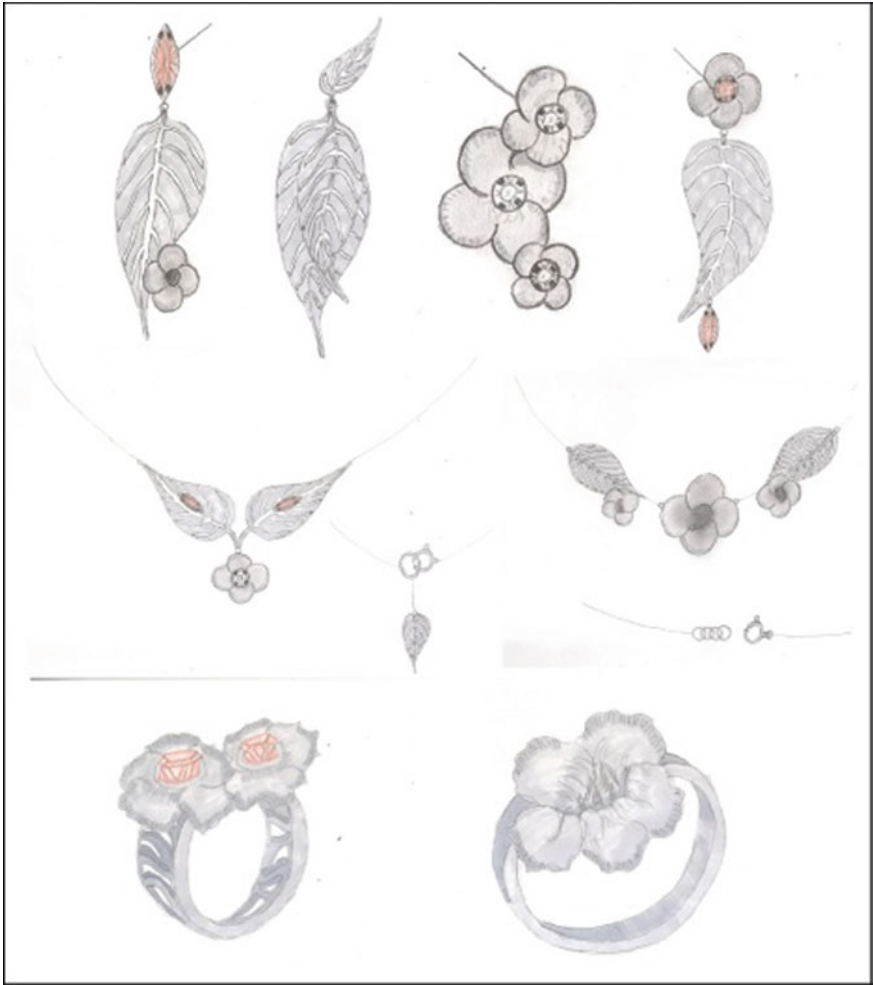


Fig. 8 Generation of Alternatives, Earrings, Necklaces and Rings *Source* Prepared by the author

7.4 *Alternative Definition*

Based on the alternatives previously generated, it was possible to arrive at the final result, which best incorporated the characteristics expected for earring, choker and ring. These were obtained with the aid of the vector software, as can be seen in Fig. 9.

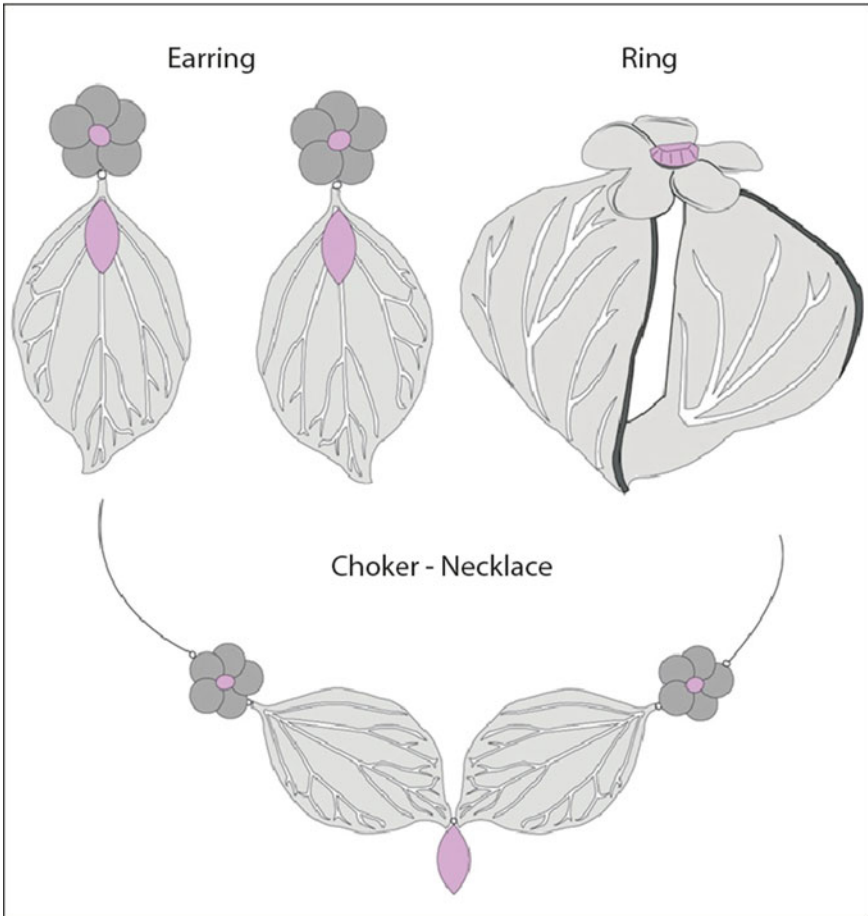


Fig. 9 Definition of earring, ring and necklace alternatives *Source* Elaborated by the author

7.5 *Materials and Processes*

For the manufacture of a jewel it is necessary to follow a series of processes, the jewel goes through several stages until reaching its final state, several technical methods of the jewelry were used for the production of the jewelry set such as casting, laminating, metal preparation, mold, hand sawing and dies with male and female for stamping shapes and obtaining the object as can be seen in Fig. 10.



Fig. 10 Production processes Source Elaborated by the Author



Fig. 11 Final product, earring, choker and ring *Source* Elaborated by the Author

7.6 Final Product

Based on all research, rationale and concept, the final product is arrived at, a set of jewelry, earring, choker and ring inspired by a plant from the cerrado biome made by hand in silver, as can be seen in Fig. 11.

8 Conclusions

The study demonstrates the ability to use a general design methodology in a way applied to a specific product to which the biome is used as the inspiration for the forms of the product design, the analyzes and the studies carried out, which induced in a more intuitive way the creation process, the relationship between the use of

bionics, inspired by the cerrado biome, improved and determined the concept of the project, enabling it to obtain a result that was not only conceptual but also the final product.

The complete development of the set of jewelry based on bionics provided an approximation of the new product with the environment that users are familiar with, thus valuing the importance of the environment that surrounds us, which is the Brazilian cerrado, one of the oldest biomes that adapts and goes back in time over 30 million years ago.

This study allows us to rethink how nature, with its methods and objectives, can contribute to the design process, in the creation of new projects. The transcribed objectives were met, and the final result, the jewelry set inspired by the cerrado biome showed innovation by using the plant as a source of inspiration in the development of jewelry, it is understood what its functionality is and it is clear that nature and design were fundamental to this process.

However, it is worth mentioning the goldsmith's handmade work in the development of jewelry, in transforming metal into great arts with concepts and meanings

Finally, it is possible to obtain a result with design characteristics that reflect the selected theme, also representing a sustainable idea, in order to provide well-being, comfort and meet the needs of users.

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Sustainability in Jewellery Design Process: Reusing and Reinventing



Mónica Romãozinho

Abstract A jewel can convey different appropriations and feelings, such as a habitat, poetic and intangible space. Within the framework of the research project named “Possible but Improbable Spaces”, we had started with the experimentation around asymmetric architectures inspired by nature and its capacity to metamorphose. The transposition of the space scale to the jewellery field would imply the concretization of spatial concepts avoiding any explicit transposition of this universe or even miniaturization. This article focuses on the methodology underlying the creation of a contemporary jewellery collection inserted in the project referred above and its main principles: versatility and reuse. We had resorted to sketches, cardboard models, 3D software, 3D printing and traditional techniques. Considering the urgency for more sustainable answers, we should question whether jewellery should not definitively follow a new course at the level of its design and materiality. If in the 20th century, some designers began to integrate new material into their creations, for a conceptual or technical reason, at this time the issue of urgency at the environmental level arises. Finally, the non-resource or punctual use of precious materials minimizes the cost of each piece that becomes more dependent on its innovation, its narrative and less on the value of the material.

Keywords Design · Jewellery · Sustainability

1 Architecture as the Main Reference: From Concept to Composition

Our initial research focused on a study of organic architectures inspired by nature, with asymmetrical and irregular contours resulting from tensions between colours,

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materials and transparencies, but at the same time reflecting a standardization of some components, namely interior volumes, coverings, furniture or lighting solutions. Several exploratory drawings and cardboard models around these concepts, allowed us to explore compositional principles of a so-called organic architecture because the essential organization arises from the internal needs and external conditions, in which each architect tries to connect their own volumetric and geometry of space projected to the topography of the land itself. What intrigues us is to draw inhabited spaces as opposed to cells inhabiting anonymously, seeking to explore a strong sense of identity. Then we decided to take the risk of studying a possible connection of these experiments with jewellery design scale (Fig. 1).

Considering Architecture as a reference for creation in the jewellery field is not new. The brand *San Lorenzo* (Milan, 1970) for instance, started to explore connections between design principles, architecture and jewellery, searching for collaboration between architects and designers (Cappellieri 2010a), choosing one single material (silver) as a medium to express new concepts. The results were abstract or geometrical objects such as “Endless”, a necklace and bracelet (1992) that consisted in an infinite and fluid line created by Massimo (1931–2014) and Lella Vignelli (1934–2016) or “Triangles” collection, for instance, where authors Franco Albini (1905–1977) and França Helg (1920–1989) had played with earrings that were the negative of one of the necklaces, or the “Arco” necklaces from Afra (1937–2011) and Tobia Scarpa (1935). These are examples of a strong connection with the idea of space(s). Other examples are mimetic transpositions from architectural solutions and Cappellieri, a



Fig. 1 Collection “Geometric spaces”. Example of experimental drawings that were in the genesis of this Jewellery project. 2019. *Drawings* Mónica Romãozinho

professor in Jewellery Design in the Faculty of Design at Politecnico di Milano and curator of several design jewellery exhibitions, gives the example of Peter Eisenman's jewels that were dynamic stratifications of geometries just like his houses, while those of Arata Isozaki correspond to models of his architecture, integrating architecting volumes such as vaults, cubes, pyramids or even cylinders (Cappellieri 2010a). At the same time, we can observe the same attitude in artists that produce jewellery like a sculpture, a composition of volumes but, when we think about architecture it's more difficult to understand it. If functionality is fundamental in architecture, shouldn't wearability be an important principle in the jewellery design process? Architecture is our main inspiration and it would be traduced in our jewels in a very intentional abstract way. We are searching for original creations taking our idea of space as a reference, although we are conscientious that our pieces are born from an eclectic intersection of solutions and details not original because History of Design, Art and Architecture are endless resources for us, proving to us that each project requires a different point of view and answer according to each program, each place and culture. That's the reason why we consider Carlo Scarpa (1906–1978) as one of the most inspiring architecture masters not only due to his projects but because his work method and his infinite capacity to find beauty in particular details invisible to other eyes and mostly because when he started working on a new project he never repeated himself, searching at the same time for an "uncompromising argument for a utopian vision, for a kind of architecture that is committed to art and culture only (...)" (Noever 2003). So we've tried to look at jewel as a living object the same we were Scarpa considered architecture as a living space that could dialogue with nature and with cultures, merging formal languages of different origins, considering both Occident and Orient legacies, playing with the reflexes of light and sounds of water between other strategies, many of them with a symbolic meaning related to his city, Venice (Noever 2003).

We are interested, from the beginning, about testing some architecture and design principles such as the idea of the connection with pre-existent conditions (topography and cultural references in architecture, the definition of specific a functional problem to solve), and we've tried with this collection to develop an exercise considering an existent object or material as departure point because of its artistic potential but mostly because we wanted to change our research course into a more sustainable process.

The present collection entitled "Geometric spaces" is part of a post-doctorate in Design called "Possible but improbable spaces" and developed within the CIAUD (Lisbon School of Architecture, Universidade de Lisboa) under the supervision of Professor Fernando Moreira da Silva.

2 Methodology: A Design Approach

This approach wouldn't be possible without the innovation of jeweller masters that decided to consider a method close to Design field, industrial production and technologies and new materials as a real challenge. That's the reason why Cappellieri refers to the work of Gijs Baker (1942), a dutch designer and Padua Gallery director, a true innovator of the contemporary jewel. With his brand "Chi ha paura...? Which he began to develop in 1996 in partnership with Marijke Vallanzasca, the same artist involved leading industrial designers and international jewellers, in creating serial and not too costly jewels made from gold, silver and alternative materials using advanced technologies (Cappellieri 2010b). However, he considered the possibility of mass-produced pieces not discarding the production of collector's pieces. He was interested about industrial or semi-artisanal production which becomes themes for the designer and about clarifying the difference between artist and designer: "Moreover, the designer has to take into account the "wearability" of his jewels, while the artist, producing sculptures of the body, can choose to ignore this" (Cappellieri 2010b). However, the definition of jewellery as the artwork was always very present in Portugal even in the 1960s, marked by the modernity of jewellery pieces created by Alberto Gordillo (1943) and Kukas (1928). This last artist, after her return from Paris, established some affinities with designers Daciano da Costa (1930–2005) and Sena da Silva (1926–2001), but would not be integrated into the projects of this group that had been fundamental to the connection between Designers and Industries (Filipe 2019). Nowadays, if we look to examples such as Liliana Guerreiro's route that has traced through a production line close to Product Design, integrating however traditional techniques such as filigree, we understand why the design method that can allow us to have a different and outside view of jewellery field.

Our process always includes Primary research, essentially made of personal photographs, drawings and thoughts and, also Secondary research which incorporates information about other authors and works that we can find in printed and digital material, books, journals, reviews or reports (Galton 2012a). Speciality magazines, namely the Journal of Jewellery Research, which stands out in this context of editorial scarcity in the area of jewellery, are invaluable. The tertiary research comprises magazines, newspapers and internet sources destined to broad public (Galton 2012b). Within this topic, we highlight Instagram, for instance, has allowed us to follow jewellers known from Secondary research and find new artists as well. Although jewellery is a less ephemeral area than Fashion Design and less permeable to trends, magazines such as Harper's Bazaar and Vogue can be also interesting references. Our imaginary is additionally much influenced by the exhibitions we visit, galleries and museums, windows installations, set design projects, that can be memorized through our sketchbook drawings and photos (Galton 2012c) which are part of the primary research, initially referred.

Another research, which is part of our daily lives, is archiving reference material such as materials of different types, failed 3D prototypes, findings, PVC wastes, electronic components, different types of wire, damaged polypropylene sheets, pieces

from pairs of compasses, old rubbers, clips and so on: “Many designers have a penchant for creating jewellery from “bricolage” (found objects), manipulating or subverting everyday, mundane objects to create whimsical jewellery” (Galton 2012d). The collection “Geometric spaces” focused on this article is precisely a result of this collecting attitude.

A mood board can also be a useful tool at the beginning of the project, depending on its nature, and we use it to communicate ideas through a combination of visual references sourced from personal research, key trends, images, colours, words of themes (Galton 2012e). This is a consistent reference that we have used at the beginning of this research project to be able to work on a narrative common to the various collections. However, the sketchbook is for us the key element that can contain part of the information that would usually integrate a mood board, as well as our lines of thought, doubts, exploratory drawings and reference drawings (Fig. 2). Our drawing process derives mainly from our connection to Interior Design and Architecture, in which exploratory drawings, with a chaotic appearance and initially in a smaller format, are crossed with synthesis drawings, less ambiguous and more specific in its content, which guarantee the visual communication of the collection. Jeweller drawings especially in the fine jewellery field, are detailed since the first moment, some of them are true renders made possible through watercolour, gouache, pen, and other techniques.

Our research is very closed to standardization principles even if industrial production is not our goal and another pressing issue was the development of a vocabulary composed by geometric modular shapes that can be reintroduced along with the collections.

At the same time, we are worried about ergonomic principles, so we usually developed drawings with measurements and other technical descriptions such as materials, finishing and dimensions, cardboard or 3D printed prototypes. Software such as Sketchup or Rhino (our present tool) allows us to visualize more rigorously

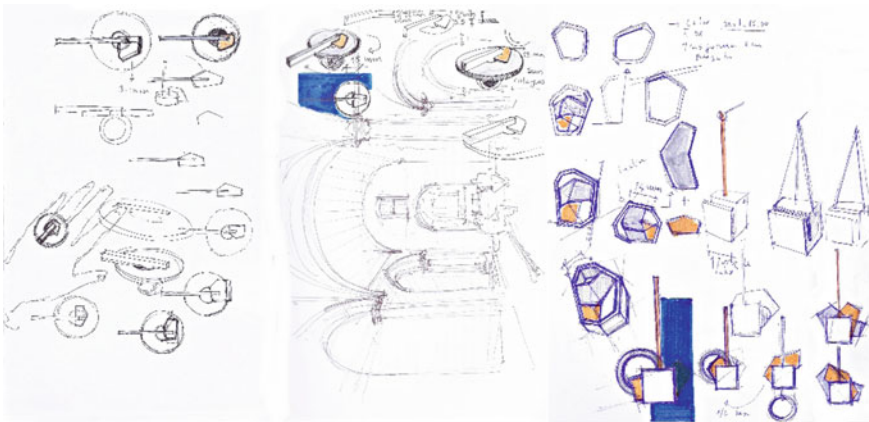


Fig. 2 Collection “Geometric spaces”. Processual drawings. 2019. *Drawings* Mónica Romãozinho

in 3D but also to develop orthographic representations such as side, front and top view of the design. These are fundamental pieces of information for the product developer, model maker (or prototype maker) and the manufacturer (Galton 2012f).

In terms of the execution along with the research project, we have intersected pre-existing objects with 3D printing and traditional jewellery techniques, proceeding with the usual steps such as cutting using a goldsmith's saw, welding, forging, filing, sanding and even grinding, counting still with the use of mini craft tools to obtain a more perfect finish.

3 Composition and Functionality

Architecture and Interior Design are the main references for our work although we are not interested in translating through a directly mode our idea of space to the jewellery scale. We don't see architecture as a mere composition of volumes and masses but like a universe of possibilities. The same way we were worried about creating projects that allow public to transform spaces, we intended to explore the same meaning in jewellery design process and mutability initially explored in pieces such as necklaces or earrings, an attitude present in the first collection "Possible but improbable spaces". It is also important for us to find a "common theme or distinctive "handwriting" that runs through all the collections of this research: "(...) this helps to carve a niche and ensures work endures over time. Designers may develop specific shapes within their collections, which can easily be identified at a glance as their style" (Galton 2012g). The same happens with architecture (we prefer the "language" expression to "style" more associated to the idea of trends) and we have created almost like a geometrical vocabulary which can be repeated although in a different arrangement from collection to collection.

The main step was to think of the jewel as a modular composition as a way to solve easily the problem of a continuous and rational structure in some collections but at the same time, it's one more step for sustainability because if some of the components are damaged we can exchange it for a new one. The necklace is created from the succession of bath gel bottle lids still discarded by hotel units that have not yet opted for fixed and rechargeable packaging. Its cubic and faceted form in the corners, and its sense of depth, has awakened the image of an intimate dwelling, turned on itself (Fig. 3). In this sense, the composition of the collar unfolds into modular elements, as it happens with the continuous structures of nature, of an evolutionary nature, although the modular elements in nature are not always the same because the environment conditions its shape and colour (Munari 2008a). Bruno Munari (1907–1998), designer and pedagogue who was responsible for designing fascinating objects and also jewellery pieces such as the series "Constellazioni" dedicated to the zodiac symbols (1975), has developed his work and reflection around the so-called continuous structures, a concept that we have tried to apply within the various collections of this research project, drawing one or more modular elements that are repeated forming a chain, as if they were cells of a given family. In the



Fig. 3 Collection “Geometric spaces”. Necklace. PVC (reuse), PLA, copper and wire. 2019. *Photo* Mónica Romãozinho

case of this collection, we cannot change the order of the elements, but we can rotate them in the case of the collar giving rise to new readings and the brooch itself can be positioned according to different angles: “Other elements slotted into another to form a chain until the last slots into the first, make up a continuous structure that may be composed of any number of equal parts. Besides, the object may be put together in several ways, according to whether the pieces are mounted all facing in one direction, or turned in the opposite direction, or alternated, or otherwise varied” (Kandinsky 1947; Munari 2008a). The cubic object can be rotated, eliciting varied readings of the same piece reinforcing the intention to view the jewel as an open work. The section of the same modular element determined the design of the collar closure, in which two pieces printed in 3D fit according to a system similar to that used in the design of a bikini. Asymmetry has always been part of the genesis of our projects, functioning as a note of an imperfection that shakes a whole. We incorporated copper planes inside of each module, corresponding to unperfect squares because they function as a symbolic separation between an interior and exterior and nature is full of asymmetries and round angles. key authors influence the way we developed the first volumetric and chromatic experiments, such as Kandinsky (1866–1944) and the constructivist Rodchenko (1891–1956), Vladimir Tatlin (1885–1953) or El Lissitzky, (1890–1941) revisited throughout the design process and contaminating our entire project-imagistic construction over time. We had valorised intuition and applied composition principles based on experimentation around the line, movement, repetition, rhythm, asymmetry and balance.

The earring volumes were developed from the composition of pre-existing elements: perforated PLA cubes corresponding to carved impressions of an exhibition system created some years ago, rubber washers, rubber sections as well as

transparent PLA wastes (Fig. 4). The cubic shapes, geometries present in the necklace itself as well as the circular surfaces constitute the dominant theme introduced symmetrically despite the different diameters of the second elements. As asymmetry is a dominant principle in all the collections of the “Possible but improbable spaces” project, we resort to the insertion by the fitting of copper planes arranged diagonally, the same principles had been reinforced by the transparent blade in counterpoint to the rubber cylinder. Also the diagonal is explored in these pendant earrings, close to 45° of inclination: “The diagonal reveals this difference from free straight lines: that it lies firmly on the plane; and this difference from horizontals and verticals: that it has a greater inner tension” (Kandinsky 1947a). This linear element had already been explored in the ring. The coloured copper wire had already been applied to the necklace, appearing in this context as a method of fixing the two bodies that make up each earring, assuming a different colour from earring to earring, a note of asymmetry. The line is treated as a structural element that ensures dialogue between different geometries: “Both in painting as in any construction in general, a line is the first and the last thing” (Rodchenko 1979).

In the case of the brooch, the texture is born from the multiplication of parallel lines (polypropylene plane). A silver line is assumed as the structure of composition in this collection and the scroll consists of a cylinder of reused rubber (Fig. 5a).

The ring consists of two parts: a PLA plane containing the opening, a rubber circle similar to the one used in the brooch, as well as a copper plane that fits in the foreground (Fig. 5b). The PLA piece not only crosses the circular element ensuring its attachment but also develops over it in the form of a horizontal linear element which, in turn, incorporates a groove where a copper blade fits. The tension caused by the horizontality of a line has been studied and approached by Kandinsky. The horizontal

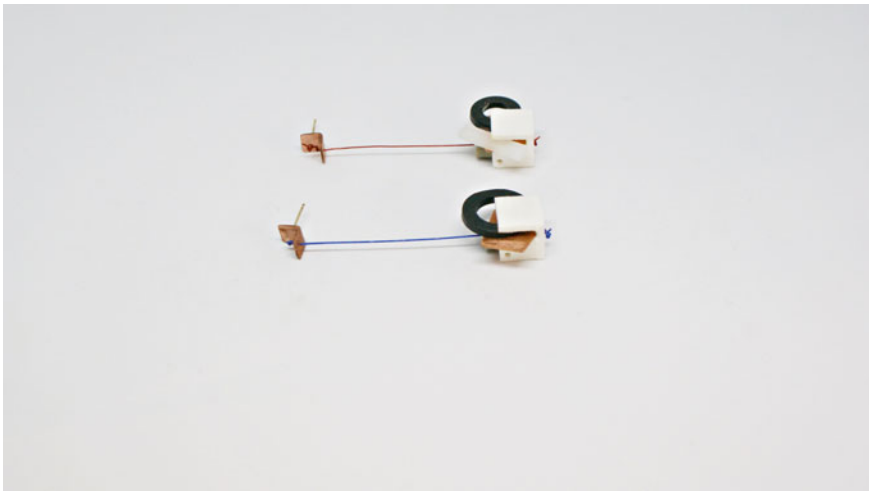


Fig. 4 Collection “Geometric spaces”. Earrings. PLA (waste), rubber (reuse), copper, wire and silver. 2019. *Photo* Mónica Romãozinho

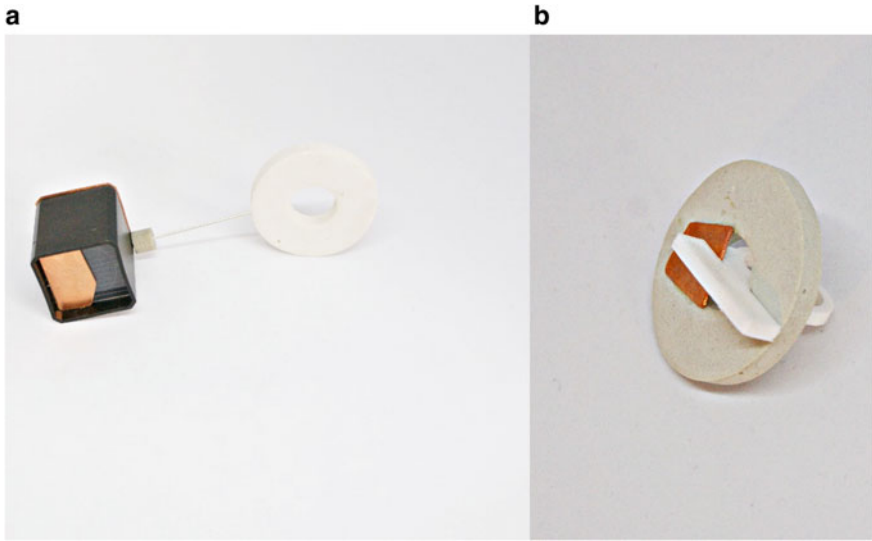


Fig. 5 Collection “Geometric spaces”. Brooch and ring. PVC (waste), Rubber (reuse), Polypropylene (reuse), silver-plated, copper and PLA. 2019. *Photos* Mónica Romãozinho

is counteracted by the diagonal movement of the copper piece: “The purely schematic straight lines (horizontals, verticals and diagonals—but especially the first two), develop their tensions on the plane and exhibit no inclination to leave it” (Kandinsky 1947b). We explored a horizontal white plane and Kandinsky established precisely an interesting parallelism between the vertical or horizontal lines and the black and white colours, considering that what unites these colours to those types of lines is precisely the approach to silence in the form of a “scarcely audible whispering and stillness”, that Kandinsky would consider so important for man, increasingly dominated by the outside world: “Black and white lie outside of the colour wheel. Horizontals and verticals occupy a special place among lines because, when in a central position, they cannot be repeated and are, therefore, solitary” (Kandinsky 1947c). We could have opted for black, associated with the same author to horizontality, but the contrast with copper would have lost its drama. The circle gives stability to the overall composition: “Whereas the straight line is a complete negation of the plane, the curved line carries within it a seed of the plane. If the two forces, with the conditions unchanged, roll the point ever farther, the developing curve will sooner or later arrive again at its starting point. Beginning and end flow into each other and in the same instant disappear without a trace” (Kandinsky 1947d).

4 Sustainability

One of the materials presented in almost every piece even if most punctually in these latter ones, is the PLA, Lactic Polyacid, material that belongs to the polymer family, composed essentially of synthetic materials created in whole or in part from renewable raw materials, such as corn, sugar cane or ricinus oil, instead of oil. On the other hand, biopolymers are based on renewable raw materials, involving lower carbon dioxide emissions, as their raw materials require lower energy consumption to be extracted, and can absorb carbon. (Salcedo 2014a). Since the PLA is degradable only under certain conditions, we are worried about the question of responsibility about the product life cycle. According to Salcedo, some barriers to the sustainability of polymers have been discussed: the problematic of the land use (change of use, deforestation and competition with food production), uses of genetically modified organisms (Salcedo 2014b).

Another measure was to reuse waste from our 3D prints or components and objects that would otherwise fit in the trash instead of integrating the production of new pieces of jewellery. The same change was announced in the pendant of the first collection of our research “Possible but Improbable spaces”. Experimentation thus starts from pre-existing objects or materials that provide a set of composition or assemblage. Production takes place once again in limited series, departing from the number of materials or parts to be reused. Sometimes the reused component, from piece to piece, can have a different diameter or colour, which makes each creation unique.

Choosing the right materials is not enough. Thinking about the disassembly of the part by the user himself or recycling purposes was something equated from the beginning, thus equating the perspective of Design for recycling described in the work *Moda Ética para um future sustentável* (Salcedo 2014c). We can equate modular parts whose components can be added or removed easily, a solution that we have sought to explore from the beginning within the scope of this project research, thinking about increasing product life. One of the most fascinating references in this field is the example of the “Comake” brand that conceives shoes that can be customized and assembled by the user himself is mentioned, recommending shoemakers. It is a durable and easy-to-repair product, due to its modularity (Salcedo 2014d). In this perspective, we can easily change a component allowing you to need a quick repair of the part, increasing its life. The execution of the parts does not imply the use of chemicals, the use of the glue is punctual and it was only applied on the copper surfaces embedded in the cubes of the penultimate one or fixing the copper plane to the PLA and rubber components of the ring. The welding process was a complementary technique in the case of the earring silver posts. Restricting the number of materials can also be another valuable measure in this direction.

5 Conclusion

Considering the problem mentioned above, we should question whether jewellery should not definitively follow a new course at the level of its design and materiality. If in the 20th century, some designers began to integrate into their new material creations for a conceptual or technical reason, at this time the issue of urgency at the environmental level arises because we do not only consume natural resources at a more accelerated rhythm than nature can replenish them as we produce waste and pollution at a faster rate than that necessary for nature to absorb them (Salcedo 2014e). The non-resource or punctual use of precious materials minimizes the cost of each piece that becomes more dependent on its innovation, its narrative and less on the value of the material. Finally, we conclude that jewellery is a very hybrid territory. It can answer to the “needs” or aspirations of society just like design or architecture domains. At the same time, jewel can be compared to artwork because it does not follow a utilitarian purpose. Finally, it is worn like clothes, it is close to our body and it communicates something about our personality and identity.

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Furniture for Children in the History of Portuguese Design



Ana Filomena Curralo and Helena Barbosa

Abstract This article is intended to constitute a contribution towards further studies on Portuguese furniture design for children. Deriving from a broader project targeting the history of Portuguese design, dispersed information was collected and organized towards understanding the place of furniture design for children in Portugal during the political period of the Estado Novo Regime (1933–1974). In addition to identifying specific cases and describing their social and political context, this article proposes a historical synopsis of the production and development of furniture for children, based on the history of Portuguese design. Specific cases of furniture for children are followed by a subsequent analysis of the Portuguese industrial development. As design philosophies were introduced and applied to the mechanized production of Portuguese furniture pieces designed for children, the introduction of industrial design in Portugal allowed the promotion of new design approaches. The subsequent paradigm shift paved the way for new concepts in furniture design for children.

Keywords Portuguese design · History · Furniture for children

1 Introduction

Child growth involves multiple body transformations, specially until adolescence. The physical and cognitive changes during this period require a specific configuration of objects for children. Furniture to support children's activities should adapt to child's growth while ensuring safety, utility and flexibility.

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However, furniture for children is a rather modern concept concerning furniture design. Over the centuries, only the cradle and sporadically a chair constituted the universe of furniture for children. For the most part, children furniture consisted of downsized replicas of furniture for adults, with different dimensions but similar design. This may help depict the importance of childhood in different societies. Nevertheless, the oldest cribs known to us are quite similar to those produced today. They were also placed besides the parents' bed, in western societies. Predominantly low in height and entirely made in wood, they usually had rounded feet to allow rocking the baby¹.

The industrial revolution in the 19th century allowed mass production. Technology and manufacture assisted by purpose-made machinery allowed better living conditions in the 20th century. Subsequently, working class houses could afford more furniture. Furniture for children, once rare and inaccessible, heavily depending on socio-economic class, would henceforth become popular products (See footnote 1).

Currently, children's development process, comfort and well-being are tangibly equated in furniture design for children. Nevertheless, such concerns would only be considered during the 20th century, particularly during the Estado Novo Regime, a corporatist, authoritarian and autocratic period of rule in Portugal, from 1933 to 1974. This article thus targets a better understanding of furniture design for children in the context of Portuguese design history, within the framework of the social and political context of the time.

Through a qualitative research methodology, involving data collection, study and analysis, mainly from scientific articles, catalogues and books, the purpose is to identify and record for future study examples of furniture for children designed in Portugal. This identification includes addressing cases and facts that may have influenced the emergence of this specific design, as well as the socio-cultural context. This study also intends to contribute towards the understanding of Portuguese design, and the place of furniture for children, categorizing reference cases of furniture for children and the main protagonists in Portugal.

2 Furniture for Children and Art Deco

During the Estado Novo regime, one of the first catalogued examples of furniture design for children in Portugal is a bedroom set by Franz Torka (1888–1953) (Santos 1995), who would become popularly recognized as the master of Art Deco in Portugal. The Viennese architect and decorator established in Lisbon in 1920 and became the technical and artistic director of the department store *Grandes Armazéns Alcobia*, a highly prestigious home décor company founded in 1914 in Lisbon.

In 1921, Torka's work was already widely recognized, being chosen to design the interiors of a luxury hotel in Estoril, near Lisbon, known as the Portuguese Riviera. The traditional Baroque exterior elements were combined with the Viennese

¹A Brief History of Furniture. <http://www.localhistories.org/furniture.html>.

Fig. 1 Interior of the Alcobia Store in Lisbon (Source Gulbenkian Art Library, Photographer: Mário Novais Photographic Studio, n.d.)



Modernism from the Austrian capital. In 1923 he also designed a cafe in Cascais, with a clear Art Deco inspiration patent in the geometry and contrast of colours used in the dining room composition (Santos 1995).

Figure 1 shows the interior of the Alcobia store, following the design intervention by Franz Torka in 1933. Chrome metal tube furniture is depicted by the chairs on the right, and would be produced in Portugal since 1931 by Alcobia. These pieces were the image of a lifestyle that sought versatility and flexibility. This product was introduced by Franz Torka, who also designed chairs in chrome metal tube for the hall the Portuguese Radio Club in 1932, inspired by foreign catalogues (Pato 2013) and the Bauhaus school.

On the left side, the furniture set is clearly influenced by Art Deco, with circular lines, geometric patterns in fabrics and decorative elements. The zig-zag pattern chosen for the seat backs suggests the dynamism and movement of a new society. The image also shows a piece of furniture with mirrors, a feature that was considered elegant at the time, and therefore an appealing feature for the Portuguese potential clientele.

The combinations of extravagant shapes and materials corresponded to the central European modernity from the late 1920s.

During the 1930s there was a significant investment in public buildings in Portugal. The Estado Novo Regime established in Portugal sought credibility and legitimacy, which led to an industrial paradigm shift.

Figure 2 shows a child's bedroom whose design is credited to Franz Torka. From the photographic collection of the Gulbenkian Art Library², the exact date of the picture is not known. The displayed bedroom consists of two cribs, a tall closet, a mirror and a low cabinet with two drawers. With geometric lines and intensely polychrome, the furniture uses both dark and light wood.

²Gulbenkian Art Library. <https://gulbenkian.pt/biblioteca-arte/en/collections/digital-collections/photo-collections/>.

Fig. 2 Children's bedroom by Franz Torka (*Source* Gulbenkian Art Library, Photographer: Mário Novais Photographic Studio, n.d.)



These features bare some resemblance to the furniture designed by the Austrian designer Josef Hoffmann (1870–1956), namely the geometric lines, structure and ornamentation (Santos 1995). Another characteristic of Hoffman's work is the bottom support of the furniture pieces with small wooden spheres. This can also be seen in Fig. 2, in the furniture designed by Torka. These wooden spheres relate to the reputed piece 'Sitzmaschine', or 'machine for sitting', adjustable armchair designed in 1905 by Hoffmann for the Purkersdorf Sanatorium in Vienna, incorporating decorative and structural elements from the Wiener Werkstätte (Viennese Workshops) style, forecasting the emergence of Art Deco in the interwar period³, while economic depression prevailed in Europe.

The walls of the room are decorated with two different wallpapers. The bottom lines are single coloured, and the geometrical middle row includes stylized children figures and motives in different colours. The refinement of this children's bedroom furniture and decoration indicates that this project was designed for a luxury home, as did most of Torka's works.

These pieces are presumably from the 1930s, since Franz Torka's work was specially appreciated during that period, including the refurbishing of the Alcobia store in 1933. According to some authors, it was the first time that art deco furniture was produced in Portugal (Santos 1995).

In the beginning of the 1930's, Torka designed exquisite art deco furniture, conceiving different sorts of pieces of furniture. Asymmetrical shapes and volumes, as well as straight and dynamic lines were combined with orthogonal shapes and wide curves, often lacquered in black with discrete notes of chrome tube. Torka developed the interior design for several houses in Estoril, near Cascais, home to aristocrats and actors, with luxurious children's bedrooms. He was also responsible for the interior design and furniture for offices and production sets for the filmmaking industry, which thrived during the Estado Novo regime as part of the propaganda machine.

³MOMA. https://www.moma.org/collection/works/3431?artist_id=2694&locale=pt&page=1&sov_referrer=artist.

This would impact the interior design for some of the most prominent family houses in Lisbon (Santos 1995).

By the end of the 1930's, a cosmopolitan modernism resisted Art Deco, which continued to emerge through foreign catalogues. There was a renovation of methods and inspirations to follow. Despite a slow evolution of the national industrial production, there is evidence of a more modern taste and custom. Nonetheless, it should be noted that Portugal did not follow the same pace in industrial development as did other European countries, which already had industrial maturity (Pato 2013).

Furniture manufacturers applied metallic surfaces onto exotic woods, leather upholstery, leather and fabrics with modern patterns, responding to the needs of the new city spaces, structures and aesthetic distinction. It was necessary to develop Industrial Design because the models produced until then were appropriations if not copies of models from foreign catalogues. The vanguard of European furniture was widely accepted and replicated (Pato 2013).

3 Furniture for Children and the Good Taste Campaign

With the growing prominence of fascist regimes throughout the world, namely in Italy, Germany, and Japan, in Portugal, the Estado Novo regime established a set of investments and campaigns towards the consolidation of the new regime. This included public works and the organization of exhibitions to showcase the ideals supported by the regime. António Ferro (1895–1956), director of the National Propaganda Bureau (SPN - Secretariado de Propaganda Nacional), was responsible for the political, ideological and aesthetic propaganda of the Estado Novo. Together with a large team of professionals, the production of the SPN included exhibitions, pavilions, illustrations, posters, books, interior design, scenography, and furniture (Fragoso 2009).

António Ferro developed the decorative arts, reviving traditional materials such as tiles, cork, wrought iron and the Alcobaça cotton fabric “Chita”, imported from India since the 15th century. This type of fabric had very colourful stereotyped patterns. It was illustrated with wide stripes decorated with drawings of birds, exotic animals, flowers, fruits, human figures, cornucopias, amphoras, nests and tropical fruits. Each pattern received a different designation, such as Persian, Viana, or Belmonte⁴, reflecting an organized choice of motifs and combination of old and new elements, domestic and foreign, in a cultural miscegenation that is typical of the Portuguese history.

The ‘Good Taste Campaign’ was intended to enhance the aesthetic awareness among the Portuguese, valuing traditional materials. Including multiple interventions and initiatives, it sought to establish an aesthetic model that would represent the

⁴Câmara Municipal de Alcobaça. <https://www.cm-alcobaca.pt/pt/menu/941/chita-de-alcobaca.aspx>.

Nation as a whole. The purpose was to establish an image of Portugal as a unified, civilized country, both modern and traditional.

Popular art was revalued, as well as folklore and artisanal production, as motors of the cultural and artistic enterprises, in order to raise the level of good taste of the population. Reviving popular traditions inspired artists, who should be modern and still be Portuguese. In the 1940's, the exquisite Art Deco models were replaced by simple pine wood and plywood furniture, making use of the abundant, available and accessible raw materials and workmanship. That combination allowed different shapes with wider rounded curves, and also lower production costs.

3.1 *Styled Furniture for Children*

Figures 3 and 4 show different perspectives of bedroom furniture for children by

Fig. 3 Bedroom furniture by Tom (*Source* Gulbenkian Art Library, Photographer: Mário Novais Photographic Studio, n.d.)



Fig. 4 Bedroom furniture by Tom (*Source* Gulbenkian Art Library, Photographer: Mário Novais Photographic Studio, n.d.)



Tom, pseudonym of Thomaz José de Mello (1906–1990). This designer was involved in the project of the Portuguese pavilions for several international exhibitions and participated in all modern art exhibitions held by the National Propaganda Bureau.

Folkloric and artisanal, simple elements are combined in a modern unit/bed capsule, simplifying room cleaning and arrangement and saving space, which was important in town flats, as opposed to the country detached houses in the Alentejo region in the south of Portugal, whose artisanal furniture production includes the combination of cheerful colourful hand painted floral motifs over pine wood panels.

There is a general formal and decorative influence from Alentejo typical furniture in the painting style and motifs for this furniture design for children by Tom, and also in the use of pinewood.

During this period, the Estado Novo Government implemented a nation-wide program of social housing (Casas Económicas), directed by the engineer Duarte Pacheco, Minister of Public Works, Transport and Communications. The project consisted of small semi-detached houses in urban areas, affordable for the average income of the working-class families arriving from the rural areas and establishing urban and peri-urban working-class communities. The migration tradition onto the Americas was affected by the Great Depression crisis and aftermath, allowing a domestic rural exodus onto the two main Portuguese cities, Lisbon and Porto, until today holding the main concentrations of population in the country.

The above Fig. 3, from the photographic collection of the Gulbenkian Art Library, depicts a children's bedroom unit. The small size bunk bed and ladder integrate a wardrobe and a set of drawers. The Portuguese Chita fabric from the bed space revetment and drapes also follows the popular patterns, making the piece more comfortable and private. There are some decorative elements in wrought iron in the wardrobe door.

Figures 3 and 4 allow analysing the incorporation of the objectives of the Good Taste Campaign. Tradition and modernity were allied as to meet the political requirements of establishing a national style, sublimating the manifestations of popular culture and artisanal production.

However, the size of the dresser and chair shown in Fig. 4 suggests a more juvenile space, although from the same set of furniture. The full set comprises a built-in bed and closet in a functional solution, a traditional chair and a traditional chest of drawers. The first row has two small drawers and the two following drawers are large. The decoration of the drawers is similar to the decoration of the bed unit, with folkloric painted flowers.

The chair also shown in Fig. 4 has straight lines and well-balanced proportions for an adult. One of the main characteristics of this piece is the braiding of the seat, in straw weave, also typical to the Alentejo southern region of Portugal. In addition to the chair, there is a clear influence from Alentejo popular art in the furniture set, possibly for economic reasons. The accessible materials and availability of workmanship specialized in the use of pinewood resulted in these simple modules, addressing popular requirements instead of luxury requirements, as prescribed by the contemporary Bauhaus movement.

While other European countries followed an opposite direction, Portugal followed a path of strong connection to folkloric ornaments, as shown in the example of Tom's furniture in Fig. 4. This attitude translates a denial of the functionalist, rationalist trend and the ornamentation taking place at the same time in other European countries, as proposed by the German Walter Gropius (1883–1969), founder of Bauhaus movement and considered one of the main names of 20th century architecture.

The controversy intensified with the concepts by the Austrian Adolf Loos (1870–1933), who considered it immoral for a society to produce objects that imitated past times, ornamented in an obsolete way.

Thus, while the Good Taste Campaign implemented by the Portuguese government intended to revive Portuguese traditions and themes, Gropius and Loos, influenced by socialism, defended the absence of revivalisms and minimal ornamentation, a new society where objects and spaces should be designed for the man in the present and not the man who lived in the past. Nonetheless, both philosophies supported standardization, and the industrial, affordable production for the growing middle class working people in the city.

Concerning furniture production, the company Olaio should be specially highlighted among the modernized Portuguese companies (Coelho 2013). In 1942, the modern furniture for children designed by Tom was produced by Olaio, although it has not been possible to retrieve photographic records of his pieces. During the 1940's, Olaio possibly manufactured other models of furniture for children, but such production was possibly tailored for exclusive clients, since it is not advertised in the company's vast and diversified portfolio.

The Portuguese companies Olaio, Altamira, Longra, A. Sousa Braga Filhos, and Jerónimo Osório de Castro (FOC), were specifically dedicated to furniture production. Exclusive pieces were also produced for special clients. However, large orders from a constant and reliable clientele such as hotels and public institutions such as post offices, hospitals, schools, or movie sets, gradually paved the way for mechanized production with specialized industrial workers and machinery (Pedroso 2009).

The years that followed the Second World War (1939–1945), were strongly influenced by the Estado Novo modernism and its regional characteristics. However, there was also a growing display of contradictions in the modern movement, through cultural dynamics and action opposing the establishment. The social model conflicted with the urban model, following international trends and changes.

3.2 The Golden Age of World Growth

As the Iberian neighbour Spain, the Portuguese industrial revolution was weaker and slower than in other European countries. The slow development of industry may be explained by low trade and a rudimentary transport industry. Agriculture remained as the most important activity of the country, predominantly subsistence farming. The

agrarian country was overpopulated, poor and unschooled. This led to an increase in poverty and labour migration to the insipient industrial sector.

Although remaining neutral during the war, there was also a toll to pay, including food rationing and shortage. In the 1940s, Portuguese infant mortality was one of the highest in Europe. Nevertheless, during the decades of the thirties and the forties of the twentieth century, there was a high demographic growth of over 13 percent. After the emphasis on stability in the 1930s, progress became the keyword of the Portuguese regime. The country had suffered during the war due to its foreign dependence. This indicated a strong need to industrialize, profiting from a favourable international climate.

The golden age of world growth was an opportunity Portugal did not waste. In the post-war years, there were new political priorities. In 1945 the Government presented the Act for Industrial Promotion and Reorganization, defining priorities for the industrial development policy. Protectionist, it was based on reducing importations, prioritizing the manufacturing industry. The development plan imposed the concentration on some sectors and the direct promotion of some industries considered essential.

This was the beginning of a series of political instruments towards industrial development in the following decade. The public investment program directed most of the funds towards infrastructures such as electricity (41.2%), transports and communications (26.8%), basic industries (18.5%) and agriculture (10.8%) (Neves 1994). Subsequently, the second half of the 1950s and the 1960s witnessed an accentuated rural exodus, with labour migration from agriculture to industry and services (Franco 1996). Middle class Portuguese workers could afford to rent a house for their family and furniture for their children.

The 1950s were also marked by the concept of total design. From architecture to furniture design, accessories and utensils obeyed the same lettering used in the buildings. In this decade, the European need to rebuild from the ashes of a devastating world war and the context of technological and economic change allowed such global approaches. In addition to rebuilding Europe and designing buildings, the architects could also create a global environment (Tostões 2000). Since the market had no adequate response, tailored furniture design was frequent, under massive state funding and international aid such as the Marshall Plan.

4 Furniture for Children and Serial Production

In the 1960's the Portuguese regime became more open to the outside world, as Portugal joined the European Free Trade Association (EFTA). Subsequently, Portugal connects with other important economic and financial institutions created in the post-war period, such as the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD). During the third financial plan from the Export Promotion Fund (EPF), the Portuguese reality and political strategy were widely debated and rethought (Rato 2002).

There was a significant development in Portugal, from a rural closed society to a society open to the exterior. Tourism also developed significantly as a result of the increase in the European standard of living, the Portuguese propaganda image branding and the development of infrastructures recommended by the Government. A European population anxious to relax discovered the Portuguese beaches (Afonso 1996). Supported by the need to systematize industrial production, designers in the 1960's participated in the structuring of companies. They also contributed to the establishment of new relationships between the industries and the consumers.

This changing cultural reality, despite some delay when compared to foreign dynamics, triggered the process of institutionalizing the modern professional activity of designer (Almeida 2009). It was also a time of great entrepreneurs around the world. Profiting from the stability provided by world peace and the availability of new technologies, art was democratized in the post-war period. It was available for collective enjoyment. With regard to the Portuguese industry, some companies played a decisive role in the country's economy, driven by key entrepreneurs with an acute perception of the advantages of Design for industry (Matos 2006).

Socially, the collective progress was translated by a significant increase in schooling and the evolution of some professions, as well as the massification of large urban centres, resulting from the population migration. This period of ideological and political changes contributed to a new stage in the artistic and cultural activity, with the dynamization of the art market, new museums, and government support to the arts.

With the industrial advancements, new materials were available, obtained by industrial processes, as well as new manufacturing devices and techniques, often designed for a certain purpose and demanding specific technical expertise. New desires were reflected in Design, originating rational and economic solutions labelled as Good Design. This represented a concept of design whose approach went beyond the useful form (Tostões 2000).

4.1 Serial Production of Furniture for Children

Following the Bauhaus trends of geometric, simple lines and minimalist shapes with little ornamentation, the designer José Cruz de Carvalho (1931–2105) was a pioneer in the Portuguese serial production of furniture for children. His work thus deserves a wider recognition in the history of Portuguese design.

The serial production of models of furniture for children was introduced with pieces such as table-chairs (see Fig. 5) or bunk beds (shown in Fig. 6), perfectly adapted for children. At the same time, the construction was very solid and sober, and there was a concern with optimizing room space (Coelho 2013).

In addition to product design, Cruz de Carvalho was responsible for the creation of the Interforma furniture company in 1967. He also devised the communication design strategy for the brand Interforma, and the interior design for the first Interforma store. The store included showroom, sales area, exhibition room and art gallery (Coelho

Fig. 5 Table-Chair MX1 by Cruz de Carvalho (*Source* Gulbenkian Art Library, Photographer: Mário Novais Photographic Studio, n.d.)



Fig. 6 Furniture for children by Cruz de Carvalho (*Source* Casa Claudia magazine)



2013). Cruz de Carvalho was very important for Portuguese graphic design, since his company was the first to produce a furniture catalogue and brand presentation leaflets.

Cruz de Carvalho put into practice for the first time in Portugal an integrated and coherent design policy at a business level, successfully developing new philosophies of production and design (Coelho 2013). This was especially significant in a country

where artisanal production workshops coexisted with modernized factories, where manual labour was still predominant.

Cruz de Carvalho thus deserves to be considered one of the pioneers in Portuguese serial design production of furniture for children. His pieces are characterized by the integration of children physiological functions, allowing an efficient performance of numerous tasks. The bench-chair model MX1 shown in Fig. 5, allows the users several combinations, mobility and versatility. Bauhaus furniture was also versatile, so that consumers would find the pieces useful for modern life use.

It is also noteworthy the application of colour in the furniture, as shown in Fig. 6, with a bench-chair in blue. Another characteristic of Cruz de Carvalho's work is the importance given to the efficiency of furniture in the living space, according to the economic level and the demands of the houses of the time, as well as people's way of life. Regarding the industry, he played an active role in creating furniture production lines. Also, the core of Bauhaus' approach was the combination of innovation and ease of production concerns.

Cruz de Carvalho contemplated different aspects concerning furniture for children. These included the height and length of the objects for children, safety and protection concerns, colour, and different elements appealing for children. Producing an innovative design for children, Cruz de Carvalho and Interforma were pioneers in Portugal. His style was based on simple geometric shapes, practicality, rigor, aesthetics and functionality.

His designs share common features with his friend Daciano da Costa (1930–2005) design work. Daciano was one of the first Portuguese designers, also following the Bauhaus school, whose distinctive and modern style of furniture design remains influential to this day.

4.2 Furniture for Children in Design Exhibitions

The first Portuguese design exhibition was held in 1971. It brought together for the first time many of those who were dedicated to design (Mananças 2005). The executive committee of the first Portuguese design exhibition included the National Institute for Industrial Research (INII) (Catálogo da 1ª Exposição de Design Português 1971) and the furniture company Interforma, Cruz de Carvalho and João Constantino. The INII, who organized the event, was created in 1959 to promote industrial investigation and was responsible for the Center for Industrial Art and Architecture, dedicated to Industrial Design (Mananças 2005).

In 1973, the second Portuguese design exhibition was also organized by the INII (Catálogo da 2ª Exposição de Design Português 1973). It was managed by António Sena da Silva (1926–2001) and the Cooperative Praxis, with the participation of several experts from different areas of Design and Architecture. Both exhibitions presented to society the best designers and products produced in Portugal, namely furniture, porcelain, glass, electrical equipment, fixtures, graphic arts and ceramics.

The design exhibitions aimed to disseminate the work of Portuguese designers to industrialists and to the Portuguese public.

The 1971 exhibition showcased furniture for children designed by Cruz de Carvalho, namely the table-chair MX-1 (Fig. 5) from 1969, in pine and mahogany, and the bunk model CH-1 (Fig. 6, below) designed for children and adolescents. In the second Exhibition of Portuguese Design, Cruz de Carvalho presented the chair and the set of furniture components model CA-4 and EL, produced in 1971.

This line of furniture consists of several autonomous units that may be combined to compose different pieces of furniture. The set includes a chair and a desk with storage space. The original system of modular furniture CA-4 and EL was in chipboard with solid wood trims 3 mm thick. It would later be produced in plastic imitating wood, for durability, aesthetic and economic reasons.

The catalogues of these two exhibitions showcased school furniture designed by Sena da Silva in collaboration with Leonor Álvares de Oliveira (b.1930) for the School Module project. The project intended to refurbish a large number of school buildings in a short time, using prefabricated components that could be easily assembled by non-specialized personnel. Designed in 1970, the stackable school chair CMD-1 and the school table and chair model MMD-3 were produced in wood. The stackable school chair model CTM-2 was in beech plywood and steel tube, and the set of drawing-table and chair model ML-1 was in beech plywood with steel profiles, produced by Longra furniture company.

The line of paint-it-yourself Essential Furniture (Fig. 7) by Sena da Silva included stackable tables and chairs similar to the CTM-2 model. They were produced in beech wood by Olaio in 1973, and also by the furniture company FOC (Santos 1995).

Due to the School Module project and the engagement of Sena da Silva and Leonor Oliveira, several pieces of school equipment were produced. Their design was guided by rationality, functionality and effectiveness, in addition to remarkable constructive simplicity (Santos 1995). It was a long work, gathering fifteen years of experience, pioneering Portuguese furniture design.

Fig. 7 Essential Furniture by Sena da Silva (*Source* Gulbenkian Art Library, Photographer: Mário Novais Photographic Studio, n.d.)



Ergonomic concerns were a novelty in Portugal. The influence from Denmark and England, whose post-war realities fostered radical changes in the education system, was essential in the development of this project. The purpose was to create school equipment meeting the requirements of flexible use, group dynamics and appropriate body posture to write and read (Neves 2003).

The Portuguese education system suffered major changes between 1960 and 1975, a period of social and political transformation, namely due to a drastic increase in primary school enrolment, as a result of the conditions provided by the Estado Novo. The increasing number of children in school demanded the refurbishment of school buildings, meeting the requirements of an also changing learning environment. However, only some of the pieces were produced, since the government also changed strategies.

5 Final Considerations

Furniture for children reflects how adults understand children's needs, demands and well-being. The spirit of time also affects the understanding of form, function and the design of furniture for children. Since the 20th century, children's furniture projects engaged more interest and new creative ideas. This sort of furniture ranged from multifunctionality and expansion mechanisms, fittings and gears, to simple modular forms with different materials, following the industrial progress and urban demands.

However, the absence of a Portuguese industrial revolution, as opposed to England or Germany, contributed to the fact that there was no urgent need to reformulate design, associated to industrial production. Due to the late industrial development, Portuguese design delayed the first steps onto modern methodologies. The industrial framework includes the optimization of production and the emergence of a new and regular clientele: the consumers.

The mechanization of production fuelled a prosperous industry of furniture for children, with designers such as Torca, linked to the upper classes. Economically wealthy, they invested in exclusive Art Deco items, whose designs were disseminated by foreign furniture catalogues. Tom's regionalist styling with hand-painted folkloric motifs set a standard in furniture for children. Intended to establish a national standard of taste influenced by a political agenda, it countered the European modernist trends of metallic tubular furniture.

In the 1960's and 1970's there was a paradigm shift in industry and subsequently in design. Cruz de Carvalho was an innovative designer and entrepreneur. He pioneered successful campaigns under his own management and design decisions. The first designer in Portugal to both design and produce furniture for children, he is a major reference in Portuguese design history and in Portuguese furniture design for children.

Portuguese government initiatives should be noted, such the INII (National Institute of Industrial Research) and the INII's Industrial Design Department directed by

Maria Helena Matos (b.1924) achieved considerable autonomy, establishing important partnerships and creating the Portuguese Association of Designers. Intended to stimulate Industrial Design in Portugal, the organism contributed towards the understanding of the need to invest in the quality of the industrial product. Agents from the Portuguese public and private industrial sector, interested in modernizing the industry and producing better and more qualified products would henceforth understand the strategic role of Design. A landmark achievement of the INII was the introduction of Design in public universities curricula in 1974, as a discipline and as an undergraduate degree, in the Oporto and Lisbon Schools of Fine Arts.

Nonetheless, the Estado Novo regime understood the importance of industry and design. They were considered important vectors for the Portuguese economy. Government incentives, through the schools' refurbishment project or the Portuguese design exhibitions fulfilled the goal of promoting Portuguese industrial design. In both exhibitions, pieces and collections of furniture for children were on display, reflecting the status of furniture design for children and showcasing its relevance in the history of Portuguese design.

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Applying Concepts of Inclusive Design in Sensory Product Design for Children



Leonardo Moreira, Rita Assoreira Almendra,
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Abstract This paper aims to present the results of an investigation succeeding a Internship of Research Abroad (BEPE/FAPESP) which sought to expand the theoretical framework on design processes of sensory products in the European Market. The emphasis is on toys for children with blindness or low vision, from its design process all though its physical prototyping. This study structure follows: (a) theoretical deepening on children with visual impairment and the design practice of sensory products; (b) synchronic analysis of similar products available in the Portuguese Market; (c) design conception in the levels of project, generation and selection of alternatives; (d) Experimental execution of virtual and physical models in laboratory; (e) documentation and analysis of the results. Thus, this research intends to contribute to the development of sensory products for children with visual impairment, and encourage further research in the areas of Product Design and Inclusive Design.

Keywords Inclusive design · Product design · Children with visual impairment · Sensory products

1 Introduction and Background

The Research Internships Abroad aimed to explore the theoretical framework on the design process of sensory products. The exchange program focused mainly on toys for children with visual impairment in the European market. It also targets the

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practice aspects of the design process and completion of a working prototype of a sensory product. This study derives from a Brazilian scientific initiation research in progress called “Prototype development of furniture for children in preschool: Link between Sustainable Design and Inclusive Design”, funded by Sao Paulo Research Foundation (FAPESP). The primary research seeks to address the design of sensory products for five to six year-old children, in order to provide a theoretical and practical deepening in the area of inclusive and sustainable design.

The study abroad was conducted in the Faculty of Architecture, University of Lisbon (FAUL). It sought to acquire a deeper understanding on product design and sensory behavior, attending to the target public of children. In addition, the design guidelines proposed by the end of the study included the impacts generated by the product on the sustainable level (Fig. 1).

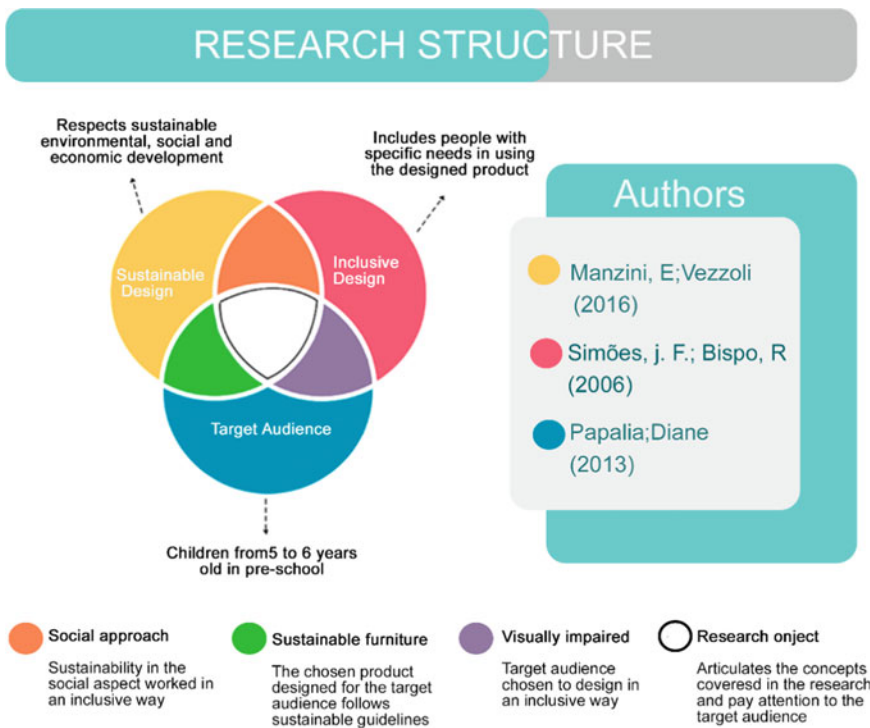


Fig. 1 Diagram of the search structure Source diagram prepared by the author, 2020

2 Theoretical Foundations

Visual impairment can be characterized by significant changes in visual functions such as visual acuity, visual field, sensitivity to contrasts and color vision. From a clinical point of view, as stated by Ladeira and Queiroz (2002), an individual may be considered visually impaired when presenting significant limitations in acuity and visual field. The criteria for benchmarking visual impairment follows the official standards of World Health Organization (ICIDH, DCI-10 1999), which specify levels into five categories, namely: 1 and 2 (moderate and severe) related to cases of low vision, while the categories 3, 4 and 5 (deep, almost total, and total) refers to cases of blindness.

Although deep visual impairment can be noticed mostly during infancy, in cases of low vision it is recurrent a delay in the diagnosis, usually noticeable in learning (Batista 1998):

ejection quite usual activities in classrooms for children of their age; lack of some knowledge usually present in children of the same age, such as word exploitation writing, counting, representation of time (day, month, year), game rules and concepts involving pairings (bingo games, domino etc.); unfamiliarity with activities of “pencil and paper” (drawing, writing etc.). It is defined that the activities of “school groups” would favor the objectives of the overall development of children, to increase the likelihood of academic success. (BATISTA 1998, p 219).

An early diagnosis is proven to be crucial in studies of evolutionary development of visually impaired people. It shows in different theoretical fields a need for early intervention with the goal of a full development of the child (Piaget 1975; Bruno 1993; Leonhardt 1992; Brodin Rivera 1999a). Thus, as proposed by Rosel (1980), children with severe visual impairment may have in the course of their development, subtle delays in obtaining fundamental behaviors. That can trouble processes such as gait learning and basic skills of personal autonomy, in acquiring social habits and some cognitive notions (Siaulyš 2006), “which should be taken as a natural development of the blind child and cannot be diagnosed as pathological” (ROSEL 1980 cited by GUINOT, 1989 p. 30).

The vast majority of studies on the cognitive development of congenital blind people are held in Piaget’s perspective. Among them, Hatwell (1986) Ochaíta (1984) and Guinot (1989) point out that children with visual impairment may be held back two to three years from the acquisition of symbolic function, and up to four years in handling of figurative and spatial elements. This delay can be alleviated from the moment that verbal language assumes the function of representation and organization of knowledge (Siaulyš 2006). Peraita, Elosua and Linares (1992) emphasize that spoken language for the blind children becomes a primary mean to obtain knowledge from the physical and social environment, thereby offsetting the visual information (Siaulyš 2006).

In addition to cognitive aspects, Mendonça et al. (2002) warn us about impacts on the development of psychosocial skills of the visually impaired children. He points out that without the possibility of mimicry of their peers and use of nonverbal communication, those kids struggle with social skills development, which in turn makes it complicated for them to be accepted by their peers. This is due, according to Vygotsky (2003), to the fact that the social experience is largely achieved by a mirroring process. As exemplified by the author, the child mimics the way in which the adult uses instruments and manipulates objects, trying to master the true principle involved in a particular activity (Siaulys 2006).

Thus, sight plays an important role in the development of an individual as a whole, and without it, it is necessary to establish alternatives to the enrichment of information taken in from the external environment. In short, there is enough evidence supporting a tendency to for visual impaired children to repeat concepts using words with insufficient knowledge of its meaning, and set in a fragmented manner the understanding of its actual content. That is due to the lack of attention to the enhancement of sensory input transmitted to the kid, combined with poor translation of visual stimuli to verbal or tactile information, combined with unsatisfactory diversity in sources of information so that the brain can form a whole concept of its surroundings. (Piaget 1975; Bruno 1993; Leonhardt 1992; Mansini 1994; Brodin and Rivera 1999a; Siaulys 2006; Vygotsky 1983; Martin and Bueno 1997; Papalia 2013; Montessori 1937).

To assist a more effective development, Vygotsky (year) suggests that the assimilation of concrete sensory knowledge is necessary to help the acquisition of concepts without untying the sensitive rational. Thus, in terms of early development, from five to six years of age, “playing” has a significant role in improving the overall development on an infant (Papalia 2013). Just like in sighted children, for those with visual impairment, playing can encourage the assimilation of concepts, improve psychomotor skills, cognitive achievements, and especially, intermediate concrete sensory knowledge acquisition that is vital for rational conceptions.

It is precisely in this way that the Inclusive Design works, when designing for diversity, with an early integration in design processes of technical aesthetic and psychological concerns that interfere with the use and perception of the object (Simões and Bispo 2006). In this sense, designing sensory product for visually impaired children must follow the principles of Inclusive Design, considering that:

The Inclusive Design is also reflected in the design practice, a democratic practice, respect for human rights, and defense of equal opportunities conditions. Most barriers to the involvement of many citizens in democratic life, that limit the full exercise of active citizenship, are designed and built by men. It is therefore necessary to be always present a new attitude to the social dimension of design practice. It is necessary that the designer strives to understand the fitness for use of spaces or products is to design (SIMÕES and BISPO, 2006, p.8).



3 Application of a Synchronic Analysis

The synchronic analysis was made through data collection of sensory products available and registered in Lisbon, with an emphasis on those targeting the sensory stimulation of children with visual impairment. The products were then analyzed for its conditioning parameters. Therefore, field trips were made to traditional toy stores, as well as sustainable and educational oriented toy stores. Complementary, a virtual search of these types of toys/products was also carried out. It is worth underlining the importance of visiting physical stores at this stage of the research, because when designing for children with visual impairment, the multisensory aspect is crucial. In this sense, those visits provided physical experimentation with the textures, materials, shapes and sounds of each object.

Among the different types of products and after the choice of basic criteria of inclusion and compliance with the target audience, there were chosen two product lines: (a) toys with sensory stimuli; (b) set of tools with engine processing.





Data collection procedures were organized according to the following parameters: (I) the characterization of the material used; (II) photographic record; and (III) provided sensory analysis processing (Table 1).

Table 1 Analysis of similar products. Photos extracted from shopping sites; text written by the author, 03/24/2020

| Product | Analysis |
|--|---|
| <p>Tool kit plastic</p>  | <p>Material: Plastic derived from petroleum, has a homogeneous smooth texture. Processing: Found in several stores and manufacturers, this set provides great motor improvement and has vibrant colors, however, the choice of color contrast is unfavorable to several visual needs, such as color blindness.</p> |
| <p>Shapes and Colors - Goki</p>  | <p>Material: Made of wood, with homogeneous texture. Processing: Product from the shop "Happy Grove". It features large motor improvement, with self-corrective activity and an emphasis on fine motor development. It has pleasant and contrasting tones of color, but its diversity of hue reduces the efficiency in some cases of deficiency.</p> |


(continued)

Table 1 (continued)

| | |
|---|---|
| <p>Lustigt</p>  | <p>Material: Made of wood and fabric cord. Processing: Product from the store "Ikea". It has great fine motor skills improvement, and stimulates important mathematical associations. This is a toy with little contrast and textures.</p> |
| <p>Bag Touch Memory - Goki</p>  | <p>Material: Made of wood combined with several textures and materials on its top surface. Processing: Product from the shop "Happy Grove". It shows great motor and sensory improvement, mainly because of the wide range of textures and bold colors working independently, which enables the cognitive development of memory, a crucial skill for the target audience.</p> |
| <p>Sensory blocks</p>  | <p>Material: Made of wood, with a variety in textures and surface finishing. Processing: Product from the shop "Happy Grove". It sets to prompt fine motor skills and large sensory stimulation through colors, textures and sounds. Suitable for the target audience.</p> |
| <p>Tool box - EverEarth</p>  | <p>Material: Made entirely of wood, with natural and painted surfaces. Processing: Product from the shop "Happy Grove". It sets to encourage major improvement on fine motor skills, with great stimulation of imagination, creativity and motor coordination. It features bright colors, which might hinder the viewing of children with some types of visual impairment.</p> |

(continued)

Table 1 (continued)

| | |
|---|--|
| <p>Tool box /Desktop- Goki</p>  | <p>Material: Made of wood, with homogeneous texture and detail in painting.</p> <p>Processing: Product from the shop "Happy Grove". It shows great improvement engine, similar to the previous product this one allows for great stimulation, but seems difficult to use for the visually impaired due to the choice of colors and the use of natural color.</p> |
|---|--|

4 Design Development with Proposition and Selection of Alternatives

This step of the research comprehends the process of generating alternatives, selecting promising ideas, working on improvement and feasibility in terms of shape definition, color, texture and finish with hand sketches, virtual models and renderings.

4.1 Proposition of Alternatives

The stage of proposing ideas was conducted by understanding and concatenating the bibliographic data and synchronous analysis presented in the Table 1, using sketches and annotations of possible variations in design of products and paths to follow into the conception process. Four alternatives were created at total, allowing the analysis of features such as feasibility and compliance with the design requirements of the targeted public.

4.2 Selection of Alternatives

Among the four ideas proposed in the last stage we selected two to move onto the prototyping phase: (1) Sensory Case; (2) Wood Toolkit.

(1) The first idea is a multi-sensory game, set to work on tactual, hearing and sight skills simultaneously (Fig. 2). The Sensory Case focuses on the act of playing, and would guide the exploration of sensory experiences in a self-correcting manner. Thus, by their own attempts and fails, the child would trigger their “System of

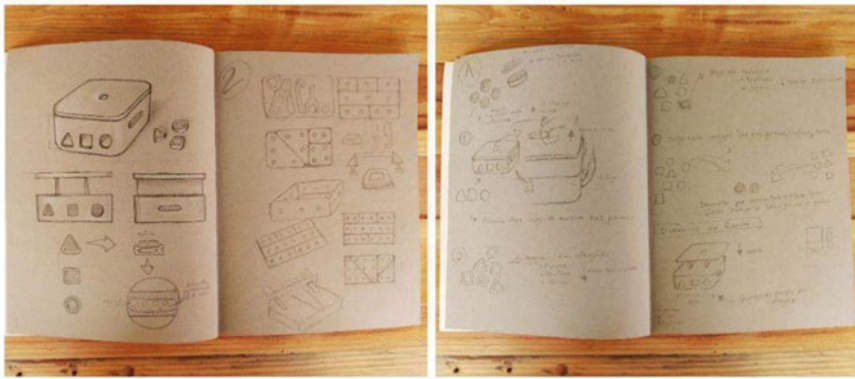


Fig. 2 Sketches made by hand, by the author (03/23/2020)

action”, which is a mechanism of combining different skills in favor of the motor skill development. It establishes a parallel between the kid’s operational logic and that of the toy functioning while being played with. That whole process would allow the child to learn by creating a motor repertoire that can continuously merge the skills that the child already possesses with those he/she could acquire. It means that the Sensory Case could stimulate the acquisition of more complex capabilities.

The Sensory Case was designed to be used in conjunction with the Sensory Table.¹ The measures and form of that object stimulate a sequence of actions set out in the act of “Catching” the toy. Thus, the first portion of the action starts by seeing and feeling the housing cover and the central opening of the lid which, when raised, separates itself from the rest of the box. Then the main playing and experiencing of the object starts, when the lid releases the parts within the box so that the kid can move and mix them.

In total, the box has 18 pieces inside of it, varying in shape, texture, color, material and sound. When removing the pieces, the child that is playing begins a process of investigation of the contents. That firstly allows for the task of grouping the items by similar characteristics such as shape, texture and sound, each feature with its own levels of difficulty. After the assimilation of those features, it is expected that the pieces can be used for simple games of configuration such as the memory game.

As much as the attempts and fails of the grouping phase, the step of the memory game can be performed following the shapes, textures and sound, with a growth of difficulty and learning in the process. With gestures of “catching”, “playing” and “signifying” the object can be explored in a multi-sensory way, thus embarking a wide variety of specific needs, including the visual ones. It was also studied the dynamic involved in storing the parts of the toy, since the shape of the box only allows that all parts are stored if the product cover is closed, and then each piece must be placed individually in the respective front opening. This process may be understood after

¹Table that enables the use of sensory objects to psychomotor processing, this furniture is being developed in the course of the main research in Brazil.

repeated trials and errors, and it adds beneficial steps to be stimulated, as coordination, reasoning, sensory exploration, and autonomy.

(2) A set of woodworking tools, named Wood Toolkit, was the second selected idea. It seeks motor skills improvement by promoting various gestures of use and also delicate and fine movements. This toy introduces mathematical proportions such as $\frac{1}{2}$, $\frac{1}{3}$ and also elemental geometric shapes such as rectangles, circles, triangles and simple polygons in the design of its parts. It encourages wishful thinking while simulating activities of possible professions, it also fosters creative development because it is composed of moving parts that can be arranged and rearranged in various ways. The pieces that imitate tools have the same functional character of their original counterparts. Thus, the playing tools can be handled to build many objects that can later on be used and reinvented by the child (Fig. 3).

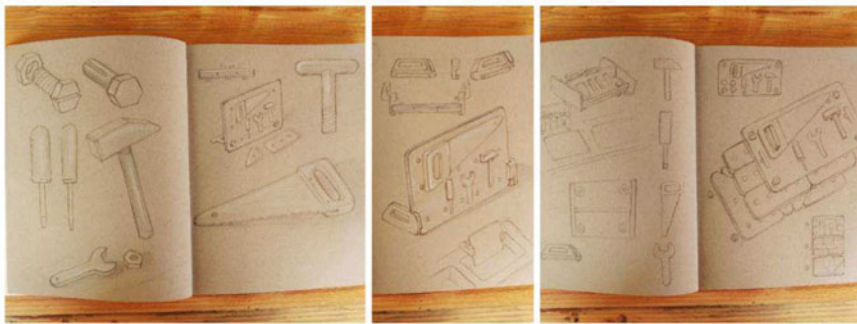


Fig. 3 Sketches made by hand, by the author (03/23/2020)



Fig. 4 Color tests with markers on paper, by the author (03.23.2020)

In order to optimize the Wood Toolkit for the targeted public, the parts were designed with high contrast (aiming at children with low vision) along with a possibility of strengthening relationships done by linking the possible used tool through color, shape and texture.

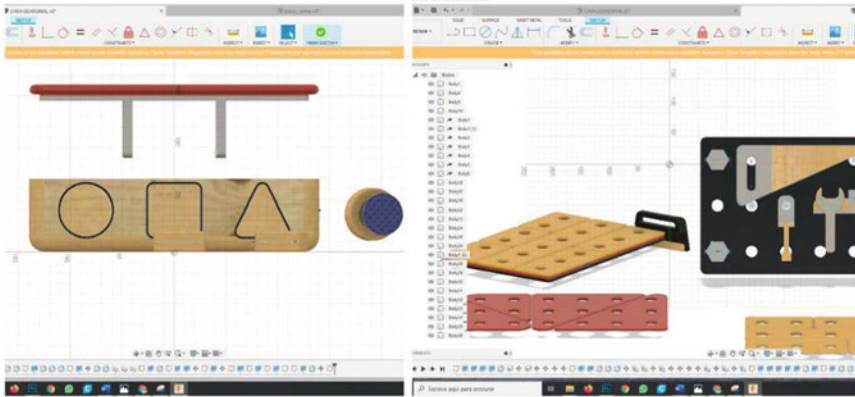
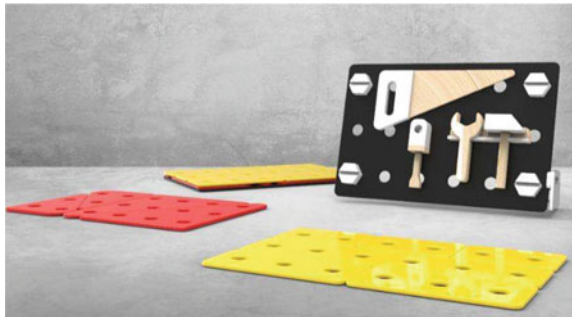


Fig. 5 Virtual models design with Autodesk Fusion software. By the author (03.23.2020)

Fig. 6 Digital renderings of the Sensory Case. By the author (03.23.2020)



Fig. 7 Digital renderings of the Wood Toolkit. By the author (03/23/2020)



Color Choice

In terms of visual impairment, severe blindness is relatively small in percentage, which means that the enhancement of residual vision is critical to achieve a wider diversity. Thus, the contrast of color can work as a strategy to augment the use. Being so, the colors were carefully chosen, several combinations were tried with markers in paper sketches along with a simulated contrast test through virtual modeling software. It is worth pointing out that extensive attention was given to the process of choosing the toolkit colors, because it possesses a large number of pieces and various possible setup configurations. So it was fundamental caring for the right amount of contrast in the color of its pieces (Fig. 4).

Virtual Modelling and Renderings

In this next stage of the conception a series of virtual 3D modelings of the two proposals were made. That was only feasible because the previous settings had already been decided. The virtual models made possible verifying the constructive viability and the aesthetics of the products (Fig. 5).

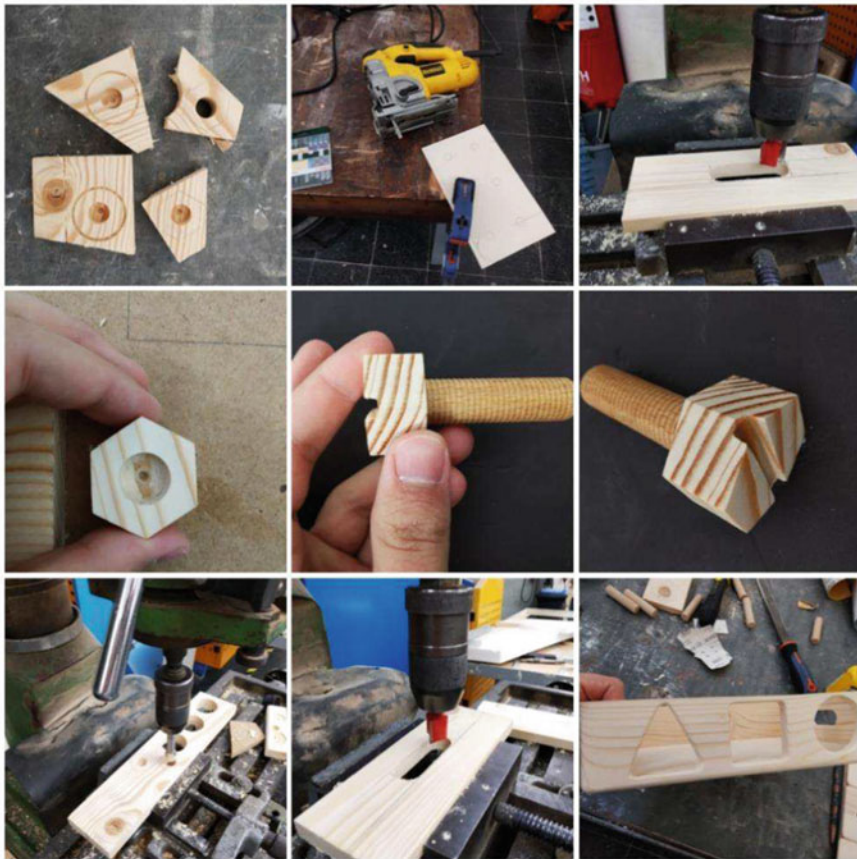


Fig. 8 Photos presenting the prototypes of both products in production. By the author (03.23.2020)

After modelling it virtually, both solutions were rendered (Figs. 6 and 7).

Experimental Execution of Physical Models in Laboratory

At this stage, a physical modelling study was initiated with the proportions and materials. In order to define the right measures and scale of the physical models, it was necessary to simulate the actual size of the sensory table with which the two designed objects would interact.

When the activities with the fictitious Sensory Table started, it was noticeable that the ideal modelling scale should be 1:1. Considering the need for use of the same materials intended for the final product, it was decided to develop a working prototype, instead of a model. In sequence, we used the infrastructure of FAUL, its workshops, for the manufacturing of the two proposed solutions (Fig. 8).

The following image shows several moments in the manufacturing process of both proposed solutions (Fig. 9).

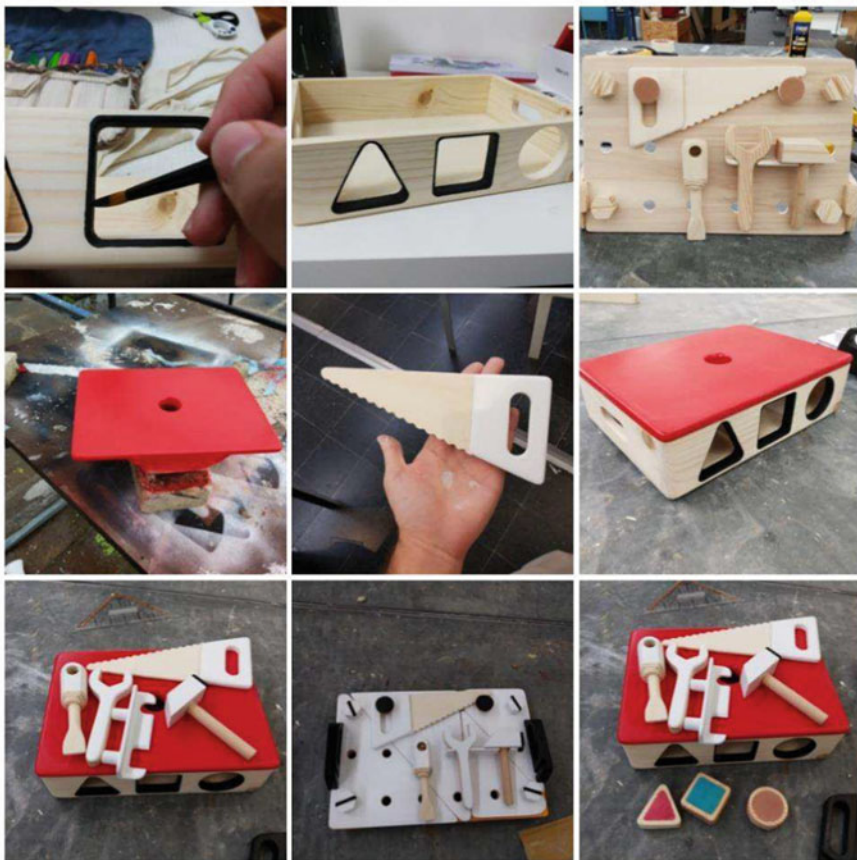


Fig. 9 The finishing process of both prototypes. By the author (03.23.2020)



Fig. 10 Photo of the Sensory Box prototype. Developed by the author (03/23/2020)

Furthermore, the Fig. 10 presents the prototypes of the proposed Sensory Box, finished and functional. Black and red colors compose its outer interface. Details in black covering the side apertures were set to optimize contrast with the lightwood. That feature can be helpful mainly for cases of residual vision in which positioning the pieces into the box might be harder. The hollow side handles become visible when the toy is removed from its place in the Sensory Table. The aperture of the handles were designed to be smaller than the geometric shaped pieces, but big enough to provide a secure grip for the child when he/she wants to lift the box.

The parts that make up the box are hollow inside and filled with different materials to provide three different types of sounds (Fig. 10). Three pieces were produced, out of eighteen possibilities in the total game, representing the three possible types of elementary forms, textures, colors and sounds in the game.

The Wood Toolkit allows for several association reinforcement tasks. One example is that the tools and its combining parts match in terms of color, shape and texture thus facilitating the assembly, disassembly and the overall engagement of children with visual impairment (Fig. 11).



Fig. 11 Photo of the Wood Toolkit prototype finished. Developed by the author (3/23/20)

5 Conclusion

Finally, by analyzing the results, it can be concluded that the goals of the study have been met and, moreover, it was possible to carry out the production of two prototypes with complex operations in a short period of time. That is, the initial plans of producing only scale models were exceeded. Generally, it is expected that these results may contribute with the theoretical and practical knowledge in the field of design as much as in methodology of design projects that could be applied in similar studies. That being said, this study still needs to carry out tests of the prototypes produced, with visually impaired children. After that, inclusive factors may be assessed in order to confirm if they meet the audience's needs. That will allow us to iterate in the process of making changes and improvements towards a subsequent validation of the proposed solutions.

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Bed for Atopic Dogs



Fernando Miguel Marques 

Abstract This article will analyse an ecodesign project, regarding animal design, when after several veterinary appointments it was concluded that it was not simple to find on the market a bed for dogs with allergies, that would satisfy all the desired requirements, from the veterinary recommendations for allergic dogs to a bed that could accommodate several dogs, satisfy concepts of sustainability and ecodesign, taking into account the durability and extension of the life cycle of materials.

This production was evaluated in comparison with an industrial production bed for sale on the market.

This is a first study of projects designed for animal welfare, since the concept of “animal design” is vast and various types of approaches can be explored as we will see throughout this article.

Keywords Ecodesign · Animal design · Dog bed

1 Introduction

Animal design aims to think about projects that satisfy the urgent needs of animals that inhabit the biosphere, which may have more or less close interaction with humans. Animal design does not intend to create conditions for humans to take advantage of animals in mass production for their consumption. It is not a design based on agricultural or animal production techniques. It is a more holistic design that essentially aims at animal welfare.

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When we talk about animal design, the idea that comes to mind is that associated with the pet. It is not at all a wrong idea, it just doesn't end there. The areas of action are vast and still under study and can range from pets to animals that are not directly connected to humans.

In our opinion, the design that is thought for animals can be divided into three distinct areas.

Pet design is usually an emotional design, that plays with the owners' needs, aiming at products that combine romantic ideals that can include decorations more or less alluding to themes related to animals, even having zoomorphic shapes that do not contribute at all for the functionality of the object and can make the functions for which they are designed difficult. They are essentially decorative objects for the home, where the main focus is the object for the enjoyment of the pet's owners, satisfying, most of the time, the primary needs of the animal for which they were designed. These products are mainly intended for cats and dogs, the most usual pets in Western society, and they try to humanize them somehow by placing iconographies related to human experiences. It is relatively easy to find water or food bowls with the shape of a fish or a bone, where the shape does not contribute at all to the functionality of the object.

There are several brands and designers dedicated to these products on the market, some more decorative, others more functional.

The second aspect, which is more technical, is related to veterinary practice. Objects designed for the use of veterinary medicine or agricultural and livestock production are usually rational objects that allow the support of professional practices, without the emotional concern of Pet design. This type of object is not intended to be used by the animal in its daily life, but in specific situations in which the animal needs medical assistance or in animal production for human use.

Referring to the biological levels of brain origin defined by Norman (2004) in his book, "emotional design" (p. 22) Visceral, Behavioral and Reflective, "animal design" will be included in a reflective level and pet design in visceral level. In other words, a more thoughtful and less immediate level of emotion as associated with pet design.

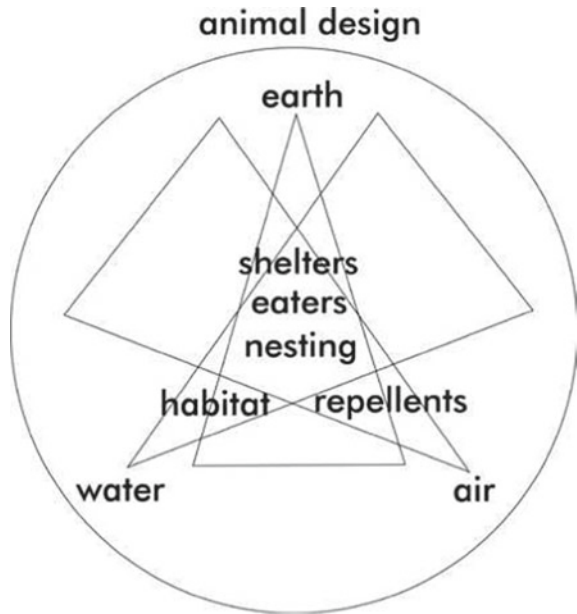
Animal design will try to balance the two areas, not neglecting the functional and emotional part of the objects designed to fulfil a certain function necessary for the animals' welfare.

Animal design can be a thought for the production of objects to have at home, technical aids to fulfil a certain function, such as wheelchairs for pets, or objects so that dogs and/or cats can have an easier life, and which is possible to combine with the domestic or natural environment.

But animal design is more comprehensive if we think about objects to have in nature, extrapolating the typical pets we have at home, and that can allow animals to use and humans to enjoy nature closer to them, or simply to allow that nature can enjoy the built objects, allowing animals better experiences, regardless of whether humans notice their presence or not.

An example of these practices are the nests of birds placed in specific areas so that they can nest, or other actions dedicated to other types of animals such as the

Fig. 1 Simplified scheme of animal design's action



project reported on the DesignBoom website by Kieron Marchese¹ (2019) in his article, where he presents a research carried out by the architecture and urban design firm “terreform one” in New York that built a butterfly nesting terrarium, structured in 3D printed concrete tiles that absorb carbon dioxide, where pollinator-friendly plants grow. This terrarium will then be replicated on the facade of a building in the city.

Another example is the one that designer and architect Angelo Renna developed in partnership with wildlife specialist Francesco Carraso: a series of 3D printed habitat houses to protect the insects that inhabit his house, where each printed house resembles the sculpted natural habitat by each of the studied animals.

Animal Design's areas of activity are extensive, almost as extensive as the biodiversity on the planet.

We can divide the Animal Design activity into the elements of habitat that may exist on the planet, water, earth, air, domesticated or non-domesticated animals, and then we can check whether or not we can intervene, by the degree of difficulty in finding information or the proximity of the animal's inclusion in the study (Fig. 1).

¹Marchese (2019) The outside of this office building in new york will be a giant butterfly sanctuary. designboom. <https://www.designboom.com/architecture/terraform-one-office-building-giant-butterfly-sanctuary-06-11-2019/>. Accessed 17/09/2019

2 State of the Art—Search of Dog Bed Characteristics

In this article, we will focus on a bed for a dog with atopic dermatitis, checking what there is on the market, which can answer to the possibility of having more than one dog who will use it, since the requirements for a multiple bed are much greater, reducing the existing supply on the market, which is usually specifically designed for the use of a single animal.

In 2017, the company IKEA launched its first collection of products specifically for pets, named “Lurvig” designed by the designer Inma Bermudéz, in partnership with the veterinarian Barbara Schäfer, with the intention of accommodating the needs of different animals covered in the collection. According to Morby (2017) author of the article “IKEA launches first range of furniture for cats and dogs”, the designer said in an interview “It’s really important to use an animal’s natural needs and behaviours—like how they sleep, eat or play—as a starting point”. These are important thoughts when planning to design for animals. One of the pieces to which the designer considers more important is a cushion that allows owners to put old clothes and fabrics inside so that the pets have the smell of something familiar to them, thus creating a close relationship between the animal and the owner. This 62 × 100 cm polyester cushion allows more than one medium-size dog (between 11 and 25 kg) to be accommodated. This cushion is already sold with filling, having as added value what was previously mentioned, but it is not suitable for dogs that have allergies (Fig. 2).

The brand Carbono (2017), a Brazilian home furniture company, launched in 2017 a line of products for animals, mostly related to sleeping, designed by Armanda Marques and Marcus Ferreira, composed of a fabric sofa protector, a bed/cushion in fabric and a wood-based raised bed, composed of a waterproof textile cushion placed on plywood support containing a bowl for water and a bowl for food (Fig. 3).



Fig. 2 Picture of IKEA’s animal products *Source* Morby, A. dezeen (2017). IKEA launches first range of furniture for cats and dogs. Retrieved 12-02-2020, from <https://www.dezeen.com/2017/10/10/ikea-launches-first-furniture-range-pets-cats-dogs/>

The Portuguese brand Manimal, created by the architects Miguel Arruda, Diogo Camilo and Lorena Masó, launched in 2019 a dog house and a dog bed made of birch plywood treated with oil because it's more natural, thus avoiding the application of varnish, which may be more toxic, and waterproof fabric with 50% polyester and cotton blend to give resistance to the bed cushion. According to the author Miguel Arruda in an interview with the online newspaper “Observador” Gonçalves (2019), “We talked to veterinarians to understand which forms and materials work best. We found that there are many dogs allergic to foam, for example. So, we had to find a special one”, he said, referring to EcoFoam medium density and anti-allergic foam with Oeko-Tex Standard certification, according to the brand’s website manimal (2019). The larger “cacau” bed, with an area of $71 \times 96 \times 15$ cm and a usable area of 65 cm, can also accommodate two small or medium-size dogs.

All of these cases are approaches made by designers with not only aesthetic concerns but also concerns about the welfare of pets, aiming to satisfy a wide range of needs. But in particular, none of these approaches fully meets the skin breathing needs, which are necessary for a dog with atopic dermatitis and allergies (Fig. 4).

Fig. 3 Pet C-113 bed *Source* carbono (2017). pet. Retrieved December 2019, from <https://carbonodesign.com.br/pt/produtos/pet>



Fig. 4 Manimal products, bed “cacau” *Source* <https://www.manimal.pt/pt-cacau.html>



3 Study Case

3.1 Contextualization of the Problem

Having three medium-size dogs at home, French Bulldogs, some logistical operations such as overnight sleeping became difficult.

The French Bulldog is a breed prone to dust mite, allergies and autoimmune diseases, such as atopic dermatitis, a skin disease that can cause skin irritation that makes the dog itch a lot, losing quality of life. Another problem is the canine behaviour. When there are males and females living together, territory marking can happen, to establish the leader of the pack, which sometimes is recurring. This process can result in territorial marking of the bed, made with urine on or next to the bed, a process by which the dog sends messages to other dogs about who dominates in the territory or whose object it is.

Most dog beds are made of textile and, in most cases, the lining material is polyester, more or less absorbent and stand on the floor, which can make more difficult to keep the bed dry. There are also some beds like the ones mentioned above that are raised, one of the essential requirements for co-sharing the bed with more than one dog, thus avoiding direct contact with the floor and the possibility of getting wet, which can make its use impossible.

Identification of medical-veterinarian conditions

Skin dermatitis requires that the skin breathes properly and has air circulation to prevent so many moist areas of the skin, so the itching may not be so intense. Skin breathing does not prevent all other veterinary treatments necessary to minimize the effects of the disease, it will be just another help. Atopic dermatitis causes the animal's skin to start flaking and leaving dirt on the surfaces in contact, hence the surface must be easy to clean.

Mite allergy can be minimized with the absence of textile surfaces that can easily accommodate dust.

According to the website “o meu animal” which the responsibility of veterinarian Prata (2017), who is currently doing her PhD at the University of Aveiro, the reasons for atopic dermatitis are:

“The dog comes into contact with the allergen either through skin or airway. More rarely, it may be through ingestion.

The allergens that can be involved in canine atopic dermatitis are:

Dust or storage mites;

Pollens;

Fungi (mould spores);

Animal flaking (skin or feathers);

Cotton, thread, wool.

Mites live in dust and fabrics, especially in damp and dark areas.

To avoid contact with mites, you should have a neat hygiene of the house. This involves vacuuming and washing all fabrics often.

Fig. 5 Bed for atopic dogs requirements



Alternatively, you should prefer furniture without fabrics, choosing, for example, leather. The floor must be polished, avoiding carpets.

You should choose hypo-allergenic beds or fabrics or cover cushions and mattresses with waterproof covers.

Ventilation of the house and reduction of dampness can hinder the growth of mites.

Finally, an acaricidal treatment can reduce 70% to 90% of live mites in the house for a month. However, dead mites remain in the environment, causing allergies. This strategy could be combined with a throughout cleaning of the house, eliminating dead mites”.

Starting question

Is it possible to design a dog bed that can be used by several dogs, allowing for easy cleaning?

Requirements

Accommodation for 3 French Bulldogs. Need for skin breathing. Easy cleaning. Distance of the mattress (sleeping area) from the floor (Fig. 5).

Through these conditions, a bed was built (d-Tela bed) to check if efficient bed hygiene would be possible, meeting the starting requirements. As a point of comparison, a bed with the same basic characteristics (Zoofari bed), similar to the one designed for comparative analysis, was purchased on the market.

3.2 Comparative Analysis of the Two Beds

Zoofari bed—10 × 85 × 15 cm bed, with a tubular iron structure with plastic connections in the corners, bedding area in polyester. A border around the structure of the bed in fabric, which can be attached to the structure through a hem through which the metal tubes pass, having two larger areas in polyester hammock, which provides effective breathing of the skin. The bed frame is assembled by taking advantage of the fabric’s elasticity and the polyester hammock, when the structural tubes fit into the plastic corners, which connects to the bed legs, without using any type of tool. Resistant to 60 kg (Fig. 6).

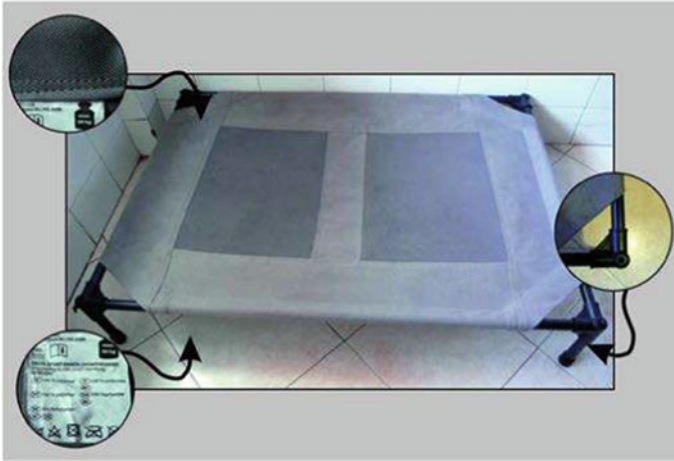


Fig. 6 Zoofari bed with information and enlargements *Source Author*



Fig. 7 d-Tela bed with enlargements, back of screen tension and detail *Source Author*

d-Tela bed—115 × 70 × 11 cm bed, tubular structure of welded aluminium, micro-perforated in reused polyester hammock for fingerprint, fixed to the structure by plastic clamps that act like stretchers of the printed hammock. We opted for a micro-perforated hammock for outdoor use because it is UV resistant, waterproof and perforated, thus allowing it not to absorb liquids when in contact with them. Resistant to more than 50 kg (Fig. 7).

In the comparative analysis of shape/function, the two beds are similar. Both rely on a rectangular metal structure, which is raised from the floor by four legs resting on rubber feet. Both can accommodate the 3 dogs and, when not in use, both beds

Table 1 Comparative table between d-Tela and Zoofari beds regarding shape and function

| Shape/function | | |
|---|---|---|
| | Strengths | Weaknesses |
| d-Tela bed Rectangular bed with micro-perforated polyester hammock with clamps to keep the fabric in tension | Measures 115 × 70x11 Accommodates 3 medium-size dogs Less distance from the bed to the floor Can be lifted supported on two feet and lean against the wall when not in use | Cannot be disassembled |
| Zoofari bed Bed with lacquered iron structure and micro-perforated hammock polyester textile and fabric | Measures 106 × 85 × 15 cm Accommodates 3 medium-size dogs Can be disassembled Can be lifted supported on two feet and lean against the wall when not in use | More distance from the bed to the floor |
| | Opportunities | Threats |
| d-Tela bed | Possibility of placing a blanket to cover animals, when it is colder | Angle too pronounced in the metal structure |
| Zoofari bed | Possibility of placing a blanket to cover animals | |

can be lifted and lean against the wall, resting on two legs, which is very useful to avoid any territorial marking by any dog.

The measures are similar and the functions are equivalent. In terms of functionality, they are very equivalent, fulfilling the function for which they were designed. However, in terms of materials and cleaning, there are some differences.

Regarding the materials used, both beds are supported by a metal structure resting on 4 metal legs with ends in protective rubbers to prevent slips and scratches on the floor. In terms of materials, there is the advantage of aluminium in the d-Tela bed, due to its resistance to oxidation in the presence of urine acids, which is superior to that of iron even if it is lacquered. In the hammock, the advantage in comfort goes to the Zoofari bed because its double-type fabric allows greater elasticity and thus more comfort. The tension of the d-Tela is directly related to the tension given to the clamps that are located at the bottom of the bed's fabric, which serve to tension the fabric itself. These are ordinary plastic clamps, applied from edge to edge in order to fix the hammock to the aluminium frame. They can break when subjected to greater efforts, which can be an advantage so that the fabric does not tear when subjected to greater weight. The height at which the hammock is located does not allow the dog to get under the bed so that he can chew on the clamps or the fabric. The only area that can be damaged is the fold of the fabric in the aluminium tube, but the presence of the metal makes the process difficult (Tables 1, 2 and 3).

Table 2 Comparative table between d-Tela and Zoofari beds regarding construction materials

| Materials | | |
|---|--|---|
| | Strengths | Weaknesses |
| d-Tela bed Rectangular bed with micro-perforated polyester hammock with clamps to keep the fabric in tension | Reused hammock Reduced price or even free hammock Waterproof polyester hammock More expensive aluminium in production but does not require maintenance, does not oxidize and ageing is slower | Smaller-scale craft production Lower resistance of the hammock Once the fabric is removed, it must be replaced with new plastic clamps |
| Zoofari bed Bed with lacquered iron structure and micro-perforated hammock polyester textile and fabric | Industrialized production Greater elasticity of the hammock, which allows greater comfort | The polyester fabric is easily stained Iron can rust with animals' urine Absorbent polyester that will show dirty wet stains |
| | Opportunities | Threats |
| d-Tela bed | The hammock is garbage after its first use. If it is to announce an ephemeral event it can be reused Fabric pattern depending on its primary function | There is no replacement hammock when the hammock is worn out It has many clamps that can be broken Hard to find replacement hammocks because there is no selective collection and the printed hammocks can be discarded after its use |
| Zoofari bed | Possibility of using several colours in the fabric | It has connectors that can be broken Hard maintenance of materials |

In the Zoofari bed, the connections between the 4 tubes that structure the hammock are made of plastic, a material that can be damaged if the dog starts to bite these joints, anticipating the end of the product's life. The other possible areas of degradation are similar in the two beds, both in the protective rubbers and in the fabric due to the wear and tear.

When it comes to cleaning, the d-Tela bed is easier to clean due to the waterproof hammock that does not retain liquids (such as urine, or other possible liquids such as regurgitated liquids) since it is micro-perforated. If it is partially soiled by washing the paws or similar, the hammock can be wiped clean with a damp cloth for a superficial cleaning or it can be entirely washed in a bathtub or shower with dimensions that accommodate the bed.

In integral washing, the advantage goes to the Zoofari bed, that can easily be disassembled and wash only the fabric in the washing machine or hand-washed.

Table 3 Comparative table between d-Tela and Zoofari beds regarding cleaning

| Hygiene | | |
|---|---|---|
| | Strengths | Weaknesses |
| d-Tela bed Rectangular bed with micro-perforated polyester hammock with clamps to keep the fabric in tension | Easy maintenance, can be cleaned with a damp cloth or washed with plenty of water in a bathtub | To remove the fabric, the clamps must be cut |
| Zoofari bed Bed with lacquered iron structure and micro-perforated hammock polyester textile and fabric | It can be washed in the washing machine | You need some strength to dismantle the structure Absorbent polyester that will take longer to dry It cannot be cleaned with a damp cloth |
| | Opportunities | Threats |
| d-Tela bed | Cleaning of the hammock with disinfectant Easy cleaning of the structure Possibility of using acaricide | |
| Zoofari bed | Easy cleaning of the structure Possibility of using acaricide | Impossibility of using disinfectant without integral washing |

However, its weakness is that the fabric is not waterproof, which easily causes stains, even when the animals are licking their paws.

In the deworming with the use of sprayed acaricide, the d-Tela bed has the advantage due to its waterproofing. The Zoofari bed can be stained with the product in areas of greater disinfectant flow.

4 Conclusion

As a conclusion, there is an advantage for the d-Tela bed. When there is urine in bed, the waterproof material allows easier cleaning of the bed fabric, since the Zoofari bed fabric requires dismantling the bed and washing the fabric, while the d-Tela bed can be cleaned only with a damp cloth or a mop or washed in a bathtub.

The retention of fungi, mites and dust is also more accentuated in the Zoofari bed, as this bed has an absorbent polyester fabric, which makes it accommodate more dirt without chances of hygiene, except integral washing by disassembling the bed.

Comparatively close the two beds are made up of a net in the sleeping area, which allows the air to circulate between the support and the animal's skin, managing to breathe without sweating too much even in hotter days, which is advantageous for allergic dogs.

The d-Tela bed reuses materials at the end of their life cycle, prolonging the life of the fabric used in the sleeping area, which is a significant contribution to the preservation of the environment, allowing changing the fabric whenever it is damaged, supporting 47 kg (total sum of the weight of the 3 dogs) without damage.

This bed can be a viable contribution for dogs with atopic allergies as well as for a bed shared by more than one dog since its cleaning is simple.

In the field of contribution to sustainability, it is made with durable materials, without finishing, that can be recycled at the end of their life cycle. The more fragile components and those with greater wear as the hammock that serves as mattress are reused in such a way that there is an extension of the life cycle.

“d-tela” is an open source project, for those who want a bed for atopic dogs, which allows easy cleaning, use of accessible materials and reuse of materials, thus extending its life cycle. thus promoting a more environmentally friendly attitude and a simple contribution for dog lovers who do not find a suitable bed for allergic dogs on the market.

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Virtual Reality for Interior Design History. The Ofir House as Experimental Project



Liliana Neves  and Fátima Pombo 

Abstract In a world where technologies are becoming a current interface in daily life, this study is aligned with the digital era and the advantages obtained from the Virtual Reality in order to extend the knowledge and the dissemination of Interior Design History. Teaching that subject is also a privileged academic area of enjoying the exploration of virtual spaces and of learning through an experience closer to the reality. This article discusses the experimental project that enlightens Ofir House designed by the Portuguese architect Fernando Távora (1923–2005) through Virtual Reality. Ofir House, as a landmark in Portuguese Architecture and interior design, is known as a “compound” between modernism and tradition, in a criticism of international architecture that, at the time, Portugal tried to emulate. This experimental space boosts the understanding of the necessary steps to create the Virtual Space and to convert it into Virtual Reality. Moreover, the methodology applied for Ofir House can be used to convert any historical domestic space from 2d to Virtual Reality, and therefore be replicated throughout other interiors. This article focuses on phase 1 and 2 of a methodology that can be extended to 5 phases. And if in effect phase 1 and phase 2 are already a coherent discussion’s topic, the other 3 phases that constitute subject of another article are already emerging in the present text.

Keywords Interior Design History · Virtual Reality · Ofir House · Technology

1 Introduction

This article presents a project that uses Virtual Reality as a learning tool within the discipline of Portuguese Interior Design History. In a world where technologies are becoming in a daily basis a current interface to communicate, this study is aligned with the digital era to extend the knowledge and the dissemination of Portuguese Interior Design History. There are already some specialized areas, like medical or military that use already immersive Virtual Reality as a form of training, allowing the

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formative experience to be performed as realistically as possible. At the same time, we have seen an increase in the creation of virtual platforms allowing to visit places from our armchair. Therefore, our intention is to draw the attention of implementing an existing technology as an innovative teaching tool in the course of Portuguese Interior Design History.

As Margolin advocates:

“First of all, a few young people have any solid understanding of design before they enter a design program. One function of a design history course is to explain to them what they have chosen to study and to assert that design is not a fallback profession for aspiring artists, but an independent practice with its own culture” (Margolin 1996, p. 1–2).

Following Margolin, it is worth to say that the programmatic content of history should develop a critical attitude and a better link between history and issues of design, focusing on all the components of transdisciplinarity and on the challenges of the practice in future contexts. In the course of Interior Design, students have the opportunity to study projects where ‘issues of design’ as concepts like volumes, objects, materials, scales, atmospheres are present and that later on, in the professional life, will be real demands to face and to solve.

According to Babich (2018) nowadays the learning process has two problems: one is teaching being focused on the retention method and the other is the massive amount of information provided in a short period of time. Babich writes “being educated isn’t the same as being informed” and as a result of the amount of information “they become bored, disengaged, and usually not sure why they are learning about a topic in the first place” (2018). Virtual Reality offers a different learning scenery based upon a contemporary ‘language’ with which students are familiar.

Why to choose Ofir House as experimental project to showcase the steps taken to convert an interior into Virtual Reality?

The Ofir House designed by the architect Fernando Távora is a landmark in Portuguese architecture and interior design. It was known to be a “compound” between modernism and the traditional, in a criticism of international architecture of which, at the time, Portugal tried to emulate (Neves and Pombo 2018). In terms of Interior Design, the house presents a modern flow through a tripartite plan, where the service, personal and common spaces are well defined. The house is also marked by the use of natural and endogenous materials, like the natural stone and wood, chosen by the architect in compound with modern material like apparent concrete. This house is a global project where the architect not only designs the building but also draws and details many essential equipment and furniture.

As result of this study it is intended to support the teaching of Portuguese Interior Design History by allowing an interactive experience in the learning process, fostering in the students more interest and knowledge for the topics of the above-mentioned course. Moreover, it underlines the argument that the interpretation of an historical space can be aligned with the digital era and benefit from the Virtual Reality knowledge.

2 Learning Interior Design History Through an Emergent Technology

Table 1 depicts the higher education framework of Interior Design Courses in Portugal referring to the level of education, course and institution and the history subject in the course. There are four institutions that offer a degree, two a master's degree and one other institution that offers a postgraduate degree. Among diverse approaches to Interior Design's core we do agree with Ching and Binggeli (2015) while underlining it as a transdisciplinary subject that should include architecture, equipment and furniture, materials and finishing's, lighting, etc. and mainly the relationship between man and space.

As it is possible to observe, usually, in the 1st year of the course, considering the degree level or the postgraduate level, history is introduced in the wider context of both Arts and Design in general and only in the 2nd or 3rd year it appears more focused with the specificity of the course/profession, by integrating history of interiors, history of space or history of environmental equipment. In the master's degree level history is transformed in a discipline focused on theory and critic of design. That means that is only in the 2nd year of the degree level that history accommodates in the studies plan some content closer to the profession of the interior designer to be.

In the last decade various scientific studies have shown that Virtual Reality with immersive and interactive experience is helping in the learning process in different scientific areas because it increases emotional reactions to what students are experiencing, which is fundamental to forming memories (Lin and Lan 2015; Mills and Araújo 1999; Rahaman and Tan 2011; Roussou et al. 2008).

Before computers, people used books as the main tool for the learning process. In the digital era, even if there are still books available, many of them turned into eBooks. Using a digital technology doesn't mean that the fact retention method does not apply anymore. However, some features related with the Virtual Reality are "powerful for education" as Babich (2018) argues:

1. "better sense of place" (VR allow not just words and illustrations, but the students to explore and live an experience);
2. "scale learning experiences" (when is not possible to visit a space or the reference that we have are just words and images, sometimes that is not enough to understand the relation between men, objects and space. In this case VR give us the purpose and create engagement);
3. "learning by doing" (in some areas the training is vital for the success of the student, however, is too expensive or too dangerous, so in this case VR becomes more affordable and safer);
4. "emotional reaction" (as we have already described a visceral reaction is important to create memories);
5. "develop creativity";
6. "visual learning" (most of the design students are a visual learners and in the case of interior design it is the three-dimensional visualization where VR allows

Table 1 Higher education of interior design in the Portuguese context (2020). *Source* Authors

| Level of education | Course and institution | | History subject in the course |
|---------------------|---|------------------------|---|
| Degree | Interior and Equipment Design at Polytechnic of Castelo Branco—School of Applied Arts | (1 st year) | Art History |
| | | (2 nd year) | Design History |
| | | (3 rd year) | None |
| | Interior Design at ESAD Matosinhos | (1 st year) | Art and Design History |
| | | (2 nd year) | Interiors History |
| | | (3 rd year) | None |
| | Urban and Environmental Design at Polytechnic of Viana do Castelo—School of Technology and Management | (1 st year) | History of Art and Culture ; History and Critic of Design |
| | | (2 nd year) | None |
| | | (3 rd year) | History of Environmental Equipment |
| | Interior and Spatial Design at Polytechnic of Leiria—School of Arts and Design | (1 st year) | None |
| | | (2 nd year) | History and Culture of Design ; Theories and History of Space |
| | | (3 rd year) | History and Culture of Design |
| Postgraduate degree | Interior and Spatial Design at Polytechnic of Oporto—School of Media Arts and Design | (1 st year) | Design Culture |
| Master’s degree | Interior and Furniture Design at Polytechnic of Castelo Branco—School of Applied Arts | (1 st year) | Theory and Critic of Design |
| | | (2 nd year) | None |
| | Interior Design at ESAD Matosinhos | (1 st year) | Contextual Studies |
| | | (2 nd year) | None |

the students to understand the relations between all components in the project: volumetrics, objects, textures and materials, lights);

- “users are ready to embrace new technologies” (VR used to be dedicated to gaming, however more and more projects and research have proved that the educational experience could benefit from the integration of VR on the classroom).

Mills and Araújo (1999) develop a preliminary investigation to understand how Virtual Reality could be helpful for learning and they refer that VR should “encourage the student to explore and to learn through constructing their own knowledge patterns” and “should increase the student’s motivation for learning by allowing the student to feel a sense of presence within the world” (p. 455). Regarding the

sense of presence, Champion and Dave (2002) wrote in the article “Where is this place?” that the creation of virtual environments should have the notion of ‘place’ (p. 93) where the ‘place’ must not be just identifiable but also allowing to know more about it. It is to conclude “that a sense of presence in virtual environment and real experiences is not just consequence of being surrounded by spatial setting but of being engaged in another place” (Champion and Dave 2002, p. 94).

3 Experimental Project—Ofir House

3.1 Project Context

It is intended with the experimental project of Ofir House to provide a reliable and reasoned space in Virtual Reality, available also online in order that it can be visited anytime and by anyone, helping the dissemination about the history of the project, its architect and also to contribute to the spreading of the Portuguese Interior Design History.

Therefore, the methodology created by the authors for Ofir House can be used to convert any historical domestic space from 2d to Virtual Reality adding to the literature and knowledge that can be used to teach and learn about Portuguese interior design. After presenting the space in Virtual Reality it will be necessary to create a platform that will provide the dissemination and the use of the virtual model into immersive experience. It is a learning tool that can be accessed outside the classroom anytime there is interest about the topic. In the platform will be added as much as possible additional information to be acquainted with the space in question.

3.2 The Ofir House

Following analysis of the *Arquitectura Magazine* between 1927–1980 there were more than 160 projects related to Portuguese domestic space. Considering the large number of projects that were depicted in the magazine, we chose Ofir House (Fig. 1) by architect Fernando Távora (1923–2005) for our project considering two main criteria: 1) the historical iconic value as it represents a turning point in Portuguese Architecture and Interior Design; 2) the learning experience of getting in touch with such space through Virtual Reality.

The Ofir House, also known as Dr. Fernando Ribeiro da Silva House (name of the owner) was designed and built between 1957–1958 by architect Fernando Távora and it is a landmark in the history of Portuguese architecture and interior design. Távora (1957) described it as a “compound of many factors” not only inherent to the architect, but also to the family who inhabited the space and the location of the building, “as far as he is concerned, the house is more than just a building” (p. 11).



Fig. 1 Article about Ofir House in *Arquitectura Magazine* (July 1957), 3rd series, volume 59, p. 10–11

Távora was a young but important architect in the 1950s and the Ofir House was known for its blend of modern and the traditional (Trigueiros 1992). This building is famous for the exploration of the central living-room (Fig. 2), which demonstrates the influence of modernism on Portuguese domestic habits. Also, the plasticity that Távora gave to the materials and the way they present themselves are a representation of the traditional culture (Neves and Pombo 2018).

By the point-of-view of the interior project the house presents a tripartite plan separating the service, the common and the bedroom areas. The architect paid attention to detail not only of the building and used materials, but also to the drawing of some furniture, like built-in cabinets, chairs, tables and lamps (Neves and Pombo 2020, p. 381).

This project was also the first in the 3rd series of the *Arquitectura Magazine* and was also a turning point in the editorial direction and the type of publication. This volume of the Magazine not only tried to promote a new generation of Portuguese architects but also encourage those who wanted to reflect on the Portuguese reality informed by the International style, but critic about it (Neves and Pombo 2018).

This building is part of the Portugal cultural heritage and is also classified as a Portuguese Public Interest Monument (DGPC 2018). In 2011 the house was decimated by a fire leaving it destroyed, however in 2017 the reconstruction was finished with the help of the North Section of the Architects Order and the Architecture Faculty of University of Oporto. The house remains in the possession of private

Fig. 2 Central living-room in Ofir House, interior photography after construction. *Source* Luiz Trigueiros



owners and is currently part of a tourist route promoted by Esposende City Hall. Visits are made from the exterior. However, it is possible to visit the interior by prior appointment and agreement with the owners (Andrade 2017; Maia 2017; Pinheiro 2018).

3.3 Development and Contribution

This study consists of five phases as it is possible to observe in Fig. 3. The 1st, 2nd and 3rd phases are related to the creation of the virtual environment and how it will be presented to the students' target audience. The 4th phase concerns the evaluation of the virtual model and its contribution to the teaching and learning process, and to analyse any issues related to the usability of the application. Finally, the 5th phase is the dissemination step where the Ofir House experimental project will be made public, alongside other virtual spaces that could be modelled.

The virtual spaces created are based on the information retrieved from several references about the space like photography, textual documents and technical drawings.

Initially these spaces are drawn in AutoCad to enable the space to be in the correct dimension for a digital format, after that, 3d space is design using Autodesk 3d Max Studio software and the Vray rendering engine that helps to create more realistic texture materials and light. The choice of this software is personal, but also because it remains the most used rendering software in Portugal, which allows the 2D to 3D transposition methods that we design to be more easily replicable. The combination of this software and the render engine allows the results to be more realistic; a CAAD (Computer-Aided Architecture Design) is already designed to be used by architects and designers with specific objects and techniques embedded in the system.

After the creation of the virtual models, the virtual spaces are designed using the Unity 3DSoftware, thus converting the three-dimensional model into Virtual Reality. This software makes paths that can be crossed by the futures users and

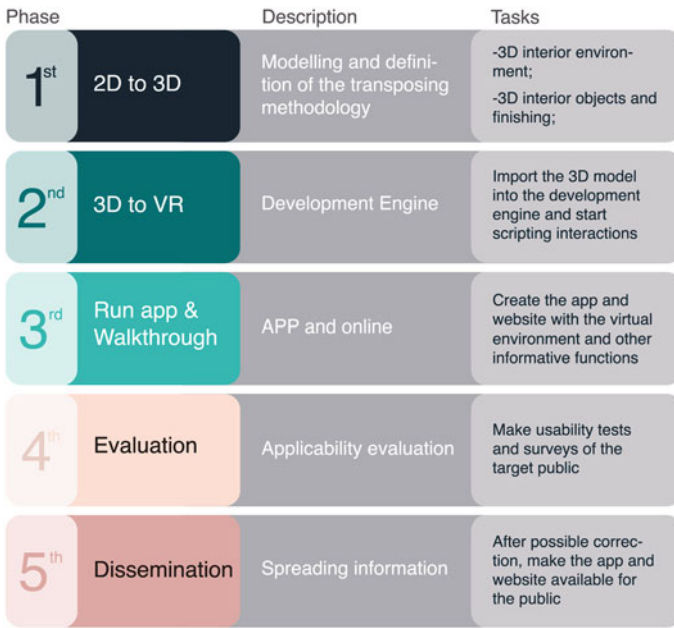


Fig. 3 Development stages for this study. Font: authors

programs scripts that enable the use of the virtual model in devices for VR display. For example, in Oculus rift or a mobile phone the user can have an immersive experience in which he/she can move him/herself and interact with the space. Or in devices like a computer, by using a mouse or the keyboard, the navigation through space can be done with keys or navigation commands.

The 1st phase is the transposing from 2D to 3D. In this step is used a methodology that helps to create not just the Ofir House, but any other domestic interior. The methodology is based on the crossing information of the analysis of images, technical drawings and texts that converge in the three-dimensional construction, as reliable and reasonably as possible.

Figure 4 showcases the Ofir House 3D model in Autodesk Studio Max where is possible to observe the interior environment and the architectural building.

The 2nd phase concerns the development engine that converts 3d into Virtual Reality. By importing 3d to the engine software starts the program of interaction among the user, the virtual space and the objects. Figure 5 demonstrates the 3d model of Ofir House imported to Unity where it is possible to script the interaction of the future user with the space as well as to build the app and to export to the dissemination platform.

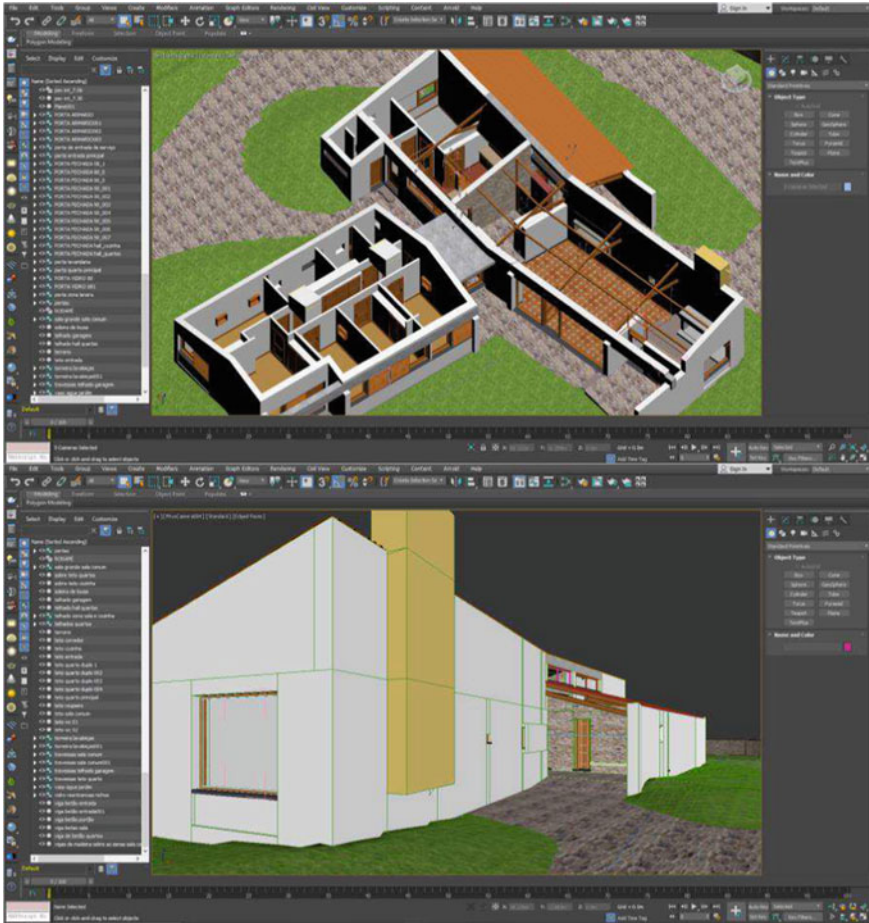


Fig. 4 3D modelling of Ofir House in 3D studio max. *Source* Authors

4 Final Considerations and Some Next Steps

With this experimental project it can be said that is possible to create a reliable and reasonable space into Virtual Reality, promoting knowledge about interior design history in Portugal. This experimental space boosts the understanding of which are the necessary steps to create the Virtual Space and to convert it into Virtual Reality, namely, what should be included in the files and how they need to be organized in each software. Also enables to design and simplify the methodology and steps to convert 2D in 3D and in Virtual Reality.

As learning tool Virtual Reality offers a better opportunity to showcase the interior flow of the space including features chosen by the architect like materials, textures,

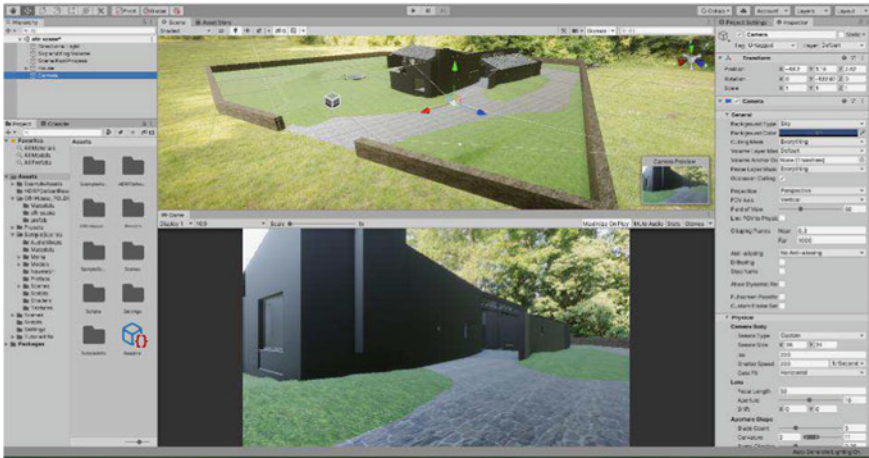


Fig. 5 Ofir house in unity, Source Authors

colours and the way they interplay in the place. This might create an emotional experience about the spaces and might stimulate new insights and a rewarding knowledge about it, as Donald Norman states in *Emotional Design* (2004, p. 135).

This project contributes to the extension of information about Portuguese Interior Design History providing a source of information that responds to the challenges of the contemporary digital era. The experimental project of Ofir House can be replicated throughout other interiors.

Despite the fact that the achievement done with phases 1 and 2 is already an aim in itself, the project still must run phases 3, 4 and 5 which are already planned and will constitute the content of another article. The guidelines are as following:

- 3rd phase—app and website design that will allow the access and the interaction with the virtual reality space. The application and the website will be complemented with as much as possible additional information in an easily accessible tab.
- 4th phase—evaluate how much Virtual Reality contributes to learning about Portuguese Interior Design History. It will be also assessed if the app is user friendly and which is the role of the lecturer in the classroom, namely how lecturer and students interact with Virtual Reality. In a preliminary study we found that Virtual Reality Environment can be the key to connect the students with the topic discussed because of the stimulating generated interactive ambience (Neves, Beça & Pombo, no prelo).
- 5th phase—dissemination of the information.

A last word to underline that it is intended to apply this methodology to other projects, bringing Virtual Reality to interiors' interpretation.

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Design and Society

Arts' Meeting/Melting. From a Strategy for Recovering Sicilian Abandoned Buildings, to a New Artistic Process



Santi Centineo

Abstract In the last decades in Sicily, a huge number of abandoned buildings and places (of different origins) has been detected and catalogued. Their main characteristic is the trace of the human presence and activity, now disappeared for different reasons. They are mostly industrial architecture, historical ancient buildings in a state of advanced ruin, abandoned quarries, even illegal buildings that were once abusive. A part of them has been recently catalogued, studied and refurbished, generating new possibilities of fruition.

At the same time a growing number of young contemporary artists demonstrate that cultural activities in Sicily are progressively growing. Whilst in the past the great Sicilian artists (such as Renato Guttuso, Fausto Pirandello, Bruno Caruso) had to migrate to northern Italy to find a successful opportunity, now a huge number of young artists, who begin to know the market high quotations, choose, as a challenge, to remain in the island, finding new opportunities and awakening also in the great artists the interest to return to be active in the island.

The result of these two phenomena is a crossing-over that made Arts, in the broadest sense of the word, converge in an unprecedented combination that represents a new opportunity for local economy, as well as it assumes new ethical, cultural and semiotic meanings.

Keywords Abandoned buildings · Contemporary art · Heritage

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1 The Abandoned Buildings in Sicily: The Origin of a New Heritage

1.1 *A Sociological Premise*

The recent history of Sicily is strictly linked to events that have occurred over the course of millennia. Specifically, in the 18th Century the social scenario was particularly defined by a split between rich and cultured classes, on the one hand, and poor classes on the other. This fracture brought the territory to that proverbial state of backwardness with which, compared to the rest of the Italian regions, it was presented at the time of the Italian Unity. During the period of the so-called “southern question”, a small middle class was suddenly born, which would shortly form an embryo of a bourgeois class, animated by entrepreneurial intent, and that within a few decades would have brought a great productive impetus to the island (Pirrone and Spadaro 2015).

The explosive nature of this phenomenon, which even frightens the rest of Italy, highlights the richness and potential of the Sicilian territory.

Also for these reasons perhaps, the post-unitary economic policies did not facilitate the existence of this middle class, which, moreover, was no present also in the rest of Italy, so that this explosiveness, within a few decades, contracted in a period of rapid decay.

The abandonment of the central state, with regard to structural investments, and its primary interest in only finding electoral consensus, intersected with the power of the local mafia, resulting in a period of decline, once again in contrast to the rest of Italy.

Whilst Italy was experiencing the so-called “economic boom”, Sicily faced one of the darkest periods of its history, during which the building heritage was mistreated, abandoned or outraged by new frightening buildings.

During these years, the formulation of the so-called “Sicilian theorem” came to the fore: according to this theory Sicily would not be backward, but rather much more ahead in comparison to the rest of Italy, in a path of obsolescence that would have very soon reached also the other regions (Miccichè 2017).

This premise is necessary to understand the consistence of the contemporary renovation of these abandoned buildings, taken into consideration, in order to collocate them into a more general analysis, that could give rise to a virtuous path of revitalization for the Island.

1.2 *The Origin of the Industrial-Archaeological Heritage in Sicily*

Although Sicily belongs to those regions not so much affected by industrialization processes during the different Industrial Revolutions, the presence of a conspicuous industrial-archaeological heritage has recently been transformed in a very interesting path for relaunching touristic opportunities, as well as it allows some implications to be deduced and traced in some general scientific guidelines.

This heritage is the result not only of the progressive disposal of industrial buildings, but also of industrial-craft manufacturing ones, of some other ones linked to local abandoned traditions (such as tuna fishing or salt and sulfur extraction (Archivio di Stato di Caltanissetta 2000), wine production, or salt pans) (Comunidad Autónoma de la Región de Murcia 2018; Comunidad Autónoma de la Región de Murcia 2019).

These buildings are mostly the evidence of the many activities improved by the presence of ancient entrepreneurial families. They were local bourgeois families, such as the Florios, but also foreign ones, such as the Inghams and the Whitakers, who in the middle 19th Century settled in Sicily, an impressively rich land where it was possible to establish entrepreneurial colonies, due to low costs of labor. The import/export activity of these families, both local and foreign, improved also a cultural development, so that at the end of the Century, Palermo was able to host the National Exhibition, 1891–92 (Fig. 1a), visited also by foreign sovereigns and by Gustav Eiffel, protagonist just three years before of the Universal Exhibition in Paris, who congratulated for the high level of progress of the exposed goods (Giuffrida and Lentini 2019).

The subsequent state policy did not facilitate this entrepreneurship, so that in a few decades these families knew the decline. Many industries had to change their productions, some other had to close, but the most of them had to change production methods and, as a consequence, they had to move away from their original buildings, in the meanwhile become insufficient and inadequate (Fig. 1b).

On the other hand, the Exhibition itself and the subsequent building expansion changed radically the face of the city. Economic interests began to be focused on the North of the town, an area full of gardens and suburban villas. Especially during the years known as “Sack of Palermo” (from 1950 to 1980), many ancient buildings were destroyed and many bad-quality others, from different natures, were built on the resulting areas, most of time without a reasonable Development Masterplan. The main effect was the progressive abandonment of entire parts of the old town. To this must be added the phenomenon of illegal building or the construction of buildings in contexts to the limits of legality and exceeding the bounds of commonsense (Miccichè 2017).



Fig. 1 A perspective from above of the area of the National Exhibition, 1891 (a), and an industrial district for citric acid in Palermo (b)

2 Strategies

2.1 *Census of the Heritage as a Strategic Legitimacy*

In recent years, from the 80s till now, the Faculty of Architecture of the University of Palermo has repeatedly made a census and a reconnaissance of these buildings, creating archives of these materials and offering rethinking opportunities that have proved useful for starting an interest now generally recognized on these buildings as a great opportunity to safeguard memory.

This type of operation, very difficult and long (the patrimony is integrally diffused on the Sicilian territory, the vastest and most articulated in Italy), has turned out fundamental, in order to subtract these manufactures to the oblivion, demolition and further illegal activity. Furthermore, this catalogue carried out a big work of refurbishment and re-design simulation that has progressively improved the possibility of thinking of this heritage according to a new point of view: shall this heritage be an opportunity for the economy of the island, both as an opportunity for employment creation, and as sequence of virtuous effects on the tourism implementation system. In both cases, it would mean a stimulus for economic recovery.

Moreover, an ideological aspect in the matter is considerable. The illegality was turned into a new ethical asset and a sample of good practice. In this way, a principle is affirmed, according to which, the central and local governments can reaffirm their power over mafia and whatever could originally be considered only disgraceful and illegal.

2.2 *Rethinking the Heritage as a Cultural Legitimacy*

In more recent years instead the policies of economic revival of the island, through strategies related to the enhancement of the territory and the development of tourism,

have strongly privileged the trend to reuse these buildings with prevailing cultural destination, in particular the artistic ones.

Whilst in the other parts of Italy, especially in the industrialized North, according to the market's need of lofts, these buildings were also often used as apartments, in Sicily the phenomenon mainly involved cultural and artistic use destinations. The long Sicilian living tradition basically refuses the loft and some of its tragic fashionable radical-chic aspects. For this reason, probably, that is also an economical reason, the main destination of this refurbishments is the artistic purpose.

As an effect, speaking of convergence of arts, a very relevant theoretic apparatus can be traced. In fact, the use these buildings as art-containers immediately offers three hypothesis to be demonstrated.

The first one, is about the power of the presence of Art, as a cultural legitimacy over the existence and the reuse of these buildings. It should be admitted that, most of the time, industrial buildings do not have particularly attractive aesthetic requirements and their environmental remediation is often expensive and difficult. Thus, not only the artistic presence, but also the destination as art-container, increase the quality and the economic level of the building.

The second one, is about the possibility of finding in this Sicilian "Golden Age" a start moment for the validation and valuation of a particularly fruitful period that today can thus be considered as a phase to be protected and looked at with a certain "archaeological" attitude.

The third one affirms the principle of the passage from 'art of industry' to 'industry of art', according to the new sociologic studies over contemporary art and its collocation in the market. For this reasons, it would be necessary that an orderly and scientific study of these products and processes takes place in a methodical and conscious way.

3 Some Case Studies

3.1 *"Fiumara d'Arte" and "Atelier sul Mare" ("Torrent of Art" and "Atelier on the Sea"), Castel di Tusa (Messina)*

In 1986 the Sicilian entrepreneur Antonio Presti left the family company and placed in a public abandoned land the Pietro Consagra's sculpture "La materia poteva non esserci" ["The material could not exist"].

After facing endless legal processes and having won them, Presti saved the work from the threatening of demolition, taking support, in 1994, from a sentence that can be considered of historical significance. For the first time a judge stated that "the concept of Art cannot be considered as a landscape damaging: damage of landscape beauties have to be excluded, as the concept of beauty is a metaphysical datum, hardly definable".



Fig. 2 Three guestrooms in the “Atelier sul Mare”, Castel di Tusa, Messina

In the meanwhile, in 1991, Presti starts with another titanic project: he detected an old hotel structure (an eco-monster on the Sicilian coast in Castel di Tusa) and started to transform it into a sequence of “Artists’ rooms”. He entrusted the hotel’s rooms’ design to different artists that could have been free to create whatever they had wanted, something not to be exposed, but lived and inhabited by hotel’s customers (Fig. 2). Mochetti, Morgia, Xhafa, Ruiz, Icaro, Ceroli, Pika, Dorazio, Cuticchio, Nagasawa and many others local and international artists were progressively involved in this project.

The main characteristic is not the masterwork itself, but the possibility of living inside a masterwork, completing it with human presence and, in some a way, with a metaphysical journey (Centineo 2019).

3.2 *Three Ancient Palaces in Palermo (Branciforte, Riso and Butera)*

A huge number of old noble residences in Palermo have been left and abandoned by their owner, fallen in ruin or for the damages of the Second World War. Three cases are quickly examined.

1. Palazzo Branciforte is one of these. An original structure of the 15th Century was progressively transformed by the Brancifortes, that bought it from the Raccuja family. At the end of the 18th Century the Branciforte moved to another palace and sold it to the Bourbons, that transformed it into a public pawnshop. The building, one of the largest in Palermo, was thus transformed: grates were placed on the windows and the large central hall of the pawn shop was created. After the revolution of 1848 and the damage suffered in the bombing of 1943, the building, fallen in ruins, was bought by a bank, then absorbed by the Fondazione Sicilia and definitively transformed in a museum, designed by Gae Aulenti (“Regione Sicilia” 2020).

The archaeological collection of Banco di Sicilia at the ground floor (Fig. 3a), many contemporary works of art, a huge library (Fig. 3b), in addition to an ethnographic collection of Sicilian puppets, in the central hall of the pawn shop, are now collected in the Museum (Fig. 3c).



Fig. 3 Palazzo Branciforte in Palermo. The archeological collection (a), the library with Ignazio Moncada's fresco (b) and the puppets exhibition in the pawn shop



Fig. 4 Palazzo Riso in Palermo. Two exhibition rooms

2. Palazzo Riso was designed at the end of 18th Century by Giuseppe Venanzio Marvuglia, with interventions by Ferdinando Fuga. Bombed during the Second World War, has recently been refurbished by the Region and, with some other important buildings, has been transformed into one of the headquarters of the Regional Museum for Contemporary Art. A stable permanent collection, other occasional ones and various events (Fig. 4) are hosted in the Museum ("Museo Regionale" 2019).
3. Palazzo Butera, on the waterfront, has been bought by the art collector Massimo Valsecchi, refurbished and transformed in a container for events, the first of which, in 2018, has been the 12th European Biennial of Contemporary Art "Manifesta" (Fig. 5a). Among the curiosities of the restoration, there is a significant choice, emblem of what this building wants to be today in the intentions of its owner. During the works in fact, it was discovered that the roots of a luxuriant jacaranda tree had crept into the walls of the building. In the restoration, it has been decided to leave the roots in their location and even to exhibit them, thanks to a walkable glass cover (Fig. 5b). The meaning of the operation is clear: in the end, no building belongs exclusively to man or nature, but it is a joint ownership of processes ("Palazzo Butera" 2019).

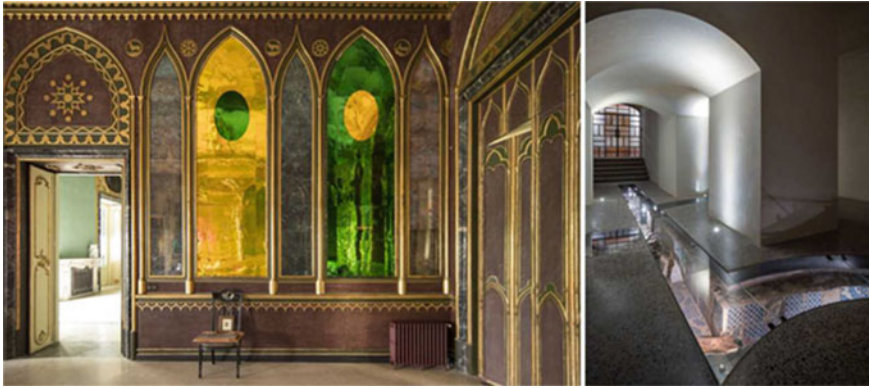


Fig. 5 Palazzo Butera in Palermo. A hall with contemporary colored glasses (a) and the walkable glass over the tree's root (b)

3.3 *Museo delle Trame Mediterranee (Mediterranean Warps Museum), Gibellina (Trapani)*

The wordplay in the name of this museum is extremely meaningful, as the Italian word “trama” means at the same time “warps” and “plots”.

The old Gibellina is a very complex theme: this town was totally destroyed by an earthquake in 1968 and progressively rebuilt in the following years at 11 km of distance. Whilst the local mafia was trying to speculate on the land on which the new city had been raised, the mayor of the time, Ludovico Corrao, decided to call international artists and architects to give a new face to the city: Mario Schifano, Arnaldo Pomodoro, Ludovico Quaroni, Alessandro Mendini, Bruno Consagra and others. Most of them were involved in the new town, but some of them preferred to work in the surrounding area.

Thus, whilst the celebrated international artist Alberto Burri created the “Grande Cretto” (drowning the whole old country in a cracked concrete casting, probably the largest piece of land-art in the world), the old “baglio” Di Stefano (“baglio” is a typical Sicilian fortified farm) was transformed in a multi-purpose building. The international artist Mimmo Paladino put his huge sculpture “Montagna di sale” (Salt Mountain), creating a natural set for performances and visually linking the wildness of the territory to the human habitation of the building (Fig. 6a). The Museum, founded in 1996 collects items incoming from different regions facing the Mediterranean Sea: Syria, Morocco, Tunisia, Palestine, Egypt, Albania, Algeria, Spain. Many of them are woven tissues, which would justify the name of “warps” of the museum: fabrics, but also carpets, traditional folk costumes, tapestries and blankets (Fig. 6b). But some other ones (jewels, tools, pottery) refer to the second meaning of the word “trame”: a plot.

The “baglio” Di Stefano hosts today also a library and a Center of Documentation about “Orestyadi”, a periodic multi-cultural event in Sicily.



Fig. 6 The “baglio” Di Stefano in Gibellina. The restored building with Mimmo Paladino’s “Salt Mountain” (a) and an exhibition room (b)

Starting from this melting pot of cultures, languages and tales, Gibellina is today one of the most interesting examples of contemporary cities of foundation (“Rete Museale e Naturale Belicina” 2020; “Altervista” 2019; “Fondazione Orestiadi” 2019).

3.4 *Cantieri Culturali alla Zisa (Cultural Construction Site at Zisa), Palermo*

From the end of the 19th Century this area was the largest industrial district in Palermo. It was entirely occupied by Ducrot Industries and Manufacturing, specialized in cabinet making, metal and wood construction (Fig. 7a). The Ducrot was the manufacturer of all the creations of the Sicilian Ernesto Basile, one of the most important Italian art-nouveau architect, collaborator of the Florio family and also artistic Director of the Ducrot Industries. From those factories came even the furnishings for the new Palace of Italian Parliament in Montecitorio, and for many cruising ships of the Florio’s fleet, both designed by Basile himself.



Fig. 7 The Ducrot industrial district in an old photograph (a) and nowadays (b)



Fig. 8 Cantieri Culturali alla Zisa. The ZAC (a), the Photograph Museum (b) and a spontaneous piece of furniture made by some youngs (c)

The forty sheds of the area also housed a factory of pieces for aviation but, after the First World War, the “Ducrot Aviation” progressively began to decline (Fig. 7b). As well as, after Vittorio Ducrot’s dead, the Industries started to decline.

From the early 90 s, the survived 23 sheds started to host the scenographic workshops of city theatres, but soon it was realized that the size of the spaces, as well as warehouses, could be used for events of various kinds (Fig. 8c).

The main characteristic is that the area has not been involved in a radical master-plan who transformed it into something else, but several little refurbishments had simply adapted the spaces to the different needs.

The complex now, as we can see it today, hosts the French Cultural Centre, the Goethe-Institut, the National School of Cinematography, many workshops of the Academy of Fine Arts, the “Vittorio De Seta” cine, the Regional Film Library (Fig. 8b), and the Festival MainOFF for electronic music. Many other important events have been kept there, such as Manifesta 12 and yearly the “Efebo d’oro” Award. one of the most important spaces (Fig. 8a) is the “ZAC, Zona Arti Contemporanee” (Contemporary Arts Zone), a workshop-space open to different artistic uses (“Artribune” 2019; “Arte e cultura” 2020).

3.5 *Ecomuseo Mare Memoria Viva, Palermo*

Originally built as a railway station on the local Palermo-Corleone line, later transformed into a locomotive depot, the building, on the mouth of the river Oreto at the borders of Kalsa district, subsequently, from 1956, fell into a state of abandonment. In 2004 it has been refurbished, mostly by using local materials, such as the Billiemi stone, and restoring the traditional structural system with trusses and cast iron capitals.

In 2004, the building was used for the first time as an art-container for the local artistic event “Kals’Art”, whilst from 2014 it has been entrusted to the association that transformed it into the museum “Mare-Memoria Viva” (Fig. 9a–b). The purpose of this museum is to restore, through multiple activities recurrent to any medium of communication, the culture of the sea in Palermo, a city that, even on the coast line, has progressively abandoned its relationship with the sea. The shape of the building,



Fig. 9 Two different exhibition at Ecomuseo “Mare Memoria Viva”, in Palermo

an empty rectangular container, allows the transformation or the subdivision of the space in many different way, according to the different needs (“Mare Memoria Viva” 2020).

3.6 Ex Stabilimento Florio delle Tonnare di Favignana E Formica, Favignana (Trapani)

In 1859, the entrepreneur Ignazio Florio bought a small tuna fishery in the island of Favignana, in front of Trapani, and commissioned the architect Giuseppe Damiani Almeyda to enlarge it. The largest tuna fishery in Sicily (20,000 squared meters) worked during several years, even when the Florios, awarded at the Exhibition of Palermo for the invention of the automatic cans opening system, could not avoid the decline. In 1937 the building was bought by a Genoese family, the Parodis, and in the 70s stopped its activities, due to the wild competition, with no rules and technologically too much advanced in the Mediterranean Sea. In the early 90s, the Sicilian Region bought the fishery and transformed it into a Museum (Fig. 10a–b).



Fig. 10 Ex Stabilimento Florio delle Tonnare di Favignana e Formica, Favignana. The restored chimneys and pots for tuna cooking (a), and an exhibition room

The permanent exhibition includes documents, tools and pictures relating to tuna fishing and processing. An archaeological exhibition (the area was the theatre of many sea battles in the Punic-Roman times) is included, but the core of the exhibition is a section dedicated to the Florio family, whose epic lives again, through a holographic reconstruction, in which various characters and the reconstruction of the “chamber of death” of tuna fishing revive, giving their testimony recounting.

The Tonnara is nowadays headquarter of a Museum system that includes many other local Museum, such as the Pepoli Museum, where numerous precious artifacts of the traditional coral craft are collected, and the open-air Salt Pans Museum (Favignana 2019).

3.7 MACSS—*Museo Arte Contemporanea Sotto Sale (Under Salt Contemporary Art Museum), Petralia Sottana (Palermo)*

The volcanic nature of Sicily has allowed in the past to exploit not only the resources of the sea, but also the subsoil.

Pumice stone, sulphur, plaster and mountain salt were the largest market, before the economic interests of multinational companies focused on the recent discovery of oil.

In the territory of Petralia Sottana, the Italkali, a mining company, works in a deposit of over 80 km of tunnels dug into the rock. In the partially abandoned area, extremely suggestive, Italkali has recently created a space intended for the culture of salt. During five biennials, from 2011–2019, thirty works carved in the salt have been installed. The dryness of the microclimate preserves the works and during the week the quarry is active full-time. Thus, visits are allowed only once a week. The largest rooms are well suited for shows of various kinds, such as performances or video-projection shows on the walls (Fig. 11 a–b). In some other caves, abandoned machinery related to the extraction of salt and its processing, are exhibited, whilst



Fig. 11 MACSS—Museo di Arte Contemporanea Sotto Sale. A cave exhibiting abandoned machinery related to salt extraction (a), and a exhibition cave (b)

it is also guaranteed the opportunity to taste food products related to salt, such as salted chocolate or almonds, produced by local artisans (“Sottosale” 2019).

4 Conclusions

We have briefly reported only some experiences among the recent Sicilian experiences. These reuses of abandoned buildings can be interpreted not only as hopeful signs of a progressive cultural revival, but open the space for some considerations.

Recently in many countries (Comunidad Autónoma de la Región de Murcia 2018; Comunidad Autónoma de la Región de Murcia 2019) the debate over the sense and the consistence of Heritage is even more intensive. From recent guidelines emerges not only the need to catalogue this heritage, but also to compare it increasingly and inter-culturally among different countries (Mannoni and Giannichedda 1996).

Only in recent years the definition of “heritage” has been extended to include the intangible, complicating on the one hand the cataloguing and the choices about its destination, but on the other hand using the fusion of the arts as a convergence of cultural meanings (Landes 1978).

Not only this “containers” represent a little chunk of history to be preserved as a glorious memory of the past, a step of the path of civilization to which we belong, but probably the destination to “arts container” can assign them a useful double meaning.

In the past, the museographic scientific conception assigned to the museum, in addition to the duty of conservation, also the task of scientific ordering of knowledge, through a coherent cataloguing and a thematic exhibition. Today this task seems more entrusted to the public/private Foundations, which generally are based on the legacy of a single artist or a collector, and which therefore respect a predetermined order, or it shall be assigned to temporary exhibitions. These ones generally coexist in dialogue with the permanent collection of museums, or with the historical nature of the building that hosts them, due to their exceptional nature, as well as their temporary nature justify thematic estrangement.

On the contrary, the nature of the building that have been shortly examined above, as it is based on the kind of process they contained, encourages the meeting and the melting of different Arts. Thus, they allow to re-focus the general sense of the word “Art”. Not only Fine Arts or Major Art, but a melting pot of different artistic expressions, including handicraft or folk and land art. No more an aesthetic fruition based on the notion of “artistic masterpiece”, but rather on the definition of a “process”.

The definition of “Arts” in this case extend its main meaning to the more contemporary definition of “artistic process”, generating an incredible number of possibilities to read new significances in it (Bertram 2008).

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Ageing in Place: A Design (er) Challenge



Cristina Caramelo Gomes 

Abstract Home is the shelter of every human being. The challenges presented by contemporaneous society, include new functions and new ways of performing traditional ones; all this is granted by technology and a different characterised by the predominance of elderly and other individuals that, by choice or forced by the circumstances, live alone. The senior citizens represent the most part of such people.

Standard dwelling does not have the typological social tissue flexibility necessary to fulfil the requirements of new functions and particularly and users' needs.

New ways of living require rethinking dwelling typology to flexibility. Intelligent environments will appear to elevate the sense of home, where security, autonomy, independence, comfort and interaction will be crucial to promote a more qualified life. The use of Inclusive Design principles as part of a natural solution and not as a trend, can lead to a more humanised built and human environment.

This study illustrates an approach to dwelling environs and Inclusive Design, driven to senior individuals; the approach comprehends literature review and the analyses of case studies with different characteristics (ability to adapt to new users requirements, interiors layout, communal facilities, materials applied, technological solutions, etc.); and at the end the design of a set of guidelines and recommendations supported by the information gathered throughout literature review and case studies.

Keywords Dwelling environs · Inclusive design · Ageing in place

1 Introduction

Design is no longer just a way to answer to functional, technical or aesthetical demands but to improve the user's experience.

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The increase of ageing people in urban neighbourhoods and particularly dwelling environments requires the adaptation of the built environment in order to encourage the autonomy, independence and the participation of this group in society. Although this group shows temporary or permanent physical, sensorial and cognitive constraints, reality reveals that the restrictions presented by the group are usually boosted by the exclusive solutions of the built environment which stimulate dependence, isolation, depression and the continued loss for living satisfaction.

Flexible solutions are the key. Flexibility can be achieved and improved throughout the ability of each ambience in order to respond to the user's requirements and expectations through the spatial distribution and functionality; materials applied, colour, texture, light, equipment, etc. The required flexibility has the strength to promote inclusive and attractive environments rather than exclusive or segregating ones characterised by restricted spatial solutions or hospital ambiances that, despite their functionality, are stereotyped, depressive and experienced as exclusive as the ones conceived for the non-existing common man.

Best practices must be studied and disseminated. A few samples of best practices, four cases of dwelling environments, are illustrating of this case: Casa da D. Rosa (Portugal) and De Plussenburgh (Netherlands). The reason for this selection is that all of them were awarded and conceived in accordance with inclusive design principles and were all visited, thus, experiencing the places and, above all speaking with their users. All of them aim to qualify the ageing in place through innovative solutions taking advantage from spatial solutions, materials applied, light, equipment, etc. In common, these cases show the required flexibility to answer to the user's needs and expectations. The ambiances are aesthetically appealing and inclusive, highlighting the importance of design as a concept as well as the design operative areas: interior, product and communication design, design thinking, inclusive design, user-centred design, etc.

2 Towards a Better Design for Ageing in Place

2.1 Dynamics of Population Ageing

European society is facing a demographic challenge with the rise of the share of ageing people. This increase is due to better living conditions, better food, medical advances and the access to health care. The improvement of technology and health (effectiveness and access) enable individuals to live more than the previous generations. Statistical data illustrate the increase of percentage of individuals aged over 65 years old, while the number of individuals aged below 15 years old either levelled off or showed considerable decrease (Eurostat [2020](#)).

The age structure pyramid illustrates the changes occurred between 2001–13 as well as the forecast in 2013 for 2080. The baby Boom generation (born between

1946–1965) reached the retirement age in 2011, and despite the number of individuals who belong to this target group and its impact in society, research about their expectations for their old age is very scarce. The published material raises the question and speculates but repeatedly lacks from evidence based. The baby-boom generation shows some difficulty in accepting that they are old; however, this baby boom generation seems to be more ethnologically heterogeneous, self-centred, socially polarized, exigent and argumentative and less permissive, believing and conforming (Roth 2012). This behaviour results from better levels of tutoring and the lifestyle adopted throughout their life cycle.

What defines the old person status? According to WHO (2015) in most developed countries, what defines an individual as an old person is his or her chronological age, the number of 65 years, once is at this age that individuals start to benefit from retirement pensions. At this moment, there is no United Nations' standard condition, but the United Nations agreed on the limit of 60+ years to define old population. Back in 1875, in Britain, the Friendly Societies Act declared the definition of old age as "any age after 50"; however, pension's benefits are dependent on a different numerical criterion: 60, 65, 67 depending on the geographic place and culture. Missing an accepted and acceptable definition, in several occasions the age at which a person become eligible for statutory and occupational retirement pensions has become the default definition (WHO 2015).

It is widely accepted that environment can improve or decrease the performance of daily routines of old people with a significant impact on their independence, quality of life and well-being.

Growing old is an uninterrupted, multifaceted and dynamic process from birth to decline. Along our life cycle each of us grows old and experiences the special effects of the ageing process. Ageing process is clear on the physical image of the individual, through hair colour, wrinkles on the face skin and other signs such as posture, walking, mobility, etc... it is possible to estimate the age of an individual. Yet, the number of years, commonly referred to as chronological age, it is not the only parameter that defines the ageing process, other dimensions of the human being must be considered like the biologic, psychological and social ones (Fisk and Rogers 2009).

Now and then, chronological age does not show a direct relationship with biological age. Reality illustrates that two individuals with the same chronological age can perform dissimilar physical, psychological and cognitive competences. The changes suffered by physical abilities are related with biological ageing whose process is known as senescence. Senescence process implicates the decline of the physical capacity and an increase of the individual's vulnerability. Most changes that characterise the process of senescence occur gradually, offering to human beings the chance to adapt themselves.

Therefore, any environment, product or communication system may become less friendly for this target group despite fully satisfying the requirements of others. The individual ability to adapt into the diversified changes occurred during the life cycle is

a central feature of the ageing process. This ability surpasses all areas of human functioning encouraging autonomy and independence although overwhelming physical difficulties to remain active in the community they are inserted.

Human ability to accept and live with difference justifies human heterogeneity. Despite the (dangerous) standardised stereotypes about elderly, old people are individuals that by life experience present more radical changes.

2.2 Inclusive Design or the Design for Our Future Selves

Human daily routines are about surpassing obstacles and accomplishing goals. Humans interact with the environment and this interaction includes body position, moving from one position or place to another, creating their own territory, reaching and/or lifting an object or understanding how to interact with a tool in spite of its analogical or digital character. The human skills to interact with the environment are grounded on human aptitude, such as height, strength and intelligence, as well as the resistance capacity and the help offered by the environment to achieve daily goals. Humans have cognitive skills and tools which allow and motivate more/better choice of interaction and a broader sort of adaptive responses (Steinfeld and Maisel 2012).

Design (considering the various fields of knowledge within and applying practices) is a dynamic and focused method that people adopt (consciously or unconsciously) to arrange their living environment in accordance with their requirements and expectations. Supported by design, human beings develop and re-arrange supportive environments, products, communication systems and experiences to promote their autonomy and support the accomplishment of their objectives.

Design, architecture, and planning usually emphasize the form and the structural quality of space, unlike the way space and objects are used and encourage interaction with and among users (Ciolfi 2004). However, design is beyond aesthetic or formal considerations; its significant purpose is to change the form and arrangement of surrounding environment and even change/challenge our interaction.

Inclusive Design aims to form and organize our surrounding environment, products and communication systems as supportive as conceivable: preclude the creation of obstacles (in spite of its physical, sensorial or cognitive character) and by rational use of resources and expertise offer as much facilitation as possible to accomplish human goals. The principle that underlies this new approach is that surrounding environments may and should be more inclusive than legislation may oblige (mainly throughout accessible solutions and principles) on the basis of non-discrimination. Inclusive design raises all the possibilities to support a better quality of life for human heterogeneity. Inclusive design principles support the creation of places, products and communication systems that decrease the need for special accommodation as well as being overpriced and difficult to find assistive devices. The attention to aesthetic parameters will stimulate a better integration between individuals decreasing the stigma of solutions oriented to and connoted with disability.

Inclusive design principles supporting the design of the surrounding environments of everyday routines can benefit individuals with limitations (physical, sensorial, psychological or emotional) and all the society. Inclusive Design helps individuals to be more autonomous and participative in the society, it may not replace assistive technology, but it may render this technology easier to use by offering the suitable support.

Several definitions of Inclusive design can be found in literature along the Internet websites, books, journals, etc. However, the main goal is always to conceive environments, products, communication systems and experiences that can be used by the human heterogeneity, in spite of individual limitations or preferences and without individual stigmatization resulting from that use. This new approach to design process aims to develop individual quality of life by enhancing human performance, health and wellness along with social participation. The reference to Inclusive Design definition, aims to give a holistic approach in the pursuit to demonstrate the relevance and wider application of the sequence defended by the waterfall model from Clarkson (n.d.): discover, translate, create and develop.

In the United Kingdom, the term “inclusive design” is popular:

“The design of mainstream products and/or services that is accessible to, and usable by, as many people as reasonably possible . . . without the need for special adaptation or specialized design” (British Standards Institute, 2005).

The practice of inclusive design principles challenges attitudes and perception on different stages. Creative clusters must comprehend that to be flourishing in the wider market, inclusive designed environments, products and communication systems ought to be simple to use, secure, healthier and welcoming to all individuals and they need to be worth of the cost when compared to the competition. Inclusive design solutions do not need to be more expensive; however, they can be whenever they offer an increased value for the extra expense. In this sense, inclusive solutions must comprehend the following characteristics:

“**Functional**—providing suitable features to satisfy the needs and desires of the intended users;

Usable—providing pleasure and satisfaction in use through easy operation;

Desirable—conferring social status, or providing a positive impact on quality of life, whilst being aesthetically striking or pleasant to touch;

Viable—assuring business success through delivery to market at the right time and at the right price” (Clarkson, n.d.).

By consequence, the practice of inclusive design requires continuous innovation in form, technology and marketing. Even though inclusive design implies a significant commitment from creative professionals and activities, its practice ranges from education, marketing, policy making and to many other non-design activities (Steinfeld and Maisel 2012).

Any inclusive innovation must be settled in a challenge apprehended as a perceived requirement or expectation. The transformation of this requirement or expectation in a solution that successfully fulfils the user’s need and desire demands an appropriate design process. The solutions conceived along the process have an effect on the level of design exclusion; plus, the in-depth insight of target users is fundamental. Many

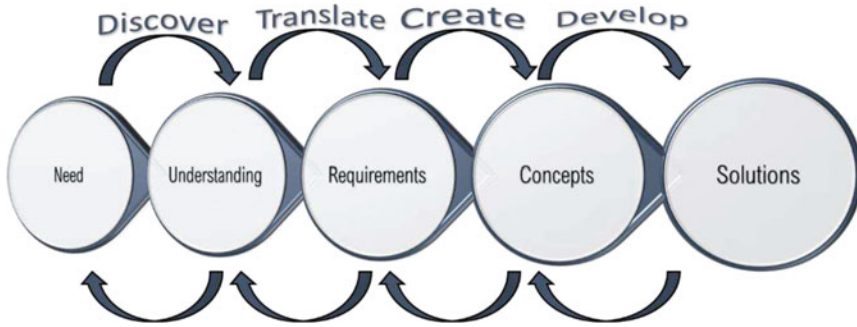


Fig. 1 Waterfall model of the inclusive design process (Adapted from Clarkson, n.d.)

authors still illustrate this process graphically, the interactive waterfall model is one of the most useful (Fig. 1):

Discover—the systematic exploration of the perceived need to ensure the right design challenge is addressed, with due consideration of all stakeholders; leading to the first output, an understanding of the real need;

Translate—the conversion of this understanding into a categorised, complete and well defined description of the design intent; leading to the second output, a requirements specification;

Create—the creation of preliminary concepts that are evaluated against the requirements; leading to the third output, concepts;

Develop—the detailed design of the final product or service, ready to be manufactured or implemented; leading to the final output, solutions” (Clarkson, n.d.).

The study of target users contributes significantly to the quality of the final solution and should attend all phases of the design process. The deep understanding of users’ requirements and expectations must be completed with their participation within design process. Users should be invited to explain their story, propose solutions based on personal experiences and evaluate trial solutions conceived. Like this it is possible to understand user needs, expectations and motivations while facing a particular activity/routine/function (Devi et al. 2012). Final solution must be centred on user experience encouraging not just the accomplishment of requirements but also users’ expectations. This close participation must occur since the beginning of the design process while encouraging changes by exploring, testing and tuning until these premises are fulfilled. Commonly, this practice of the user participation is part of a multidisciplinary design approach entitled User-centred design, which can/must be applied to all design practices that wish to offer a qualified user experience (Fig. 2).

The traditional European age pyramid has changed dramatically, showing that the number of individuals aged over 65 years old is more or less as that of young people (Eurostat 2020). Although a considerable number of individuals show some handicaps and impairments, the most significant are the restrictions resulting from the contemporaneous lifestyle. Loneliness and isolation are also a consequence,

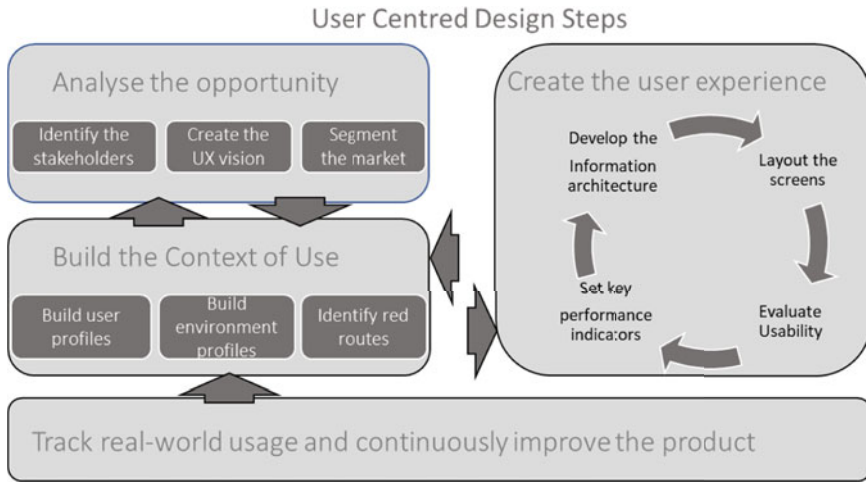


Fig. 2 User-centred design model (Travis 2009)

acknowledged since Antiquity, as argued by different philosophers and religions alike (Simões and Bispo 2003). The aging European population should be active and participative. In reality, most are supported by retirement schemes, unemployment or impairments aids, thus contributing to the deficit of social security.

Contemporaneous society faces a new paradigm, with an old but healthy and active population, who aims and needs more inclusive environments and experiences. City planning in general and habitat planning in particular show a lack of human concerns within their conceptual process. The built environment reveals a motivation for economic profit, doubtful management and poor political decisions. In contrast with (almost exclusive) built environment reality, inclusive design, as a user/human-centred way of conception, (products, environments, communication systems and experiences) envisages the right to equal opportunity for individuals with different (physical, sensorial or cognitive) characteristics.

The last decades have showed an increased awareness of the need for equality between individuals. Despite gender or racial reasons, religious or political options, several institutions reclaimed the opportunity to participate in public and private lives, in equal conditions. Remarkably, people with special requirements and senior citizens still live from governmental or familiar help, locked at home, as they cannot find environmental conditions or equipment in the community for their requirements; humanitarian reasons have failed to resolve the needs for this group and the way ahead seems to be the argument of economics.

Most people, as in Portugal, are homeowners, as a result of either deficient supply alternatives from the lease property market or the will to invest in a trustable asset. This fact is an obstacle to housing mobility thus preventing, quite often, relocation to better suited (in respect of needs satisfaction) dwellings. In consequence there is a need to endorse communities and habitats which promote independence, security,

health, and wellbeing to people that can live their lives as long as possible with their relatives, friends and memories around them.

Nowadays, residential typologies represent a conceptual model with remarkably high-quality aesthetical considerations; yet absolutely fail to fulfil the requirements of real life (Caramelo Gomes and Aouad 1999). Considerations should be made to impairments during life, but mainly new types of lifestyle such as telework, mono-parental families, elderly/childcare which need functionality, security and a comfortable and healthy environment. The way to balance both life cycles requires flexible environments conceived to a contemporaneous way of living.

Growing older motivates a need to be at home, by the individuals' mobile or sensorial limitations, or just by individuals' choice. Despite this fact, even in Metropolitan Areas, there are plenty of old individuals who live in precarious, non-decent, inhumane or even hazard conditions. These characteristics have a significant impact on the safety of the elderly, contributing significantly to the social costs (hospital and convalescence internment or institutional supports). Older people prefer to stay at home rather than relocating; still, as mobility or any health configuration declines, they will need some help to enable the permanence with the safety and comfort guaranty.

Flexibility is the main idea behind the concept of new dwellings or the renovation of the ancient ones; solutions must be encountered to promote the balance between the building and human life cycles (Caramelo Gomes 2007).

3 The Contribution of Design to Accommodate Ageing in Place—Best Practices

The role of design is more than solving aesthetical, functional and emotional needs. Design can play a significant role in encouraging sustainability and creating social inclusion. Inclusive design enables the empowerment of designers to have a more operative and creative role in the development process. The involvement of users along the entire process helps to outline issues and directions plus validates the idea in the end.

Despite Inclusive Design in the built environment is gaining acceptance it is still not a common practice. What is usually asked and delivered is the minimum to satisfy the existing standards and regulations. Rules and regulations practise illustrate the poorer inclusive design solutions, promoting stereotyped environments, products and communications systems impossible to use; however, reality demonstrates the accomplishment of regulations, the preconception of individuals, the lack of knowledge of professionals and the political agenda of municipal managers. Inclusive Design qualified solutions must be analysed, studied and disseminated.

Best practices of Inclusive Design are intended to create practice and procedure that satisfy the Inclusive Design principles and offer affordable design solutions that satisfy the needs of the widest possible range of end-users (Cornell University

ILR School 2007). Not all best practices apply in the same situation; thus all technical specifications must be wisely thorough and deliberated together with the local authorities, professionals and end-users. Inclusive Design solutions' best practices act as a guideline that should be analysed to understand how they answer to functions and end-users requirements and expectations encouraging extrapolation to different realities.

To illustrate the previous statement four case studies were selected. They show how the inclusive design principles were applied to interior layouts, equipment, finishing, and technology while answering to end-users demands. The reason beyond the choice is not to introduce the best solution or "The Solution" but a set of possibilities that can establish the difference and encourage inclusive and sustainable solutions.

3.1 Casa da D. Rosa—Bairro dos Ourives, Lisbon

This neighbourhood is dwelt by people with low economic and social conditions. It is a mono-functional neighbourhood which shelters a considerable high density of social housing provided by municipal authorities of Lisbon city. Municipal dwelling neighbourhoods are managed by *Gebalis*, a municipal organisation which aims to manage social occupancy, rental contracts and provide maintenance, particularly to structural and functional pathologies. Most these neighbourhoods presented an existence of several decades, non-existence of maintenance and common vandalism. Besides the pathologies hit on buildings by the passage of time, the aging status of inhabitants' demands also the need of accessible solutions.

To answer to contemporaneous questions, the solution adopted was to develop Inclusive dwelling environments, as part of LIFE project, a project focused on promoting behaviours, intervention and the best practices of excellence in the aim of accessibility in residential areas. This project also pursues to present innovative solutions, and all together fill in a gap in the construction market i.e. the lack of inclusive dwelling units.

This social housing complex was subject to maintenance yet this small dwelling unit in analysis was proposed for a different kind of intervention. More than solving physical pathologies, the ones related with the enhancement of accessibility for the end-user, an old lady with severe mobility and obesity impairments, were the most important. The layout of the unit was changed in order to enable more freedom of movement, the toilet was refurbished to encourage the autonomy of personal hygiene routines. The most significant alterations were made in the kitchen where the furniture with electrical features system gave the end-user the possibility to reach equipment easily. The standard doors' width and opening aimed wider dimensions and included an open parallel sliding wall (Table 1).

The available technology in the house includes the security system of the main door and the windows through the inter-communicators (video cameras) that allow communicating with the person outside, provided in every single area and the remote control of windows blinds.

Table 1 Casa da D. Rosa, dwelling unit characterisation

| Casa da D. Rosa - Bairro dos Ourives, Lisbon | |
|--|--|
| Architects/Developers/Client/Year | Miguel Ganhão/Gebalis/CML/2011 |
| Rehabilitation purpose | Rehabilitation focused on its users empowerment: one old lady with severe physical impairments |
| The team aspirations | To promote autonomy to users throughout an accessible and inclusive home environment |
| Awards | <i>Selo Acesso</i> —awarded by Fundação LIGA - Liga Portuguesa de Deficientes Motores (Portuguese League of Physically Disabled) |
| Flat tenure | Social housing |

Materials applied are of easy maintenance and with light colours to make the most of natural light.

The bathroom does not embrace technology but the simple inter-communicator; however, the spatial area and the finishing applied are crucial to the autonomy of this person who has mobility disabilities, overweight and lives alone (Fig. 3).

A very interesting technical solution is provided by an electrical system that allows the motion of the kitchen equipment, throughout metallic guides, conferring it the right height to answer to the functions and end-user requirements.

The kitchen cupboards can be moved to reach the right height to facilitate the management of the items inside de cupboard, or to do the dishes.

Even though the technology available is very simple compared to the most modern devices, in fact it is a technological progress toward the adaptation of the dwelling environment to the end-user's needs and expectations.

Nowadays most of these solutions can be considered superfluous or luxurious but based on the experience of the last century they will be regarded as normal requirements in a very brief period of time. Nevertheless, a serious study should be taken, including professionals and end-users, to identify their requirements and

**Fig. 3** Casa da D. Rosa, social housing complex and dwelling unit (author)



Fig. 4 Casa da D. Rosa, mechanical system of the kitchen cabinets: detail of work top in motion (author)

aspirations: answering to human needs can be the driven force to their acceptance and general use (Fig. 4).

3.2 De Plussenburgh - Rotterdam, The Netherlands

De Plussenburgh is the result of a competition by invitation that requested a design for a housing project for pensioners in Rotterdam suburb area. It is located in a neighbourhood conceived to shelter old and disabled individuals. This example is specially designed to answer to the expectations of a senior population. The population inhabiting this building are baby-boomers and the health assistance needed (when needed) is offered in a healthcare facility next door (Table 2 and Fig. 5).

This building is composed of two volumes that intersect each other on the third level. Depending on the orientation of the facade, the volumes that constitute the

Table 2 De Plussenburgh apartments' characterisation

| De Plussenburgh - Grote Hagen 558-772, Rotterdam, The Netherlands | |
|---|---|
| Architects | Arons en Gelauff architecten |
| Client/Year | Stichting Ouderenhuisvesting Rotterdam/2006 |
| The team aspirations | To provide appealing and inclusive home environments for seniors aged 55, with particular emphasis on form, texture and colour. This project results from a competition invitation in 2001 to design a retirement housing |
| Number of flats | 104 units |
| Flat tenure | Housing <i>Subcategory:</i> Multifamily; Senior |



Fig. 5 Night perspectives on De Plussenburg building (Musch, Hoekstra) and main entrance (author)

building present the balconies in concrete dynamic lines or the glass surface that brings natural light inside the circulation areas.

There is an identified pathway to arrive to De Plussenburg main entrance. This area has CCTV (closed-circuit television) surveillance. Besides the building there are healthcare facilities to provide the assistance needed by residents (from De Plussenburg and from the neighbourhood community). This area is mainly dwelt by senior citizens, so these facilities of assistance range from the first aid to assisted living environs. This fact, offers to the neighbourhood a special mood; most of the people walking around the streets are old and/or have some kind of special needs. The concentration of this kind of individuals has the benefit of designing the community to their needs (although the particularity of each individual, the number and similarity of age and disabilities suggest a pattern) but reveals the disadvantage of the homogeneity of the image and mood.

This building is a different architectural solution, in shape, materials applied and mainly on the way to take advantage from the natural light. This building aims to qualify the community environs, and it is already a regular visit for students.

Residents can park the cars outside or in the indoors car park, where, maintaining the Netherlands tradition, there is a considerable number of bicycles.

The lobby area is pleasant and well illuminated by natural light. The concierge manages the building. This is a kind of passive security and supervision; if no help is needed there is always a reason to chat. Informative panels on the walls inform about the activities in the neighbourhood community or just those taking place in the multi-functional area, outside the main building.

The elevators can be used to change floors. The panel button is of easy reach and use; the buttons are large and tactile enough for older fingers and the lettering is big enough to be seen for the different visual capacities of individuals. The elevator is wide enough to carry several individuals, bicycles and their assistive equipment.



Fig. 6 De Plussenburg detail of the coloured glasses on concierge facility area (author)

Inside the elevator there is a handrail and a chair to help those with balance difficulties (Fig. 6).

The corridors are generous allowing the free mobility of wheelchairs and pushchairs as well as the personalisation of each home entrance. The floor is covered by a red carpet that contrasts with the bamboo pattern textured white colour of the walls and ceiling. This whiteness, however, is only perceived on the lifts area. This area is lightened with artificial light; despite its direct incidence there is no glare induced because of the texture of the carpet and the texture of the wall, which is covered with a white and textured wallpaper.

The flat units are designed to support future layout changes (closing off/opening up rooms). However, because all the units were occupied, we could not visit inside. None of the residents wanted their homes to be scrutinized by strangers.

Light in the houses comes from the concrete balcony on the facade, and the corridor through the side window on the main door or the small window within the kitchen area that allow the natural light into this interior area. These windows are important to illuminate interior areas as well as to allow a discrete surveillance to individual needs. They are also subject of inhabitants' personalisation of their home space.

Every resident who has a special need can tailor the flat unit doorway. The wide corridors allow areas of relax, which explains the number of sofas, chairs, tables, magazines, etc.

“The façades of the dwellings gain a strong three-dimensional quality through the addition of wavy balconies. The glazed galleries—set with self-cleaning glass—are smooth but very colorful in over 200 different shades” (Architectural Record 2015) (Fig. 7).

The glass facades are associated with the circulation areas, in the pursuit to play with natural light bringing to the corridor area a pleasant, warm and always different



Fig. 7 De Plussenburg's interior coloured corridors detail (author)

ambience. This dynamic ambience is due to the coloured light from the tinted glasses of the windows, weather conditions, season, time of day and especially to the different coloured glasses that run along the path.

De Plussenburg is a building site designed to old citizens. The units' flats take the needs of this target into consideration, offering accessible bathrooms and the possibility to easily change typological layout by adding or subtracting rooms. The communal area is limited to a multifunctional room area where people meet to chat and play traditional games. Despite the limited activities offered, this space has the ability to create on residents a daily routine, important to motivate their mobility and interaction. The concierge acts as a passive form of security, by supervising the building 'access, residents' routines (any disruption will be noticed), and creating the link between the needs of the residents and healthcare facilities within community environs.

The ability of this neighbourhood community to receive and answer positively to a focused target group labels it as an accessible environment but does not give it the label of inclusive. In fact, although this community answers to these target needs and expectancies, walking around stimulates the feeling of experiencing a "ghetto for old people", where individuals are homogeneous in their age, fragilities and facial expression. An interesting detail of this building is the solution designed to bring light into the circulation areas. The warm, dynamic and coloured light added by the dimensions of these areas encourage the indoors areas of relax and/or social interaction designed by residents. However, it seems important to mention that this is just possible under a civilised behaviour off individuals, managing this "public space" and simultaneously preserving the privacy required by any neighbour door.

Nevertheless some other key points were found:

- The use of texture and light as a source of sensorial stimulus to individuals in general and to old people in particular.
- The lake that embraces part of the building can be an attractive pole to short sidewalk.
- The passive supervision of individuals permitted by the side window on the main door and the small window in the kitchen area.
- The video cameras to control access to the indoor areas. The video cameras and the concierge supervision create a sense of security among the inhabitants; despite the importance of this reality, the closeness of the site to environ community encourages a considerable level of anxiety just by any disruption in the habitual routine.
- The differences between ages of residents and the indoor social areas created an individual responsibility with the next-door neighbourhood or with those who by particular reasons are closer (this reality was confirmed in site during our visit).
- Individuals show their satisfaction with the flats units, due to their dimensions but mostly because of their flexibility to respond to their expectancies.

4 Conclusions and Guidelines Proposed

The emergence of human rights, and on the last years the elderly weight in the social tissue, lead us to think that we need and expect a more humanised built environment, and this can be achieved by the awareness of the multidisciplinary teams involved on its design; research developments and its relation with industry and certainly by public participation. To continue to add years to our life cycle we must assure the dignity of those days. Until now theoretical performances overshadow the good practices. Several reasons support this attitude, mainly the human egoism or the idea of the long distance to achieve that period, forgetting that all the good practices are not focused on elderly but in everyone that for a limited period or permanently experience some physical, sensorial or behavioural impairment.

This study aims to encourage the required change.

After a detailed review of the general and focused literature and the analyses of case studies research findings allow us to draft and sustain the following guidelines:

Proposed Guidelines

- Inclusive/smart dwelling must locate in multifunctional urban areas.
- Parking places for residents and visitors should answer the community needs.
- Sidewalks must be dimensioned to allow human mobility as well as displacement aids such as wheelchairs, pushchairs, etc.; sidewalks must be free of obstacles and the pavement must be comfortable and non-slip, textured with the limits tinted by a different colour and/or texture.
- There must be green, sheltering and relaxing areas in the community neighbourhood and/or along the sidewalks.

- Dissimilar residential typologies must be offered to contribute to the heterogeneity of the residents.
- The main entrance of the building and home entrance and corridors must allow mobility impairments aids and the access of equipment and furniture.
- Construction process must be reviewed. Interior partitions must be flexible to adapt to different layouts; plasterboard elements with sound isolation and mechanical resistance will facilitate further refurbishment (waste refurbishments' materials, time consumption and inherent costs).
- Improved open space to increase flexibility to any required adaptation. Open spaces can be fenced by movable elements such as furniture, folding screens, wardrobes, etc.
- Home environs should outperform the minimum of the regulation's standards. Anthropometrics, kinesthesia, ergonomics and proxemics issues must be considered to the future standard dimensions.
- Kitchens and bathrooms should be dimensioned to support individuals with mobility impairments. The use of a shower is always preferable to a bathtub.
 - Materials applied must be no-slip, be matte to avoid reflective glare.
 - Light must be indirect with some task's spotlights.
 - Cupboards must be accessible and if possible, allow electrical devices and remote control to facilitate their accessibility.
 - There should be a safety alarm.
- Living rooms must be dimensioned to support different functions. Frequently these environments answer to living rooms, dining room and professional working demands. Its layout connection with the kitchen can be useful to expand the social area.
 - Natural Light must be controlled by sun blinds to adapt to the human circadian cycle, diminishing reflective glare from walls and pavements surfaces and creating atmosphere ambience.
 - Artificial Light must be indirect to minimise reflective glare from wall and pavement surfaces with direct spotlight to help visual acuity towards different tasks in specific places.
- Bedrooms are usually the most intimate place within home. Due to the dwelling dimensions, frequently these areas become also as working areas.
 - Natural Light—must be controlled through sun blinds to escort human circadian cycle, diminishing reflective glare from walls and pavements surfaces and create atmosphere ambience.
 - Artificial Light—must be indirect to minimise reflective glare from wall and pavement surfaces with direct spotlight to help visual acuity towards different tasks.
- Balconies should have dimension and shape to allow outdoor activities (relax, gardening, etc.) They should provide the residents contact with exterior and contribute to indoors air renewal and natural light. To achieve these goals their

relation within building facade is very important. Windows must be accessible in height, weight and with easy open devices.

- Windows and doors' knobs must be accessible in height and easy to manage.
- Sockets and switches must be accessible in height (which improves also its security); dimmers are a good solution to provide different lightening ambiances. Sockets must provide switches to on/off. Technical tracks can be useful to manage actual and further connecting cables.
- Finishing must present a diversity of patterns, textures and colour to identify and personalise spacious-functional areas, to help individual orientation. Surfaces must be matte to minimise glare's reflectance.

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Chaos and Innovation in Design for Disaster Resilience



Lara Leite Barbosa 

Abstract Many cities around the world have repeatedly manifested chaos. In fact, our contemporary risk society produces the risk conditions that result in disasters. If such chaos were absorbed as an event that provides opportunities for renewal, or even innovation? From the perspective of chaos, self-similarity in fractals and other phenomena helps to explain problems in a scientific way. The article reflects on how chaos theory can contribute to the field of design, specifically for disaster resilience. Would it be possible to adopt strategic thinking in the creative process of design, managing the complexities according to the precepts of chaos theory? If the evolution goes from simple to complex, with a tendency from nature to increase the degree of disorder, could the man operates according to principles of the Law of Decreasing Chaos? It presents some relations made by artists between design and chaos, such as Buckminster Fuller, Leonardo da Vinci and Salvador Dali. As a result, it lists and articulates fundamentals for design innovations. The conclusion is that the resilience to disasters that flourishes after a chaotic situation can be highly creative and generate innovations in design.

Keywords Chaos theory · Creative process · Design · Disaster resilience · Fractals · Innovation

1 Chaos in the Risk Society

Cities that manifest chaos are current realities that have been repeated with increasing frequency. These are not prophecies or futuristic predictions of a civilization that is ending, but the imminence of disasters in our contemporary risk society. Ulrich Beck, a sociologist who coined the term “risk society”, explains that this perspective

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of certainty, security and control over the natural world is the result of a predominantly technocratic interventionist stance (Beck 1992). Consequently, man organizes himself to solve the problems created by himself, since it is our own society that produces the risk conditions that result in disasters. This condition called chaos refers to the emergency situation in which the system collapses.

The approach to risk as a result of factors other than technical and physical is expressed by the formula, with some variations: $\text{Risk} = \text{Hazard} \times \text{Vulnerability} \times \text{Exposure}$. It means that the risk is directly proportional to the Hazard (the physical phenomenon); increased by vulnerability (a human factor, the result of social and economic processes); enhanced or controlled by exposure (structural mechanisms that can regulate the previous ones). Known as risk equation, it is important because it presents the dimensions of disaster risk that are not limited to the physical phenomenon itself, but include vulnerabilities and the structures that indirectly potentiate the effects of disasters (UNDRR 2020).

Urban complexity needs to be considered, understood as a system composed of interrelated layers and structures. Rafael Cardoso evaluates large cities as highly organized, since to keep their flows in perfect working order, there is a continuous effort to maintain their balance. May it happen thanks to the consolidation of the networks of: “water, sewage, electricity, gas, telephony, food supply, garbage collection, traffic engineering, public transport, and so on”¹ (Cardoso 2012). What we think is chaotic, like the floods after torrential rains, are exceptional situations attended by emergency services. If they cease to be exceptions and become widespread, they would provide the real chaos that leads to collapse.

“After a disaster, the structures that support the functioning of a city are shaken, which requires urgent measures to prevent problems from escalating. According to the magnitude of the event, the supply of telecommunications and electricity, as well as the water supply can be interrupted; the means of transport and access by bridges, roads and airports are blocked and the availability of fuel rationed. The absence of essential public services explains the urgency in restoring order after chaos, when emergency responses are put into practice. If the system is able to return to the state it was in before the disaster again, after a shock occurs, it can be said to be resilient”² (Barbosa 2019).

¹“água, esgoto, eletricidade, gás, telefonia, abastecimento de alimentos, coleta de lixo, engenharia de trânsito, transportes coletivos, e assim por diante”. Translation by the author.

²Após um desastre, as estruturas que sustentam o funcionamento de uma cidade são abaladas, o que requer medidas urgentes para evitar o escalonamento dos problemas. De acordo com a magnitude do evento, o fornecimento de telecomunicações e eletricidade, assim como o abastecimento de água podem ser interrompidos; os meios de transportes e os acessos por pontes, estradas e aeroportos serem bloqueados e a disponibilidade de combustível racionada. A ausência dos serviços públicos essenciais explicita a urgência no reestabelecimento da ordem após o caos, quando as respostas de emergência são postas em prática. Se o sistema for capaz de retornar ao estado em que se encontrava antes do desastre novamente, depois que um abalo acontece, pode-se afirmar que é resiliente”. Translation by the author.

1.1 *The Chaos that Incites Resilience*

When a system goes from its usual functioning to a condition in which it is not possible to predict what will happen, once its limits have been exceeded, chaos occurs. At first glance, an unlucky phenomenon, but chaotic behavior can be approached positively. Chaos theory emphasizes that these cataclysmic moments are not random, but are the culmination of the “noise” accumulated within the system itself. And these crises that are generated independent of external factors can be the trigger for the change towards a wider regeneration of oneself. Such external factors are considered the Hazard—the danger or the phenomenon that in some cases are consequences by climate change. The origins of these threats can be natural (geological, such as earthquakes and volcanic emanations; hydrological, such as floods; meteorological, as storms and cyclones; climatological, as drought; biological, as epidemics) or technological (related to accidents involving the transport of dangerous products) or even passengers; collapses of structures, armed conflicts, radioactive contamination or in environments that are sources of water, etc.) (Ministério da Integração Nacional Classificação e Codificação Brasileira de Desastres (Cobrade) 2018).

Edgar Morin argues that it’s necessary to make a deal with disorder, because the risk is part of the universe, even as uncertainty. To maintain order it is important to face disintegrating process. He suggests a quest for balance through permanent regeneration, as a fight against degeneration.

“Disorder refers to everything that is irregularity, deviation as regards a given structure, random, unpredictability. In a universe of pure order, there would be no innovation, no creation, no evolution. There would be no life or human existence. But neither would any existence be possible in pure disorder, because there would be no element of stability on which to found an organization” (Morin 2008).

An intention similar to that of chaos theory is placed by Nassim Nicholas Taleb in the concept of antifragile, which is distinct from resilience for benefiting from chaos, that is, disaster would be considered as something positive that triggers improvements. In his interpretation, he belittles the robust or the resilient, as if it implied remaining the same after the impact, naming the notion of resilience present in political discourse “cowardly”. As the resilient is neither harmed nor aided by volatility and disorder, he argues that only the antifragile has mechanisms of growth and post-traumatic evolution (Taleb 2017).

2 From Simple to Complex

As a great mystery to be solved, the shape of the Earth can be approached as a result of a cosmic phenomenon with astronomical causes that combine internal and external factors and not as an accidental product. An interesting hypothesis coined by William Lowthian Green suggests that the Earth, when it was cooling, tended to take the form of a tetrahedron, with four vertices protruding outwards, giving

rise to the continents (corresponding to the masses of Scandinavia, Siberia, Canada and Antarctica), and four faces protruding inward, giving rise to the oceans (South Atlantic, Indian, Pacific and Arctic) (Green 1875).

This theory addresses the cooling of the Earth as an evolution that goes from simple to complex and that heat dissipation is an action that continues to act. Endowed with continuous movements, the shapes of the oceans and continents indicate life in constant transformation. Such an interpretation, which applies an inverted reasoning that starts from the complexity of the current shapes of the oceans and continents to deduce that they derived from simple shapes such as a tetrahedron, can refer us to fractal figures.

2.1 *Self-similarity in Fractals*

A Fractal is defined as a geometric object that is repeated with the same characteristics at different scales. From 1975, Benoit Mandelbrot started research on fractal objects and these studies reverberate in other areas of knowledge where chaotic phenomena are present.

“A Fractal is a self-similar object ... In the 17th century, German thinker Gottfried Wilhelm Leibniz (1646–1716) proposed that a drop of water contained an entire universe, which in turn contained smaller water droplets; each these small drops contained a universe that within the even smaller drops of water and each one of them...”³ (Braun 2003).

Fractal structures can help explain problems in a scientific way, whether by analogies of their behavior in phenomena present in medicine, biology, economics, engineering, linguistics, music or any other similar complex systems. Fractals can connect different elements in the world of health, such as in non-linear biological systems where the fractal structure of the conductive fibers of the heart or of the bronchial networks, which allows adaptation by the variety of rhythms (Braun 2003). The chaotic behavior of some systems can be explained by fractal characteristics and structures. From the perspective of chaos, phenomena that are apparently different, such as turbulence, the weather, the stock index, are actually very similar.

Some artists have explored the theme of chaos in their works, in particular those that will be presented here: the studies and worldview of Buckminster Fuller, which can be represented by the geodesic dome; Leonardo’s studies of the flood in the Codice Atlantico f. 393; the video Chaos and Creation and the lithography *Aquae diluvii super terram* from Salvador Dalí.

³“Un Fractal es un objeto autosimilar...en el siglo XVII, el pensador alemán Gottfried Wilhelm Leibniz (1646–1716) propuso que una gota de agua contenía todo um universo, que a sua vez contenía gotas de agua más pequeñas; cada uma de estas pequeñas gotas encerraba a sua vez um universo que em su interior otras gotas de agua, todavía más pequenas y cada uma de ellas...” Translation by the author.

3 Buckminster Fuller: Man's Intervention is Anti-entropic

Richard Buckminster Fuller claimed that man's role in the universe is metaphysical and anti-entropic. While nature is entropic, with a tendency to increase the degree of disorder, according to the "Law of the Expanding Universe", man goes against the grain. He explains this phenomenon by indicating that the patterns of the human mind, derived from experience, continually simplify and shrink, operating according to principles called, among others, "Law of Decreasing Chaos" or "Law of the Universe in Contraction" (Fuller 1975). Thus, the systems move towards a chaotic state, due to their entropy. To prevent a collapse, anti-entropic intervention, as a form of management, is needed to organize the system before it reaches a critical point.

Buckminster Fuller had the qualities of a scientist, philosopher, ecologist, in addition to knowledge in engineering, architecture and design. He himself argued that comprehensive knowledge could generate more discoveries and more complete inventions. Thus, he identified skills like those of Leonardo da Vinci as typical for creators.

"Characteristics of genius consist for instance of an actively self-attended intuition opening the conceptual doors for innate, frequently and combiningly employed, scientific, artistic, philosophical, idealistic, sensorially conceptive, physically talented, logical, farsighted, imaginative, and practical articulations" (Fuller 1973).

This "type" Leonardo man, as referred to in his book, in the age of industry for mass production would then be responsible for the design intended for manufacturers or contractors and not necessarily for the final consumer of products. From this redirection of those who designed Singer sewing machines and Gillette razors came. Of course, Henry Ford, whom he calls the 20th century Leonardo.

3.1 Comprehensive Knowledge can Generate More Discoveries and Inventions that are More Complete

The popularization of vehicles, made possible by the large-scale production of standardized products through assembly lines, is one of those transformations to which he refers. The most important criticism of Fordism, as such mass production is called, is the alienation of work. Once the process is divided into stages for assembling product parts, this implies work specialization. In addition, the specialization that occurs with the production line, despite guaranteeing the maximum performance of each component, would be going against the adaptation principle. Anthropologists, in search of a common cause for the extinction of both biological and human tribes, have found superspecialization as an explanation. Adaptability to general conditions and climatic, contextual, behavioral and other changes to which we are subject is lost.

To preserve “super-specialized” species, it is necessary to protect them in environments that preserve the values that created them. However, the universe is changeable and continues to expand, so they are bound to be extinct (Fuller et al. 1971). Initially using local resources close to his home, the man learns to build a ship with wood from his best tree, strings from his best fiber. Nevertheless, you know that there are taller trees in other places where you’ve been and you could make a better mast with them. (Fuller et al. 1971).

Despite this path, often followed in the field of design, the type of “innovation” that matters is more holistic, as it incorporates dimensions in addition to technological ones.

“So a regenerative process begins in terms of the widely dispersed resources of the world... Then you came to another country, such as the Philippines where you found much stronger fibre, and you took those fibres to make your ropes. In still another place, you found better fabrics for your sails. And so, as you sailed round the world, your ship got stronger and better. This was the beginning, really, of what we call the production line” (Fuller et al. 1971).

The geodesic dome was the United States Pavilion at the Expo 67 world fair in Montreal. It was a translucent acrylic shell measuring 250 ft in diameter from the central idea of doing more with less. This project applies mathematics and geometry to propose a shape when the sphere’s diameter is doubled it will quadruple its square footage and produce eight times the volume. It is a structure that uses the principle of tension instead of the usual compression, made with many small repeated pieces and that can be easily transported. However, he failed to choose the highly flammable material to cover everything. In an accident on the afternoon of May 20, 1976, in Montreal, Canada, a fire destroyed the original transparent acrylic bubbles in the dome (see Fig. 1), but the steel structure resisted.

Fig. 1 Buckminster Fuller: Geodesic Dome on fire, 1976. Project for the United States Pavilion, built for the Universal Exhibition of 1967



4 Leonardo da Vinci: A Concept of Uncontrolled Universal Turbulence

Leonardo da Vinci's reference addresses the holistic aspect of innovation. Recognized as a genius who contributed to several areas of human, biological and exact knowledge, he was also a precursor to other advances in science and technology that began with his studies.

A part of his work in particular registered in the *Codice Atlantico* f. 393 demonstrates a fantastic aspect that could be called prophecy, something between myth and history. It portrays what would be the flood as a “stupendous and harmful wonder”, through visions of an apocalyptic scene in minute details: allegories, aquatic vortices, storm clouds, military tents, objects and buildings being destroyed in vast land, sea and air landscapes (see Fig. 1). Elaborated in the last years of his life, the first drawings dating from 1502 and the last in 1518, they are also called the spiritual and artistic testament of Leonardo's work (Versiero 2005). Many considered that Leonardo was obsessed by water, fluid dynamics, having planned many waterways and made studies on channeling rivers, etc. These investigations, which could begin in the smallest particles, through their designs of water turbulence, vortexes and whirlpools, could lead to the perception of chaos in large and complex systems.

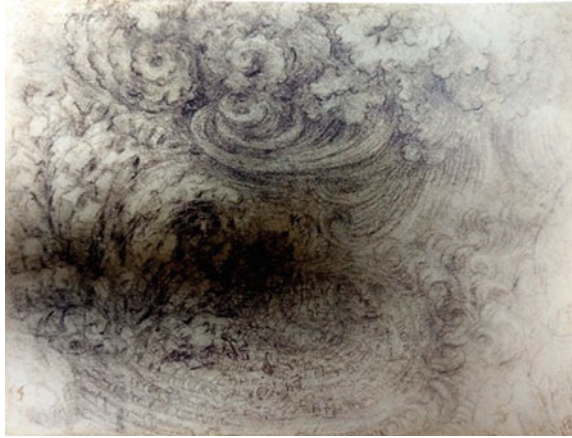
Irving Lavin believes that such studies of Leonardo's water treaty contain the concept that reveals the cosmos. That they are neither representing the biblical flood of the past, nor predicting a future end of the world that, according to Christian tradition, would come by fire.

“On a metaphorical level, however, the Deluge and the End of the World were closely related concepts; the End of the World was often defined as a second Deluge...Leonardo may have arrived not simply at an idea of turbulence and catastrophe as narrowly defined but at a concept of uncontrolled universal turbulence, akin to the ancient ideas of an original, primeval chaos—like that recorded in the second verse of Genesis: “And the earth was without form, and void; and the darkness was upon the face of the deep”—from which the world was formed and to which it will one day inevitably return” (Lavin 2018) (Fig. 2).

5 Salvador Dali: Chaos as an Artistic Process

A lesser-known side of the surrealist artist was his experiences as a filmmaker. In the video *Chaos and Creation* (1960), Dalí performs his own public persona as a television interviewer as his foil. He documents his artistic creation influenced by both technological development and Freud's theories, such as the “return of the repressed” and Heisenberg, the latter responsible for laying the foundations for the matrix formulation of quantum mechanics in 1925. His method it is expressed by the performance that is planned from a conceptualization (starts with a lecture) to end

Fig. 2 Leonardo da Vinci: Diluvio, 1515. The Royal Collection/HM Queen Elizabeth II, n. 12378 recto. (Lavin 2018)



with the creation of a work of art. Provocative in nature, Dali's so-called eccentricities can also be understood as a way of contesting order, invoking strangeness and translating unfathomable themes through symbolisms.

Pennisi and Caldarella relate the intricacies of the mind and the unconscious to the inner strength of chaos, addiction and caprice as manifestations of the “shadow territory” or *Doppelgänger*, a German term similar to a double traveler, a double, the evil twin for a concept of romantic literature that concerns our hidden side. For Freud, it is equivalent to the term *Unheimlich*, as a disturbing strangeness, or the familiar stranger, a phenomenon associated with the unconscious repressed in confrontation with the conscious, in which the ego resists. This is the same inspiration that motivated Dali and the Surrealists. Cites the motto of Freemasonry, challenging that putting this mess in order is not an easy task: “*ordo ab chao*, says the emeritus, without however indicating the way out, creating traffic jams at strategic junctions”⁴ (Pennisi and Caldarella 2019).

Surrealism as a literary and artistic movement explores chaotic principles: it displays the disconcerting juxtaposition of incompatible objects. Among his famous speeches, one mentions “Surrealism is destructive, but it destroys only what it considers to be shackles limiting our vision”. Salvador Dalí also portrays the Great Flood under the title: *Aquae diluvii super terram* (Floodwater covers the land), as part of *Biblia Sacra* in 1964 (see Fig. 1). The great black spot indicates that everything on earth will perish destroyed by the flood. Noah and the ark represent what survives. Were floods an act of divine punishment for corrupted civilization? Many cities face the dilemma of being repeatedly affected by excessive rainfall, without sufficient mechanisms for dilution, drainage or even becoming impervious to damage after heavy rains (Fig. 3).

⁴“*Ordo ab chao, dice l’emerito, senza però indicate the via d’uscita creating ingorghi negli svincoli strategici*”. Translation by the author.

Fig. 3 Salvador Dali: *Aquae diluvii super terram* (Genesis 6:17), 1964—1967. (Photo by the author at the Royal Dali Exhibition in Villa Reale di Monza, December 2019)



6 The Innovation Inherent in What Cannot Be Controlled

In urban terms, what appears to be ‘on the edge of chaos’, as defined by Colin Fournier, would be a healthy balance between order and disorder:

“The city has to have enough intrinsic order and regularity to maintain some degree of coherence, but enough disorder to be able to cope with the unknown and potentially with the advent of catastrophic events. Variety is not a question of aesthetics, it is a question of survival” (Fournier 2015).

What he calls true customization are the examples of street vendors’ stalls, street markets and illegal informal settlements.

At first glance, chaos would not be a good foundation for art, since its irregularity is contrary to the order and symmetry of the beautiful. Nevertheless, when we analyze cities and streets as spaces where incompatible uses take hold, accidents and ambiguous ways of living manifest, we recognize the creativity of chaos. From the architect’s desire to geometrize to standardize and prefabricate, Zygmunt Bauman returns to Le Corbusier’s definition of architecture as “a born enemy of all the art of platonic sublimity, mathematical orderliness and confusion, spontaneity, chaos and messiness” (Bauman 1998).

The question is how to incorporate this chaotic nature in the creative process to conceive results closer to the way in which people relate to spaces. He refers to studies of Richard Sennett of the ‘uses of disorder’ in which he shows a frightening picture of the destructions visited upon ‘the lives of real people for the sake of realizing some abstract plan of development or renewal’⁵ (Bauman 1998).

Andrea Branzi says that in view of the worldwide population increase with all the urban complexity, its crises and migratory flows is unthinkable that the order could impose itself. The future goes towards disorder, but it is not a lack of order. Chaos is the law of the universe, with its series of energetic and magnetic pushes... Chaos means that we live in the era of relativity... geometry was not born by chance, the

⁵Sennet, 1996 *apud* Bauman, 1998, p. 121.

laws of perspective were born at the moment when to represent reality one had to place oneself outside the picture, as in the theater”⁶ (Lanza 2017).

Andrea Branzi’s reflections on the project in the era of relativity, as he calls it, imply the crisis of the project itself. Together with Michele De Lucchi and Francesca Whale Arista, they proposed an exhibition in 2016 where students from the Design Lab of the first year of Master of Science at the Politecnico di Milano interpreted the theme “Chaos” in partially organized habitats, according to domestic functions. Chaos from this perspective is not a lack of order, but a liberating presence, which subverts the rules. People are freed from the need to keep everything tidy, which guarantees a more authentic result to the space.

Self-organization would be a characteristic that could reveal the illegitimate, what was repressed and that would thus find a place to express itself. “The paradox of ‘mass customization’ is that it clearly implies a top-down process of decision-making... It can be argued that true customization can only emerge as the unpredictable outcome of bottom-up initiatives taken by individuals in the city” (Fournier 2015).

6.1 Biological Inspiration for Innovation and Parametricism

There is a direct link between chaos, complexity and randomness that has been studied by physics and mathematical sciences (Roberts 2017).

The use of the algorithm in the drawing can allow exploring new non-linear shapes. Parameterization is noticeable at all scales, from object design, interiors, and architecture to great urban design. The parametric model can generate complex configurations in which, in addition to the object parameters, environmental parameters and observer parameters must be integrated into the parametric system. As a result, parametricism prefers open systems that always remain incomplete. It allows multiple associations of system-component relationships, system-system relationships and system-subsystem relationships (Schumacher 2009).

Computational design tools can assist the development of biomimetic projects, which seek to learn from nature, researching the underlying algorithmic logic in natural structures and implementing geometric principles in design (Symeonidou 2019). Frei Otto was a pioneer who in the 1970s creatively investigated the structural performance of branching structures based on natural systems and created innovative light structures.

⁶“Il caos è la legge dell’universo, con la sua serie di spinte energetiche e magnetiche... Caos significa che viviamo nell’epoca della relatività... la geometria non è nata a caso, le leggi della prospettiva sono nate nel momento in cui per rappresentare la realtà bisognava porsi fuori dal quadro, come a teatro”. Translation by the author.

7 Chaos and the Contribution to Design

Chaos theory during the 1970's influenced the natural sciences, but in the 1980's, the social sciences also adopted these principles. Considering the fundamentals based on chaos theory, creative processes can be inspired in situations after disasters, such as floods.

In the context of public relations, chaos theory has been shown to be very beneficial for crisis management. Priscilla Murphy makes an analogy with how to deal with problems and concludes that there may be a contribution in social contexts. When there is a radical change of opinion, only reaching enough people, the initial disturbance will have large-scale effects. If, at the time of intervention, agents may seem powerless when dealing with groups with conflicts of interest, the effects of education or negotiation can amplify over time. It suggests sensitivity to context, patience and time to maturity (Murphy 1996).

“In a chaotic system the power resides in the collective; individual units, especially those external to the system, have little influence. As long as events adhere to a strange attractor, change will be very difficult to implement. However, when sufficient deviance has amplified through the system, change will be very difficult to arrest” (Murphy 1996).

Lastly, in the light of the reflections placed here in this article, we can count some points that can assist creative processes and innovation in design. Creators can consider the following fundamentals based on chaos theory for design innovations:

- Embrace interdisciplinary knowledge generation methods;
- Develop advanced parametric design systems;
- Be inspired by fractal structures and shapes that go from simple to complex;
- Allow self-organization, where the illegal, illegitimate and informal are revealed;
- Provide subsidies to generate individual units, where power resides in the collective.

The list does not end with these few items, but can expand from this point on to increasingly complex interrelationships. As the intention is to investigate Chaos to propose innovation in design and the interpretations are relative, it allows for more developments beyond those mentioned here. The article shows that the work of artists like Buckminster Fuller, Leonardo da Vinci and Salvador Dali can provide many clues for new explorations on the subject.

The conclusion is that the resilience to disasters that flourishes after chaotic situations can be highly creative and generate innovations in design.

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Communication Design Within Social Innovation



Ana Melo and Marco Neves

Abstract The present article deals with the contribution of communication design in social innovation processes. Based upon a literature review on design for social innovation, it focuses on two distinct areas: social innovation and communication design, identifying some strategic points in the process of social innovation where design may make its contribution. Design for social innovation is an area currently in expansion, applying design project methodology and its particular methods to initiatives which try to find innovative solutions to all kinds of community problems. As the world and the problems that need to be addressed are becoming more complex, social innovation seems to be a viable alternative in exploring new solutions that embed collaborative and participatory ways to foster change. The paper also aims to list the specific needs of these processes that can be met by communication design, especially when considered as a comprehensive and evolving area, regarding the scope and the artifacts it originates. When applied to social innovation initiatives, communication design can take advantage of its unique capabilities to strengthen and expand them.

Keywords Communication design · Design for social innovation · Social innovation

1 Introduction

The contemporary world presents itself as a scenario of complex problems. They are networked, open, dynamic and seemingly intractable or difficult to solve, in the perspective of several authors who are dedicated to the study of design for social innovation (Thackara 2005; Murray et al. 2010; Dorst 2012; Ceschin 2014; Manzini

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2015). Underlying this idea is also the realisation that the resolution of this type of problems cannot be accomplished by using the same tools that have been employed in previous challenges (Scharmer and Kaufer 2013; Emilson 2015; Manzini 2015).

Social innovation is considered as one of possible paths (European Union 2010; Murray et al. 2010; European Commission 2015) to find differentiating and effective solutions to pressing problems such as environmental sustainability, social cohesion, quality of life in urban spaces, migration and integration of displaced populations, or population decline of inland territories. Social innovation consists of the recombination of social and technological resources already existing in a given situation. Creating new configurations which serve the resolution of community problems (Manzini 2008; Murray et al. 2010), it follows the purpose of common well-being and sustainability (Manzini 2015).

Design for social innovation emerges in multiple local initiatives spreading their influence all around the world (Thackara 2005; Manzini 2015). It can be described as the application of unique and particular ways of knowing, thinking and doing of design (Cross 1982) in social innovation initiatives. Its role is to promote, facilitate, and strengthen processes generated or participated by communities by applying design methodologies and tools (Manzini 2015).

In a specific way, communication design seems to add value to these processes, since it addresses the needs of visual materialization, knowledge circulation, communication between stakeholders, and visibility and dissemination (Frascara 2004; Manzini 2008; Mulgan 2014; Manzini 2015; Lemos 2017).

Communication design takes part in social innovation initiatives integrated into co-creative processes and in multidisciplinary teams, while in permanent dialogue with adjacent areas such as strategic design, service design or interaction design (Jégou and Manzini 2008; Manzini 2015). It is mainly focused on allowing the visualization of realities which would otherwise remain undetectable, in exploring scenarios of future possibilities and in materializing prototypes that allow experiments to be tested, iterated and evolved into solutions which can be implemented in communities.

2 Communication Design as a Comprehensive Area

Communication design is defined by Frascara (2004) as a project activity that produces visual communication, encompassing processes of selection, organization and creation of textual content and graphic elements.

Starting with this description, it is relevant to distinguish between communication design and graphic design, since both terms are often used in the literature with interchangeable meanings, revealing a diffuse delimitation (Neves 2012; Lemos 2017). Graphic design begins to emerge as an activity with the technological breakthrough caused by mechanical reproduction of printed objects from the 19th to the 20th century. It was then that printed posters began to show the transition from graphic artists to graphic designers (Hollis 1997). Buchanan (2001) refers to the historically

increasingly complex nature of the design process, with graphic design featuring in the design foundational discourses as an area concerning the communication of information through visual symbols.

But, if communication design generally includes graphic design, not all graphic design can be considered communication design, by nature more complex and extensive. Graphic and aesthetic arrangement of visual elements can leave out fundamental characteristics for the effectiveness of communication, such as the adequacy of content regarding the objectives, media, and audiences (Frascara 2004), or the possibilities of interaction with users (Neves 2012).

In this perspective, communication design can be considered as a more holistic approach (with a greater degree of depth and complexity) to the production of communication artifacts, due to the way it designs the interdependence between content, form, media, production techniques and use, obtaining results that can even go beyond visual communication.

As a discipline and a practice, communication design is exposed to challenges that have been transforming the scope of the design field. With the unfolding of the multiple dimensions in which artifacts created by design interact with humans and the contexts in which they are embedded, comes the need for new ways to practice and research (Buchanan 2001; Jégou and Manzini 2008; Norman 2010):

Clearly, issues of strategic planning, collaborative design, participatory design, and, above all, human-centered design rise to a new level of intensity, requiring new kinds of knowledge to effect successful solutions (Buchanan 2001, p. 14).

Under this viewpoint, communication design can be understood as “an expanded field of practice” (Lemos 2017, p. 33), in the sense that it no longer can be described in the same way as it was in the past. Also, it requires new terminology, new frameworks and ways of dealing with the adjacent areas that are present in almost any design project of the contemporary world.

Being such an interdependent area of technological evolution, not only in terms of reproduction techniques (Hollis 1997; Livingston and Livingston 1998) but also in terms of media and of social dynamics within which communication is one of the predominant variables, it is inevitable that the evolution would be mandatory, fast and exponential.

Communication design is also becoming increasingly a part of a dynamic polarity that has problem-solving on one side and creation of meaning on the other. These two dimensions are parallel but converse and blend in non-linear ways. Thus, in addition to acting in material, functional, technical and technological realms, design also moves in a social dimension by questioning, manipulating and generating discourse and meaning (Manzini 2015).

Considering the contemporary understanding of the expanded scope of communication design, we can frame its intersections with the territory of design for social innovation.

3 Design for Social Innovation

Design for social innovation acts as trigger, facilitator and amplifier of social innovation, applying its own methodologies and tools to the processes, enhancing co-creation, multi-disciplinary collaboration among participants, and producing artifacts for the dissemination and replication of initiatives.

3.1 Social Innovation

Social innovation is the appropriation and recombination of available resources (social, technological, human, territorial, among others), aiming at the resolution of problems that affect the life quality and well-being of communities and individuals. Simultaneously, social innovation also strives for economic, social and environmental change towards sustainability.

We define social innovations as new ideas (products, services and models) that simultaneously meet social needs and create new social relationships or collaborations. In other words, they are innovations that are both good for society and enhance society's capacity to act (Murray et al. 2010, p. 3).

The definition above refers two dimensions in which social innovation operates. In the first place, they are new ideas that emerge from society, in society and for society, taking advantage of existing resources but manipulating them in innovative ways. Secondly, social innovation reorganizes, creates or recreates social relationships, allowing initiatives to develop the necessary resilience to be sustainable and thus perpetuate, disseminate and replicate. Creating or strengthening relationships between local producers and consumers or between the elderly and young people of a community, for example, social innovation contributes to weave a tighter and more interconnected social fabric. This allows to better sustain multiple individual points that are connected to the system. At the same time, it amplifies the ability for new combinations and relationships to be created.

Although it generally operates at a micro level, through participatory and co-design processes initiated by local communities, research in the area suggests that there is a tendency for dissemination and replication of experiences that prove social and economic viability (Thackara 2005; Manzini 2015; Nicholls et al. 2015), thus reaching more macro levels of influence. The process of social innovation is described along these lines by Murray et al. (2010): beginning with prompts, proposals and prototypes, initiatives then evolve into a journey of sustaining, scaling and, hopefully, generating systemic change.

There are new conditions for the resolution of problems (Manzini 2015), and a transition is underway towards new socio-technological scenarios (Ceschin 2014; Emilson 2015; Sauer et al. 2016). In fact, with the increasingly technological development, it is now possible for local communities, institutions or individuals to be in an ever growing and permanent connectivity (Manzini 2015; Franqueira and Gomes

2017), on a local and global scale. This shift contributes immensely to the rise of new possibilities of social and economic sustainability, which would not be possible before since communities, institutions and individuals were much more isolated, and closed in themselves.

There are new ways of thinking about the economic and productive system, and new models of organizing the connections between production and consumption are emerging (Yunus 2011). These kinds of experiments showcase some key-concepts identified in the literature and in successful social innovation cases (Murray et al. 2010; Caulier-Grice et al. 2012; Manzini 2015), such as openness, participation, connectivity, collaboration, interaction between local and global, and distributed systems that have greater capacity for redundancy and resilience.

Social innovation takes advantage of distributed, networked, and horizontally organized systems, replacing centralized, hierarchical, normative systems that are “blind” to the particularities of peripheral elements (Manzini 2015).

It is this type of system that has the potential to achieve profound structural changes, especially when combined with the openness of social innovation. Participants from multiple personal and professional backgrounds collaborate within bottom-up initiatives, originated among members of the community, or in top-down or hybrid initiatives—with the participation of institutions, organizations or companies. Technology enables the collaboration between all participants, facilitating horizontal communication, and the dissolution of a common physical infrastructure.

Before the digital age the notion of local implied a circumscription to a specific territory, but nowadays the concept of place can be framed by the idea of *cosmopolitan localism* (Manzini 2015). Local is mainly what is rooted in a place. So, it is the place from which one interacts with the world, from a particular point of view. Local calls for action derived from a certain perspective and from certain resources that are also specific and unique. The value of being positioned in a place combined with access to global resources enabled by technology opens a range of possibilities that were not previously experienced in human history. Manzini (2008) considers *cosmopolitan localism* as one of the pillars for design for social innovation. For this author:

A scenario emerges at the point of intersection of two complementary strategies: a balanced interaction between the local and the global dimension, on the one hand, and a sustainable enhancement of local resources, on the other hand (intended both as physical and as social-cultural resources) (Manzini 2008, p. 448).

Caulier-Grice et al. (2012), identify several typologies of social innovation outcomes: new products, new services, new processes, new markets, new platforms, new organizational forms and new business models. All types of social innovation can be situated in an axis between radical and incremental (Nicholls et al. 2015) as they generate a total reorganization and disruption of a socio-technological system or contribute with just an addition to what previously existed.

All these features of social innovation are the breeding ground where design has the ability and the opportunity to get involved in such processes. In fact, it is possible to identify some points for strategic interference, as discussed below.

3.2 *The Process of Design for Social Innovation*

Design for social innovation (Hillgren et al. 2011; Meroni et al. 2013; Mulgan 2014; Emilson 2015; Manzini 2015; Amatullo et al. 2016) consists in the use of designers' tools, methodologies and skills in social innovation processes: "Design for social innovation is whatever design can do to start, boost, support, strengthen, and replicate social innovation" (Manzini 2014, p. 65).

Designers take part in social innovation initiatives as promoters, facilitators or mediators. They often are in the genesis of creative processes, and sometimes they act as specific partners, implementing tools and prototypes. Their participation in teams made up of members of local communities and other experts reflects the co-creative and participatory environment typical of social innovation initiatives. In this context, social innovation processes take advantage of the designers' ability to address complex problems and to generate knowledge. Also, they benefit from the application of design methodology and its tools (Cross 2007; Brown 2009).

The dynamic process of social innovation is based on cycles of generation, testing and implementation of ideas (Mulgan 2014). These have similarities with several steps of design methodology, as described by Swann (2002): starting with a problem, analysis and synthesis lead to execution, production, and evaluation. The design process continues to constantly evolve in loops until it is complete. Project planning and management, methods for generating innovative ideas and concepts and also for selecting, prototyping, implementing and disseminating them are components of the design project that can benefit social innovation processes (Meroni et al. 2013; Mulgan 2014).

In addition to dedicating itself to the production of tangible or intangible artifacts, such as services or experiences, in social innovation processes design focuses on the support, facilitation and mediation of stakeholders, processes and systems (Lemos 2017). In fact, when in the context of social innovation, the role of design is intrinsically linked to facilitation, providing support and creating conditions for ideas to emerge, as well as promoting communication and collaboration between participants (Manzini 2015; Hillgren et al. 2011). It may be necessary to trigger and systematize initial debates, materializing outputs; mediate interactions between participants from different contexts, helping to democratize expert knowledge throughout the group; it may also be necessary to make the various stages of the process more explicit and to help manage the project as a whole.

Meroni et al. (2013) point out several phases for a design process for social innovation, described as a *Social Innovation Journey*, which:

(...) explores how design can enable people, communities, enterprises and organizations to kick off and manage innovation processes by co-designing and setting in place experiments of new services and solutions (Meroni et al. 2013, p. 2).

3.3 *Role of the Designer as Expert*

Communities and individuals face a scenario of growing challenges and problematic situations but at the same time they are able, due to digital technology, to easily share experiences and knowledge. This has led to the growing development of a sense of agency, and more people are actively involved in trying to find solutions to their own problems. This is, in fact, one of the most transforming aspects of social innovation, since the motivation for action results from objective problems and from understanding the power that may be in our hands by defining “life-projects”.

In this context, Manzini (2015) distinguishes between *diffuse design* and *expert design*. The first concept describes design practiced by individuals who are not trained in design, but who choose to actively participate and collaborate in design processes for social innovation. The second describes the activity of trained and experienced professionals in addressing social innovation problems. These initiatives are characterized by requiring complex design activities and the intervention of a design expert to fulfil the functions of mediator and facilitator. The role of the design expert can be to trigger relevant and productive social conversations (Ehn 2008; Manzini 2015) that become an integral part of strategic design processes (Meroni 2008).

When design gets involved in the process of social innovation, there is also the possibility of producing *design knowledge* (Manzini 2015), described as the set of knowledge, data and analysis that can be accumulated on design initiatives for social innovation. One of the difficulties pointed out by several authors in the field of social innovation is the difficulty in mapping and having access to a bank of past experiences (Murray et al. 2010; Ceschin 2014).

3.4 *Design as Infrastructure*

Design process for social innovation differs in some ways from one focused on a design project. While a design project generally responds to a briefing, has a specific audience, specific objectives, and a time frame to be completed (Dubberly 2005), social innovation processes are often more indeterminate.

These processes need to be more open, flexible and time-consuming due to the complexity of the network of actors, contexts and needs. In the course of these processes, new connections can be established between multiple stakeholders. Likewise, unexpected opportunities may arise which, in order to be explored to their full potential, may require a flexibility of time and resources. Therefore, elasticity and adaptability are necessary for initiatives to pursue new directions, move forward with more hypotheses or prototype new solutions (Hillgren et al. 2011).

Regarding this situation, the authors Hillgren et al. (2011) propose an approach for design for social innovation focused on creating infrastructure. In other words, the activity that consists in fostering and deepening the relationship between actors, so it can become an asset to be explored in the long term. Creating infrastructure

also means activating and promoting robust and more expanded networks, mapping stakeholder systems that can be used as a resource during the evolving process.

This infrastructure concept brings up feasibility questions, since allocation of a facilitator team, namely the design team, for indefinite time, is problematic. However, when infrastructure issues are not properly addressed, doubts arise about the real impact of the initiatives. In fact, initiatives that only are active for a short time, insufficient to fully explore the complexity of contexts and possibilities (which often characterize the design process), tend to achieve low impact results (Mulgan 2014).

This is why planning the exit strategy (Meroni et al. 2013) becomes crucial, providing non-professional participants with tools that make them able to continue the work initiated by designers and facilitators, becoming autonomous to create, develop, and implement new strategies and prototypes.

3.5 *Co-design and Participatory Design*

Social innovation entails the participation of actors directly involved in the problematic situations they are attempting to solve, as they are the ones who better know the multiple dimensions of the problems (Murray et al. 2010; Ceschin 2014; Manzini 2015). For this reason, social innovation initiatives adopt co-creation methodologies, participatory design, and other methods that facilitate the collaboration of multiple stakeholders throughout various stages of the process.

Co-creation is described as a creative act generated, implemented and shared by groups of people, through collaborative creation tools. Co-design is a less inclusive term that describes the open processes of collaboration between designers and participants that are not design experts (Lemos 2017). These processes are directed to the design project, but have an exploratory and democratic nature, with an active and intense degree of participation by all those involved (Koskinen 2011; Manzini 2015; Lemos 2017).

The co-creative and participatory processes can be defined as dynamic social conversations (Manzini 2015). Although they are often seen as methods to reach consensus between social actors with different or contradictory interests, they can evolve into agonist design processes, in which opposing positions give rise to productive results (DiSalvo 2012).

Design for social innovation process is in its nature collaborative since the teams include community members, professional actors from various technical and knowledge backgrounds, professional facilitators, and representatives of companies, associations, or institutions. One of the main issues of collaborative processes is, therefore, trust (Jégou and Manzini 2008) that must be established among the participants, building bridges of dialogue between them. In a participatory process, the existence of trusted relationships is vital for the creation of complex stakeholder networks, which allow forming a group that acts as a *designing network* (Jégou and Manzini 2008). Designers and other facilitators can also act as trusted mediators (Hillgren et al. 2011) between community members and institutions or companies.

4 Communication Design in Social Innovation

Within the scope of design for social innovation, communication design tends to reveal its complex and comprehensive nature, since the outcomes of these processes are often hybrid artifacts that combine products and services, involving the participation of multiple stakeholders, and responding to problems expressed by communities (Manzini 2015). Its contribution may be particularly relevant to address some of the challenges that often confront social innovation initiatives.

4.1 Visibility

This is what happens in the development of visibility strategies (Frascara 2004; Manzini 2015), which are essential to enhance sustainability of the initiatives, expanding the communication spectrum not only to participants and the closest community, but to wider areas of society, and thereby helping to gather human or financial resources.

In many social innovation initiatives, the resulting artifacts are intangible, and it is up to the designer to devise “(...) how intangible ideas can be visualised, communicated and implemented” (Andrews 2011, p. 85). By making ideas visible beyond the participating community, through communication and dissemination actions, communication design can help social innovation processes to be able to reach critical mass.

However, the need for visibility is not just about communicating initiatives outside of the engaged community, but also and perhaps more importantly, because of its role in amplifying weak signals within the initiatives, revealing existing or potential relationships, hypotheses or systems (Manzini 2015). That is, making explicit opportunities that could otherwise be submerged in the fragmented point of view of each of the participants and their specific interest, and expanding the field of possibilities.

4.2 Visual Materialization

The collaborative and co-creating nature of social innovation processes requires participants, experts or non-experts, to go through several phases together, such as mapping of the problem space, discussion and selection of concepts to work on, or rapid prototyping of the first ideas for testing. Throughout these steps, visual materialization capabilities can be an asset, as well as others associated with the design project methodology which communication designers know well, such as tools for researching, generating, selecting and implementing ideas (Brown 2009; Hillgren et al. 2011; Stickdorn et al. 2018).

In the case of design processes for social innovation, visual representation allows to make visible and explicit some abstract realities that would otherwise remain immaterial or unclear. Graphical representations tend to facilitate understanding of ideas, data or complex process flows, making them more accessible for participants as a source of knowledge and allowing generation of insights, which can lead to unexpected and relevant knowledge (de Ponte Figueiras 2016). Designing with fragmented or scattered information lends itself to this by transforming large amounts of data, or disconnected information, into a readable artifact that allows for a big picture vision and to detect previously invisible patterns or relationships (Yi et al. 2008).

Mapping and schematisation of complex data are very relevant in heterogeneous groups of participants from different professional contexts, since visual materialization can facilitate collaboration between experts in various areas (Gibson and Owens 2014), which is often a necessity in social innovation processes.

Over time, graphic artifacts have played an important role in production and communication of knowledge. It was often through visual representations that new scientific concepts were tested and modelled, allowing to represent and communicate abstract mental productions (Massironi 1982). Representation of the atom by Niels Bohr in 1913 or the DNA helix are examples of how certain knowledge can only be made explicit through visual objects—what Massironi called hypothetigraphy, the explanation of scientific hypothesis using graphic and visual means.

A vast number of tools are identified in the literature, which mainly use visual resources to materialize, structure and generate knowledge (de Ponte Figueiras 2016; Gibson and Owens 2014; Roxburgh 2014). This is the case with conceptual maps, conceptual prototypes, user journey maps, diagrams that outline processes, interactions and connections between ideas or components of a service (Stickdorn et al. 2018), amongst many others.

4.3 Legibility

Another role that can be part of the communication design practice in social innovation processes is the creation of visual outcomes using information dispersed by several sources or complex information that hinders easy reading. Information design deals with organization of informational content and data in order to provide its easy access to users (Saffer 2009). It deals with the selection of the information to be presented, as well as the organization of the various elements, textual, numerical or graphic and the way in which the designer presents these elements, aiming at efficiency of communication (Wildbur and Burke 1999). Creation of an information architecture that structures the content is thus fundamental in situations with great data complexity, making it understandable and interpretable by users. Working with content in such ways allows designers to transform raw data into meaningful and contextualized information. And in some cases, to create narratives (de Ponte

Figueiras 2016) that enhance communication of something that previously might not have been visible or accessible to understanding. Processing and designing dispersed data and disorganized information units can be of central importance to the circulation of knowledge among participants in a social innovation initiative, as well as to facilitate communication and collaboration.

4.4 Design for Communication

While acting as a promotor and facilitator in social innovation processes, communication design also has an almost didactic role regarding other participants. Preparing an exit strategy (Meroni et al. 2013), it should be taken into account the resilience (Manzini 2015) of products, services, or systems created. In doing so, communication design must work towards giving autonomy to non-designer participants, equipping them with tools that allow them to address project needs themselves (Hillgren et al. 2011; Meroni et al. 2013; Manzini 2015).

We can frame the role of communication design as *design for communication* (Lemos 2017), as it contributes to participants' autonomy, producing ways of communicating that foster collaboration with the community (in and outside the project). From this perspective, the target audience for communication in these processes tends to move from receiver to participant, framed in a relational mindset (Cipolla 2012). The focus of communication design intervention shifts to process, deviating it from design products. Through participatory design and co-creation methodologies, designers can explore the relational potential within groups while making everyone feel more involved and engaged in initiatives, as well as more able to move them forward.

4.5 Communicate for Dissemination

A need for dissemination is also particularly prone to the intervention of communication design since it requires development of communication strategies and their outcomes. These outcomes can serve internal communication purposes in the course of a process of sharing status and results with the communities involved. They are also used to communicate outside that circle, promoting initiatives and fostering new links and synergies with other social actors, such as institutions or companies (Hillgren et al. 2011; Meroni et al. 2013).

A successful dissemination strategy may result in replication of initiatives that have already been implemented, tested, evaluated and improved, allowing to accumulate experiences and, in doing so, optimize results and effectiveness. This potential for replication is one of the main assets of social innovation: small but multiple centers of action, combined and networked, might be able to create new social dynamics.

4.6 Framing and Sense-Making

The ability to generate new framings is one of the issues that brings more transformative potential to communication designers' intervention in social innovation processes. It is about approaching a situation or a system from a new perspective, finding new ways of thinking about it, and reordering functions and connections within the system (between available resources). Framing problems in an innovative way makes possible to challenge socially constructed ideas, trigger new interpretations of situations, and circulate new meanings. The ability to frame and re-frame a problematic situation seems to be one of the most striking characteristics of design activity, although it is not exclusive to it (Dorst 2012; Emilson 2015).

Communication design acts as a story-listener (Bertolotti et al. 2016), in order to map the concepts that may be preventing certain behavioural changes or adoption of certain social innovations (Dorst 2012). In doing so, it can also act as a storyteller, contributing to create new narratives that can be more operational, productive and sustainable.

The ability to build new narratives highlights the role of communication design as the enabler of sense-making (Zurlo and Cautela 2014; Manzini 2015; Lemos 2017), a process of rationalizing practices and experiences that frames them in the context of social and cultural values. It also functions as a dynamic interpretation of reality: "(...) *a motivated continuous effort to understand connections in order to anticipate their trajectories and act effectively*" (Klein and Moon 2006).

When approaching a problematic situation, it is a question of defining not only how to solve problems, but also of defining what problems should be solved. Using its critical thinking and reasoned judgement, design takes part in the production of meaning.

In social innovation processes, creation of meaning is especially relevant since it allows different needs and aspirations of local communities with very different participants to come together around shared conversations, creating bridges for dialogue that are critical for initiatives to move forward.

By aggregating visions of the future and projections of desired future scenarios or, on the contrary, rupture (Emilson 2015), communication design can use its methodologies and tools for visual materialization in order to contribute to initiate social conversations with greater potential for change.

5 Conclusions

As part of the landscape of design for social innovation, communication design moves noticeably in a more complex and comprehensive universe, especially when we establish a comparison with its wide area of activity, linked throughout the years to commercial purposes. Creation of visual communication takes into account the

concern with the content of messages, to whom communication is addressed, by what means it will reach the public and which is its purpose, commercial or social.

However, the contexts where communication designers are called to act upon have tended to expand even further. The scope of projects in which they participate tends to be broader, as well as the typology and the framework of its interventions. Communication designers are increasingly called upon to participate in co-creation processes, to think strategically or to design services and interactions, working with immaterial user touchpoints. Despite these developments, the approach to communication design as a comprehensive area of practice is still little explored, namely in the area of design for social innovation.

A more deep and systematic understanding of the role of communication design in social innovation can contribute to the optimization of processes and assert communication designers as strategic actors, fundamental for the success of such initiatives. Its methods and tools allow for effective visual representations of complex and otherwise abstract ideas, systems or experiences, as well as enhancing communication between stakeholders, communities, and society. Communication design skills are also fundamental for mapping, visualizing information, materializing future scenarios, and prototyping service or digital solutions.

In this perspective, the intervention of communication design may lead to more resilient and durable social innovation initiatives that can be disseminated more effectively and, as a result, can be able to replicate their power to create transformative changes.

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Design and Culture in the Making of Happiness



Maria Luísa Costa and Gonçalo Estêvão

Abstract Design responds to the needs of individuals, being happiness and well-being the subject of an increasing number of studies, which gave rise to a new discipline, Positive Psychology. From these new approaches and concerns related to subjective well-being comes Positive Design, whose objective is to promote the well-being of individuals and communities in connection with a culture of innovation. The cultural routes made accessible through wayfinding systems, make it possible to put Heritage in dialogue, emphasize the culture, memory and history of communities, providing citizens with meaningful experiences that will have an impact both in the short and long run, thus becoming agents for the happiness of individuals. This article discusses the concept of Positive Design based on Positive Psychology, analyzes the evolution and importance of Heritage in the Culture of peoples and communities, questioning how the Wayfinding Systems developed for cultural promotion can integrate the practice of Positive Design and how this contributes to the subjective well-being of individuals.

Keywords Positive design · Heritage · Cultural routes · Wayfinding

1 Introduction

Design as a holistic discipline responds to social and cultural needs, assuming itself as a catalyst for a changing society. The designers' view of their professional practice and their social responsibility adjusts to social changes and trends. It is a fact which

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research in the area of design has been promoting exponentially, through the identification of needs and the application of practices, more aware and in line with the well-being of populations and communities, thus generating responses and actions differentiated in order to safeguard a better world, socially more just and culturally more participatory, we would say, eventually, happier.

The idea of happiness takes on enormous importance in contemporary society, as demonstrated by several studies in the field of Psychology, as well as by the emergence of a new area of study within Psychology, called Positive Psychology, which is reflected in the scope of design thinking and practice, and from which Positive Design results.

The Delft Institute of Positive Design (DIOPD), founded in 2011, has the mission of creating knowledge that allows designers to formulate strategies which contribute to people's happiness, not only in terms of usability, that is, of the users' relationship with products, but also in the construction of a healthier society and a better world, since it has been verified that material wealth (access to multiple consumer goods) does not seem to translate into happiness. It is, therefore, the objective of Positive Design to create opportunities to improve the life and well-being of individuals and populations, instead of just trying to eliminate their problems (<https://diopd.org>).

Culture, properly communicated and promoted by design, can contribute to the well-being of populations, since culture is a human construction, resulting from the history, memories and ways of doing of different individuals, communities, societies and civilizations, manifesting on their tangible or intangible heritage.

The concept of Heritage has evolved significantly. The 1st International Conference for the Conservation of Historical Monuments, in 1931, which resulted in the Charter of Athens (1931), assumes itself as a historical landmark in this evolution, since the notion of Heritage is no longer exclusively linked to family structures and institutions, promoting the concept of Historical Heritage, intended for the collective enjoyment of the community. Many recommendations and conventions follow, extending the concept of heritage and emphasizing the importance of its enjoyment within communities. Currently, the need to preserve Intangible Cultural Heritage is emphasized through a communication that promotes cultural diversity in a globalized world.

The communication and promotion of the different types of heritage can be put into dialogue through cultural routes, communicated through wayfinding systems which, more than facilitating the access between a certain point and another one wishes to reach, must enable significant activities both cognitive as playful, rooted in cultural values providing the experience and involvement of individuals.

2 Design and Happiness

As can be seen in Fig. 1, in the last two decades there has been a huge growth in research on happiness and subjective well-being (Myers and Diener 2018), a fact that reflects the emergence of a new discipline in psychology: Positive Psychology.

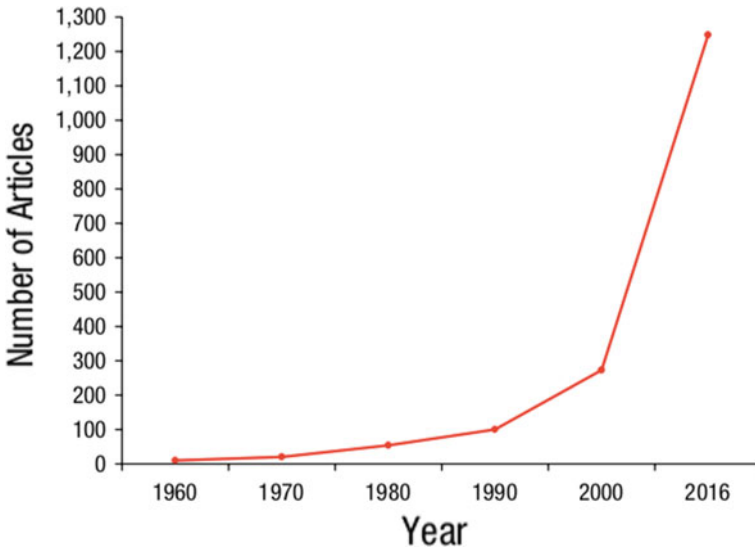


Fig. 1 Number of articles about happiness, per year (Myers and Diener 2018)

Maslow introduced the term Positive Psychology in 1954, but Seligman and Csikszentmihalyi popularized it in 2000 (Seligman and Csikszentmihalyi 2000), in a special edition of the *American Psychologist* magazine. The published article reflects a paradigm shift, since psychology has always focused more on the negative part of the human psyche and on how to deal with human unhappiness and adversity than on issues related to well-being and happiness.

However, due to the expansion of research in this scientific field, positive psychology will start to encourage studies on happiness, in order to understand what makes people happy and flourish (Seligman and Csikszentmihalyi 2000).

In summary, we can say that happiness is a multifaceted concept that not only includes more positive and less negative emotions, but also contains a cognitive component relating to life satisfaction (Diener and Biswas-Diener 2008). “Happiness, then, allows for a small dose of negative feelings while we are frequently experiencing positive ones. The balance, however, should heavily tilt in favor of the pleasant emotions. There is also a “cognitive,” or thinking, component to well-being” (Diener and Biswas-Diener 2008).

Happiness is more than simply an emotion; it is a broad psychological state of which emotions are only a part.

In a study carried out in 2010, Schueller and Seligman (2010) argue that pleasure, involvement and meaning consist of the three elements capable of providing well-being and that the three combined aspects will provide a happier life for individuals. However, these authors argue that, when considering these three elements, meaning and involvement have a greater influence on well-being than pleasure.

Seligman (2011) refers that well-being is a construct, that has five measurable elements: positive emotions (of which happiness and life satisfaction are all aspects); engagement, relationships, meaning and achievement, and states that none of these elements defines well-being, but each contributes to it.

3 Positive Design

Design is present in our daily lives and it depends on how we interact not only with objects, but also with information. This interaction, in turn, promotes emotional states. This perspective has led to investigation and the development of several theories on how the design process can be oriented towards happiness and subjective well-being. This was named by some authors as Positive Design.

Thus, we found that Positive Design derives from new approaches to positive psychology and the value attributed to subjective well-being.

According to the Delft Institute of Positive Design (<https://diopd.org>), Positive Design aims to promote the well-being of individuals and communities, and is deeply related to happiness and the commitment to develop a culture of innovation where technology can be a way of improving life, and not just a tool to solve problems.

Also, according to DIOPD (<https://diopd.org>), researchers have been working based on the knowledge of Positive Psychology to clarify the principles of positive emotions and well-being, in an attempt to answer what are the conditions for human flourishing; what are the determining factors for achieving well-being and what is its effect on behaviour and health; what is the role of different emotions in well-being and how can people increase their happiness.

In an attempt to create a tool to help those involved in product design and despite not using the positive design nomenclature, Jordan's approach (Jordan 2000) already follows in this direction, identifying four types of pleasure that products can bring. These are: physio-pleasure, socio-pleasure, psycho-pleasure and ideo-pleasure. The physical pleasure related to the pleasures of the body and coming from the senses. Socio-pleasure comes from the pleasure that derives from the relationship with others, which can be intentional or accidental, such as a coffee machine that ends up promoting conviviality around it. Psycho-pleasure has to do with the cognitive and emotional states that the products promote. The ideo-pleasure has to do with the individual's representation of objects or interaction and how this fits with their values.

For Desmet and Pohlmeier (2013), Positive Design initiatives must deliberately intend to increase people's subjective well-being, resulting in an increased appreciation of their lives. This objective should be paramount.

These authors propose a framework for positive design composed of three components of subjective well-being: Design for Pleasure—experience positive affect; Design for Personal Significance—pursuing personal goals and Design for Virtue—being a morally good person.

Design for pleasure is related to the well-being in the moment, the subjective well-being that derives from the sum of positive and pleasurable moments. Here the focus is on the here and now, on promoting positive emotions and the absence of negative emotions (Desmet and Pohlmeier 2013).

Design for Personal Significance, here the focus is no longer the moment, but the individual's goals and aspirations. Whether these are in the future, making them easier to reach, or in the past, helping to recall or recover already achieved aspirations. In virtue design, the focus is on behavior that the individual considers correct and appropriate. The design must be appropriate to the individual's values (Desmet and Pohlmeier 2013).

Design for Virtue, is related to the virtuous behavior, it is based on a moral level.

It should be noted that this structure proposes that positive design goes beyond mere pleasure, because although pleasure or positive emotions are a fundamental component of subjective well-being, positive design must go beyond this. It will contain the three components, although each of them can serve individually as a guide for positive design (Desmet and Pohlmeier 2013).

Thus, an experience-oriented design that contributes to subjective well-being generating pleasure will only be positive design if it also addresses the individual's sense of virtue and personal meaning (Desmet and Pohlmeier 2013). However, the three components do not have to be addressed at the same level. There may be an emphasis on only one, as long as the other two are not compromised. Any type of design in a certain way will contribute to the subjective well-being of someone, even if it is by reducing threats to well-being, but only through the presence of these three components is it possible to design for human flourishing.

Desmet and Pohlmeier (2013), also propose five characteristics that positive design should have: should be oriented towards possibilities; swing; adjusted to the individual; user involvement; and long-term impact.

The "orientation towards possibilities" has to do with changing the design orientation from problems to possibilities. Instead of trying to reduce or try to resolve negative circumstances, positive design should go beyond neutral and try to create new possibilities. For example, the absence of discomfort is different from comfort. A problem-oriented design will try to reduce or eliminate discomfort, while a possibility-oriented design will try to stimulate or add comfort.

The "balance" has to do with the degree to which the three components of positive design are used. They do not have to be addressed at the same level and positive design can choose to focus on one of them, as long as it does not cause displeasure, promotes immoral behavior or threatens to achieve personal goals.

The "adjusted to the individual" means that positive design must take into account that well-being is subjective, precisely because it is different for all people, and therefore must take care of important general aspects, such as relationships with others and the contribution to a greater good, but take into consideration for whom it is developed, what is the context, lifestyle or personal goals, in order to ensure adequacy.

"User involvement" is associated with the idea that design will only promote well-being if the individual gets involved in the process. The individual's flourishing is

directly dependent on his involvement and interest. So, design should promote and facilitate well-being by promoting thoughts or behaviours, but in order to promote flourishing they will need to require user involvement.

In the “long-term impact” factor, positive design should have a long-term perspective, although the positive emotions component of subjective well-being is associated with immediate gratification. Life satisfaction is related to a longer assessment of well-being. And happiness is very much associated with a balance between these two perspectives. If positive design is to promote happiness and individual flourishing, it should promote long-term effects. The characteristics listed above related to the practice of Positive Design have tangential points with Emotional Design, this depends on the interaction between user and product, and can motivate a set of positive experiences.

Norman (2004), refers to the importance of time, but as being the element that, in the final analysis, will verify if the object is relevant, that is, if it stands the test of time then it is relevant. Many objects elicit emotional activation due to the novelty, but the process of familiarization with the stimuli causes the repeated presentation to the same stimulus to stop provoking the emotional response with the same intensity. According to the author, one of the possibilities is complexity, that is, the ability of the stimulus to continue to present new opportunities to be explored, or the way it is learnt to never be complete.

However, it is considered that the initial emotional impact may be sufficient to keep it fresh and withstanding the test of time. This high initial impact will be present in the memory. In other words, it can stop causing the same emotional state but it still allows you to recover it through memory.

This Design, which is intended to be Positive, a Design for happiness and well-being, cannot continue to be directed towards consumption and commerce. Designers have a great influence on the lives of citizens, through the messages they produce and, according to Berman (2009), “we all have a duty to make sure that the inventions we embrace and enhance by design are not just clever but also wise; that we don’t just create intriguing, marketable stuff, but that our creations are aligned with a sustainable future for human cultures and civilization as a whole.” Appealing to consumption, the designers thus promise access to a better world, happiness and well-being, but in reality, they often promote sadness and frustration in the long run.

Design projects that provide knowledge and appreciation of intangible dimensions of our culture, when combined with collaborative practices, with the involvement of citizens and communities, can contribute to a society where subjective well-being and happiness are closer to being achieved.

4 City, Culture and Heritage

Our reading of the city is a construction which depends on the existing physical images, that is, its natural, landscaped and built space, but also on intangible images,

which are rooted in a subjective dimension of those who “read” the city, images composed by experiences, memories, traditions and emotions (Costa 2013).

According to Lynch (1960), the greater the legibility of the city, the greater our comfort and well-being. This legibility contributes to its structural material elements, streets, corners, as well as sensory perception, its light, colour, scent, and the space of the city, in addition to being organized, must be poetic and symbolic, revealing to us its traditions, its history and memories.

This sensitive dimension of the city, consisting of experiences, memories, traditions and emotions is rooted in culture since, according to Saraiva (2003), culture is everything that does not depend on nature and is added to it by the spirit, and that includes utilitarian, playful, intellectual and affective activities.

According to Titiev (1969), the term culture is used by anthropologists to describe instruments that are not genetically acquired by man, as well as all the behavioural facets acquired by man after birth.

Thus, we maintain that all cultures have a pattern of behaviour, but this pattern is neither static nor pre-existing to a community. According to Cuche (2003), culture is always a process of construction, deconstruction and reconstruction.

Culture is a dynamic process, to which all groups of individuals contribute, as well as their social, scientific, technological and environmental practices. Some professional groups play a decisive role as catalysts for social and cultural changes, among which we highlight the designers, who create and promote experiences and who, according to Press and Cooper (2009), when creating experiences and meanings, also create culture and future.

The notion of culture is intrinsically linked to the notion of heritage, both in its material and immaterial dimensions, integrating the beliefs, ideas and values, intangible dimensions that constitute the material of culture, as well as the tangible ones such as: objects, symbols and technology that represent and give “body” to the former (Giddens 2010).

The concept of Heritage is now extensive and covers different areas, but associated with the notion of Heritage there is always the idea of the need for its protection and enhancement. The Athens Charter (1931), proven to be decisive for the evolution of the concept of Heritage, leaving it to be exclusively linked to family and institutional structures, passing on the concept of Historical Heritage, which is intended for collective usufruct, to be fomented. Then, the Venice Charter of 1964 changed the notion of monument, which is no longer seen as an isolated architectural creation, extending this concept to urban or rural groups representing a particular civilization, a significant movement or historical event (Charter 1964).

From here on, the city is seen as a whole and a value to be preserved, within the line of thought of the “Convention Concerning the Protection of the world Cultural and Natural Heritage”, approved by UNESCO in 1972 (1972).

After that, there are many recommendations and conventions promulgated by UNESCO, in which the immaterial dimension assumes greater importance. Thus, in 1989, the “Recommendation on the Safeguarding of Traditional Culture and Folklore” (1989), in which UNESCO considers as well to safeguard cultural identity, as they are economically and politically determinant for contemporary culture.

In 2001, the “Proclamation of Masterpieces of the Oral and Intangible Heritage of Humanity” (2001), was created by UNESCO, aiming to distinguish the most notable examples of cultural spaces, or forms of popular and traditional expression.

From the analysis of this problem we can conclude that there are two major groups of Heritage: the Natural and the Cultural. However, the Natural and the Cultural are inseparable and interconnect, giving rise to concepts such as cultural landscape, historic urban landscape, territories of cultural value and creative territories (Costa 2013).

With regard to Cultural Heritage, its division is made into two broad categories: “Material”, within which we fit the Movable Heritage (works of art, objects, collections) and the Immovable Heritage (built: monuments, buildings and sets of buildings). The other major category of Cultural Heritage is designated as “Intangible”, and according to the Convention for the Safeguarding for the Intangible Cultural Heritage, this is part of the cultural identity of peoples and communities and is constituted by the practices, representations, expressions, knowledge and skills—as well as the instruments, objects, artefacts and cultural spaces associated with them (2003).

5 Cultural Routes and Wayfinding Systems

Cultural Routes put in dialogue the different types of Heritage, showing the culture of the people and highlighting the spirit of the place.

The Spirit of the Place, according to the Québec Declaration (2008), consists of the tangible elements “(buildings, sites, landscapes, routes, objects) and intangibles elements (memories, narratives, written documents, rituals, festivals, traditional knowledge, values, textures, colours, smells, etc.), that is to say the physical and spiritual elements that give meaning, value, emotion and mystery to the place”.

In turn, the cultural routes bring different types of heritage into dialogue and, according to the Charter on Cultural Routes (2008), they reflect the evolution of the concept of heritage and the role attributed to the environment and its significance at territorial scale, represent evolutionary, interactive and dynamic processes of human relations and cultural diversity. Cultural Routes are part of a natural and/or cultural context and contribute to their characterization and enrichment with new dimensions within the framework of an interactive process, and should be supported by tangible heritage elements which confirm the existence of intangible elements and together create meaning and significance.

Thus, these routes developed according to a procedural Design methodology based on wayfinding systems can promote user involvement, and create both cognitive and playful experiences that last in memory, contributing to the subjective well-being and happiness of the intervening parties.

To this end, the wayfinding systems, in a cultural context and of spatial ambulation, must enable multiple interactions in order to meet the needs and preferences of their users. In general, we can say that wayfinding systems result from the need

to facilitate population the access to complex spaces and are, according to Berger (2009) and Gibson (2009), a Design intervention field, encompassing multiple study areas, whose objective is to facilitate the access and movement of people in a given space, as well as to enhance experiences.

A wayfinding system provides the necessary means to help people to orient themselves and feel at ease in their surroundings, enabling guided walking in a certain physical space (Gibson 2009).

However, it is considered that different approaches must be taken into account when designing a wayfinding system, and its purpose must be noted. We know, according to Costa (1989), that the needs determine the system, which must be created for each particular case.

Based on this principle, we consider that the approaches must be necessarily different, depending on whether it is a project aimed at a transport interface, or a project aimed at the knowledge and enjoyment of a space, such as cultural routes. The first, needs to be direct and accurate, providing information that allows easy access to a certain point, with a minimum of hesitation. In the second case, the wayfinding system, in addition to assisting in the route and access to a certain place, should enhance experiences involving the wayfinder, and promote different levels of knowledge, according to the interests and expectations of the user.

In the first case, the wayfinding system, due to its exclusively guiding function, makes the individual feel no discomfort. But, according to Costa (1989), these types of projects are not intended to leave marks on the memory of the individuals who carry them out. It is something that is forgotten immediately after reaching the goal.

In the case of a Wayfinding System developed for a cultural route, it should create memories, add knowledge and have a long-term impact on the individual.

Berger (2009) states that in the context of wayfinding systems, new spaces will be viable through the mixture of virtual reality, cyberspace and multiple intelligent materials, and that this will be a challenge for designers because they will need to include in their projects a set of transversal, even wider and improved capabilities.

According to Rosa (2012), wayfinding systems consist of a set of visual, physical, sensory and/or spatial elements that help the user to find a destination. The concept of wayfinding works better when the user has the capacity to conceive or mentally interpret a physical context and is able to place himself spatially in that representation. The idea of experience results from this connection between physical and sensory resources, to which we associate the knowledge of heritage and the protection of cultural diversity. In this way, through experience we can generate meaning and individual pleasure, providing subjective well-being. These steps, combined with the promotion and protection of cultural values, inscribe this type of projects in the so-called Positive Design.

Experience, knowledge and interaction are facilitated in contemporary society by the use of smartphones and tablets “The increasing ease with which individuals interact with mobile devices, the enhancement of their capabilities, as well as all the resources available online, open possibilities in the context of the creation of differentiated products for use in wayfinding systems” (Costa and Amaral 2020).

Where we can use internet, GPS systems and augmented reality are now a possibility that greatly facilitates and enhances the users' experience, as well as allowing the search for multiple information based on geographic location. It will then be possible to access multiple information related to the history and memory of the different places that can integrate the itinerary. On the other hand, Augmented Reality can contribute to access information, and also provide a more playful approach to the realization of these routes.

Augmented Reality is an immersive experience that superimposes virtual 3D objects upon a user's direct view of the surrounding real environment, generating the illusion that those virtual objects exist in that space (Azuma 2017).

According to Costa and Amaral (2020), Augmented Reality provides inter-active experiences that are so valued today in our society. Augmented Reality creates layers that overlap the 'real' world, allowing access to differentiated information, more in-depth or more playful, depending on the goal to be achieved.

Azuma (2017) states that Augmented Reality AR will succeed in the consumer market sooner if it can establish new forms of media that users find compelling, enabling new forms of media and making meaningful connections between the virtual content and the surrounding real environment, generating experiences where the power comes from that connection and not solely from the virtual or solely from the real world.

Thus, we consider that multiple platforms combined in a Wayfinding project can enhance the experiences, which become pleasurable in the immediate and memorable in the long term, as long as the project is complete, integrate relevant information that allows the user to increase their knowledge, or provide recreational and game activities. However, there must be complete freedom for the user to decide how to carry out that itinerary, as well as the type and level of information he wants to obtain and, thus, Design can promote the experience and enjoyment of a certain place. Regarding the materials we considered here the use of digital media to be used using tablets or smartphones. However, the possibility of using analogue means (maps, flyers, routes and games) to satisfy different users cannot be excluded, providing them with access to a significant experience in the discovery of cultural heritage, achieved through a wayfinding system developed to carry out a Cultural Itinerary.

6 Conclusions

Given the growing importance of Happiness in contemporary society, a new area of Psychology designated as Positive comes into being. Positive Design emerges as a reflection of this concern and the care placed on the happiness of individuals, which is based on the principles of Positive Psychology. Results from the observation show that the culture of consumption of material goods has not promoted happiness and that new practices will have to be implemented in order to find solutions that make individuals happier.

To this end, the authors analyzed in this paper, as well as in the manifesto of the Delf Institute of Positive Design, present a set of premises on which Positive Design must be based in order to achieve its greatest objective, that of promoting the well-being of individuals and contribute to their happiness.

On the other hand, in the face of a globalized world, local culture and cultural diversity are assets to be preserved, since culture integrates the most genuine features of each individual, group, community or country, presenting themselves through their heritage.

The Intangible Heritage: the stories, memories and traditions represented in the Material Heritage that gives it life and expression, must be placed in dialogue and made known through the development of Cultural Routes, revealed through Wayfinding Systems.

Wayfinding Systems, combined with multiple technological potentials, are considered to enhance experiences and promote different levels of knowledge, according to the interest and expectations of the user, constituting an opportunity to improve the lives of individuals by allowing an approximation to their roots in line with their values.

Immediate pleasure, considered decisive in the Positive Design process, is related to experience and derives from the pleasurable and positive moments that are achieved. In this case, the Wayfinding System using geo-referencing systems and Augmented Reality provide differentiated playful approaches that involve and call for the participation of the individual and contribute to a drift where discovery and play will result in dynamic experiences that enhance pleasure and fun, and positive emotions.

Signification is another of the determining elements in the development of Positive Design. Here, the focus is no longer the immediate, but relating to aspirations and individual cognition. In this approach, the individual's knowledge and values are unequivocally considered, as well as the possibility of access to different levels of knowledge.

In this way, the individual acts correctly in the protection of cultural specificities, in which he is inserted and with which he identifies. This is the parameter of virtue, considered a determining factor of Positive Design, recommended and defended by the authors addressed here.

We see, therefore, that the main values that legitimize Positive Design, pleasure, meaning and virtue, are foreseen in what we consider to be a wayfinding system for the realization of cultural routes. Although each of the three elements is not, or does not need to be present at the same level, none of the other elements is compromised. The level of presence of each of the elements depends on the individuals who take the journey and on their interests, since both platforms and the Wayfinding System allow freedom of choice, the adjustment of interests and motivations.

In this way, we consider that the development of Cultural Routes based on Wayfinding Systems which integrate different technologies and use multimedia support are means of promoting the subjective well-being of individuals.

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Design and Knowledge: Creative Thinking for a Knowledge-Based Society and Policy



Marlene Ribeiro  and Francisco Providência 

Abstract Based on the importance of knowledge and with focus on the contribution that Design and Research in Design intend to provide for the development of a more informed society with better, but also sustainable, quality of life, this paper propose to collect the theoretical framework regarding juxtaposition of the agents University (Knowledge) and Governments (Policy), mediated by Design. The ongoing research in Design for the Territory, which this reflection is part, identified in the critical and creative nature of thinking in Design, a clear opportunity to support the creation of a knowledge-based society and knowledge-based policy. The evidence of the strategic nature of Design and the mediation operated by Design, place the discipline as an urgent partner of decision-making bodies in Universities and Governments.

Keywords Design knowledge · Knowledge-based society · Knowledge-based policy · Knowledge-based political decision-making · Creative thinking · Design cultural mediator

1 Introduction

Design plays a fundamental role in the transformation and development of a world environmentally sustainable, economically viable, socially equitable and culturally diverse. We can systematize in this way, the enormous challenge released by 2030 Agenda (United Nations General Assembly 2015), without precedent in research on a global scale. Challenge that the first World Design Declaration (World Design Summit Organization Inc 2017) brought to the interior of the discipline of Design.

This paper, analyze public policy documents, with focus on Research and Design, and it seems relevant for us, in its condition as a theoretical device for the perception and enunciation of policies aligned with the European Government that can be

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understood in the field of Design Management to center Design into the strategic discussion about territory.

Regarding the structure, this paper is developed in two parts justified by the two agents (University and Governments) under discussion, proceeded by the introduction and proceeded by the conclusion. We note that a third agent of territory, Industry (Economy), the topic of Knowledge-based Economy and the University-Industry collaboration is not object of analysis in this paper, even though it is mentioned.

First, knowledge is presented in general, not specifically in Design, as a basis for the development of society and political strategy. The evolution of the role of the University for the democratization of knowledge “belongs to all and for all”, an objective of open science (Ministry of Science, Technology and Higher Education, Portugal 2016), is here suggested from key moments. Cooperation between Science and Policy also deserve attention. This first part ends with the identification of problems of communication and knowledge transfer, resulting from the differentiating nature of the agents University (Knowledge) and Governments (Policy).

In the second part, the focus move on the challenges and opportunities that this University—Government relationship brings to Design, we identified the nature of critical and creative thinking as privileged tools for communication between stakeholders, and in this alignment, the condition of Design as a cultural mediator, it presents itself as a resource for the creation of new knowledge.

2 Knowledge-Based Society and Policy

2.1 University: Cooperation and Knowledge Sharing in the Interdisciplinarity Time

Universities plays a central role to the creation of a knowledge-based society, policy and economy. Historically, the evolution of the academic mission, summarized by Etzkowitz (2013), focused at first on the conservation of knowledge (education), then moving on to the creation of knowledge (research) to arrive at the application of knowledge (entrepreneurship). Thus, after the moment when the University exist as a kind of safe box of eternal, definitive and finished knowledge and, because not being enough systematize the constant production of new knowledge through research, the transition to an entrepreneurial culture with intellectual and commercial potential, brought new social and economic development challenges for universities, with partnerships with the public and private sector that engines for the development of new areas of knowledge (biotechnology, biomaterials, and a lot of others). It is, therefore, in this environment of interdisciplinarity and knowledge sharing that the universities affirms its social, political and economic importance.

More than 20 years have passed since European Education Ministers from twenty-nine countries gathered in Bologna to sign a joint declaration that came to affirm the objectives for the creation of a European system of Higher Education. The Bologna

Declaration (1999) constitutes an intergovernmental and interinstitutional cooperation effort that has come, among others, to promote the mobility of students, teachers, researchers and administrative staff and to guarantee quality and evaluation systems.

It was also around this time (2000), that the European Research Area gained a physical space, identified as essential for the cooperation resulting from the mobility of researchers who, in the opinion of Carlos Moedas (European Commissioner for Research, Innovation and Science between 2014–2019) encourage the “flow of knowledge across national borders” (Directorate-General for Research and Innovation of European Commission 2016). Aligned with this idea of opening borders, the Portuguese commissioner led the program “Open Innovation, Open Science, Open to the World—a vision for Europe” (Directorate-General for Research and Innovation of European Commission 2016).

In Portugal, the Government and the Ministry of Science, Technology and Higher Education have defined as a priority the commitment of the scientific community, to the principles and practices of Open Science, launched in 2016, with the support of Foundation for Science and Technology of Portugal. The program foresees the elaboration and implementation of a National Open Science Policy, that allows the transfer of scientific knowledge to the scientific community, society and companies, thus making it possible to increase the recognition and social and economic impact of science (Ministry of Science, Technology and Higher Education, Portugal 2016).

It is in this context of cooperation and openness of science that, the strategic plan (2019–2022) of the University of Aveiro emphasizes that “knowledge creation is increasingly a collective, collaborative, inter and transdisciplinary, which requires articulation and new dynamics to address the complex problems of contemporary society” (Reitoria da Universidade de Aveiro [Rectory of the University of Aveiro] 2019). Paulo Jorge Ferreira (current rector of University of Aveiro) presents the new challenges, described in his rector application “the University of Aveiro will have to help define a smart and winning growth strategy for the region, working with municipalities, companies, business associations and civil society, seeking internationalization and innovative, mobilizing projects with strong and dynamic leaders”, adding the imperative to grow with the region, looking at the world for the “urgency of Aveiro to accelerate its trajectory towards the knowledge society” (Ferreira 2018). Regarding the challenge of teaching in the era of interdisciplinarity, the rector notes very encouraging preliminary results for the development of Shared Curricular Units, with the areas of Management, Marketing, Engineering and Design, being the best positioned (Ferreira 2018).

After identifying cooperation measures at different levels (here oriented from the global to the local dimension), as challenges for science and knowledge sharing between governments, institutions and disciplinary areas, next point propose for reflection, the dialogue challenges and opportunities between Science and Policy.

2.2 *Science and Policy Communication*

Communication between Science and Policy, both areas of public domain, seems to be doomed from the start by the nature of opposition that characterizes the root of their thinking. While Science is guided by constant questioning, in a posture that is always critical to the existing results, therefore restless and open, the Policy, acts through, in the need to reach consensus, which is the same as saying narrowing.

It is true that the differences are many, but Science and Policy are clearly linked by dependency relations. In its most basic dimension, research is financed by the political sector and the results of Science is used in the design of policies. Thus, the collaborative idea is inevitable as stated by Bocher and Krott (2016) because the only strategy that can make a difference is that both areas of knowledge join efforts.

This communication between Science and Policy, where policymakers frequently encounter complex issues, and the role of scientists as policy advisers on these issues is not always clearly defined was reviewed (Spruijt 2014) using scientometrics analyzes for 267 publications, that is a clear demonstration of the pertinence and interest about this linked area. Similar work of overview and classification to identify the Knowledge Communication problems between experts and decision makers was done by Eppler (2007) that affirm:

“the process of knowledge communication hence requires more reciprocal interaction between decision makers and experts because both sides only have a fragmented understanding of an issue and consequently can only gain a complete comprehension by iteratively aligning their mental models”.

Based on the acceptance of the fundamental differences between science and policy, and with the propose of be a bridge for the transfer of knowledge, the model RIU—Research-Integration-Utilization (Eppler 2007), is based on four main premises:

- Building trust in encounters;
- Exchanging a maximum of information;
- Accepting limits of mutual understanding;
- Looking for allies of science.

The three components of this model can be systematized by the usual knowledge transfer path. The first component—Research, part of the academy’s independence in identifying research questions, focused on problem solving. The second component—Integration, oriented the research towards practical issues and needs in two directions: specific issues provide guidance for the formulation of scientific questions and scientific results provide guidance for solutions in practice. Finally, the third component—Utilization, is where scientific results are used to solve problems in practice (Bocher 2016). We see, by the characteristics of each component, a clear transfer from Science for the Policy and it is precisely in this transfer that Design is mediator and can be a wise ally, as we will see later in this text.

3 Challenges and Opportunities for Design

3.1 *Design, Cooperation and Knowledge Sharing*

In Sect. 2.1, we presented examples of cooperation generally intended for Teaching and Research configured in Intergovernmental Declarations, European Programs, and in the strategy and Action Plan of our University. Once here, it is important to move the focus to international cooperation aimed at the unequivocal affirmation of the economic value of Design and its instrumental role for the creation of innovative products and services, which favor the competitiveness of territories and the quality of life of citizens. In the following documents (Ribeiro and Providência 2019), the authors give visibility to these objectives, further reinforcing the imperative of research and the adoption of Design methodologies to increase productivity, improve the user experience and guarantee diversity, thus being considered as an instrument of guarantee of European sovereignty.

The first World Design Declaration, “Montréal Design Declaration”, reflects the common goal of developing an international action plan that leverages the power of Design to address the pressing global economic, social, environmental and cultural challenges (World Design Summit Organization Inc 2017). In this document, the need for strategic Design leadership at the local, regional, national and international level is recognized and thus the need for models of governance and integration of policies based on Design in the local, regional, national and international agendas. This Worldwide Design Statement confirms Design’s intrinsic capacity as an agent of change and a source of creative transformation (design) and the critical role of Design (reflection) as fundamental to the creation of an world environmentally sustainable, economically viable, socially equitable and culturally diverse and still the value of working in a collaborative, holistic and integrated way to promote Design as a common benefit.

With a focus on data dissemination, the report “The Design Economy: The value of Design to the UK”, published in 2015 (updated in 2018) by the Design Council presents itself as the largest study on the contribution of Design to the United Kingdom economy. The document places Design in a different way of thinking, making it responsible for the ability to help large organizations, Small and Medium Enterprises, companies in the social assistance sector and charity organizations, to change the way they work. It is, in defense of the contribution and importance of Design that, since 1944 the Design Council has operated, namely as a government advisor. More than the data compiled here, which are not the focus of this reflection, it is important to underline the conclusions of the Design Council that assigns Design a central role to generate growth, efficiency, quality, sustainability, better quality of life and stronger communities. As the latest projection notes for the future, The Design Economy says: “as we face up to new global economic realities, Design will play an ever more important role in ensuring our economy remains competitive” (Design Council 2015).

The “Europe 2020” strategy established the guidelines for a decade (2010–2020) of smart growth (economy based on knowledge and innovation), sustainable (economy more resource-efficient, greener and more competitive) and inclusive (economy with high levels of employment that ensures economic, social and territorial cohesion) (European Commission 2010). The “Innovation Union”, one of the emblematic initiatives of this strategy, recognizes the importance of taking advantage of the European creative potential, in particular the role of Design to bring innovation to the market (European Commission 2013a). This document specifically refers to the objective of intensifying the role of Design in the innovation policy, a rare centrality in these political documents.

In order to accelerate the integration of Design in innovation policies, the European Commission services prepared the working document “Implementing an Action Plan for Design-Driven Innovation” (European Commission 2013b), focusing on actions in the short and medium term and that establishes as general lines of execution three strategic domains of action: Promote the understanding of the impact of Design on innovation (Design and Knowledge); Promote industrial innovation based on Design to reinforce Europe’s competitiveness (Design and Economy); Promote the adoption of Design to foster renewal in the public sector (Design and Policy). Regarding these three domains, it is important to reinforce in the first, what we called Design and Knowledge, the need to educate policy makers right away about the role of Design in innovation; measure the economic impact of Design; see reflected in the research the attribution of a central role to designers and Design methods; integrate the concept of Design-based innovation in the curricula of different disciplines and facilitate permanent dialogue between the main agents of Design-based innovation policy (European Commission, national, regional and local governments, European industries, universities and Design professionals and border areas). In relation to the second domain, Design and Economy, the introduction of Design in Industry as an essential engine for the creation of innovative products that constitute an asset for companies, in the face of competition, is highlighted, however, the lack of Design Management skills, as a significant obstacle to wider adoption for the integration of Design in European companies. Finally, the third domain, Design and Policy, explains the need to reinforce strategic Design for the modernization of public administration and recommends the adoption of Service Design methodologies, to improve productivity in the public sector, and to maintain and improve the experience of the user.

3.2 The Nature of Thinking in Design

Distinguish the way of thinking about Design, from the designer, identifying what may constitute its originality or differentiating factor, both in professional practice and in research, has been the subject of reflection by several authors. Castillo (2018) identifies the contributions of Herbert Simon and Bruce Archer as pioneers for the emergence of Design Thinking.

This proposal served as a starting point, which we decided to develop by introducing and articulating more authors. Admitting as Castillo says that it was Simon (1996) who spoke for the first time of “Design as a way of thinking”, the concern to affirm the dimension of reflection, that is Design knowledge production, it may have been opened here.

The first publication, in 1979 of the Journal “Design Studies”, introduced Bruce Archer’s which in the article “Design Discipline” identifies the important “aim to establish the theoretical bases for treating Design as a coherent discipline of study in its own right”. The author (Archer 1979) affirms:

“exists a designerly way of thinking and communicating that is both different from scientific and scholarly ways of thinking and communicating, and as powerful as scientific and scholarly method of enquiry, when applies to its own kinds of problems”.

Cross brings to the present the ideas of Simons and Schön, contributing to clarify the historical framework of the authors that links to their more recent peers, thus defining a state of the art that opens space for their reflection around Design methodologies, focusing “on the designerly ways of knowing, thinking and acting” (Cross 2001).

“Design as a way of Thinking” (Simon 1996), “Designerly way of Thinking and Communicating” (Arber 1979) or “Designerly ways of Knowing, Thinking and Acting” (Cross Cross 2001), are subtle differences to name the common interest in identifying a specific form of thinking, communicating, knowing and acting that seems to characterize Design.

The questioning and reflection as a natural act of the Design activity, brought to scientific production in this area, the concept “reflective practice” of which Donald Schön is an unavoidable reference and therefore regularly revisited. Visser (2010), exposes “for Schön, Design was one of a series of activities in domains that involves reflective practice: city planning, engineering, management and law, but also education, psychotherapy, and medicine”.

As Design is an activity based on the project, the positions of connect or disconnect practice and research reality are current. Dorst (2016) proposes solve this with a middle level between Design Practice and Design Research—“Academic Design” as a mean of integrate booth.

Thus, it seems to be this balance between the use of scientific knowledge and unreflected approaches such as intuition and instinct, contemplating uncertain situations in conflict resolution through the project, the element of differentiation in Design. It is also a greater challenge for practice and teaching, the reconciliation in harmony between knowledge and intuition, although there is no doubt that all creative processes require deep prior knowledge (Narváez 2000; Cross 2001). The binomial Reason vs. Intuition is also discussed by Ricard (2008) who, in a diachronic proposal, reflects from objects to establish the foundations of creativity in Design.

However, when admitting intuition to the project in Design, the challenge to identify such a specific way of thinking becomes more complex, justifying publications whose purpose is to question the authors about their creative processes. For proximity to the interests of our research, we highlight the interviews compiled by Millman

(2007) with reference names of Design practice, that intend to decode “how to think like a great graphic designer”, or, in a national context, the cycle of conferences “Inside a creative mind”, that brought together contemporary portuguese architects and invited them, also through an interview to reflect on the creative process of a selected project (Borges 2016).

The reflection about creative thinking, present in the book “Creative Virus—a book about and for Creative Thinking” (presented as a manifesto and design project itself) coordinated by Tschimmel (2019) is a demonstration of the richness of diversity as a factor of unity. More than 60 authors were invited to present their idea of creativity, preferably in a graphic mode, in a double page. The book aims to infect the reader through information about creativity, fostering it through mind games and inspiring images.

3.3 *Design as Cultural Mediator*

The name of Archer already mentioned in the previous point is still identified in any chronology of Design Research in Europe, because he founded the important Department of Design Research of the Royal College of Arts, in London, and because he started the idea of Design Research as mediation. Reflecting on the activity of Design, Archer writes: “thus Design activity is not only a distinctive process, comparable with but different from scientific and scholarly processes, but also operate through a medium, called modeling, that is comparable with but different from language and notation” (Archer 1979).

Design as an activity of cultural mediation (through artefacts, devices and services) between the past and the future, between companies and people, between people and others, or even between things is the proposal of the ontological framework of the discipline that Providência (2012), (2017), presents and that is tested in the PhD research about Design for the Territory, that this paper integrate.

Narváez (2000) define Design’s own knowledge as the relationship between human being and objects and, in line with this idea, Design is presented as an area of knowledge capable of interpreting the scientific results of the others, translating them into objects (and images) for citizen use (Monat et al. 2008). The authors finally warn of what appears to be a lack of confidence from designers who see their professional activity as less fundamental than other areas of knowledge. Hence the need to reposition and affirm Design among its professionals, civil society, academia, decision makers and industry.

Specifically about the territory, the idea that all Design is political stands out (Pater 2017) and makes visible, the invisibility of the Genius Loci through the brand, which can be the visual representation of the inheritance or the ambition (political decision of strategic positioning of the territory, now subject to the competitive presuppositions of the global market). Integrating the local agents (University, Governments and Industry) in the construction of the brand and corporate strategy, Design acts

as mediator and by Design Management (attribution of holistic coherence) is an instrument to support decision making (Ribeiro and Providência 2018).

4 Conclusions

This paper is presented with the conviction that knowledge must be the basis of social, political and economic development. In this sense, the University, as a home of science and a space for the production of knowledge by excellence (without denying the importance of the knowledge generated in industry and society) should be the predominant organizational format of a society, policy and economy based on the knowledge.

Therefore, the selection and presentation of key moments for Universities and Science in general, aimed to demonstrate their capacity for cooperation, adaptation and repositioning, here first focused on the European context of intergovernmental and interinstitutional commitment that the Bologna process unleashed, then specifying the path to reach the objective of a single European Program for Research and Innovation which, already in a national context, is manifested by the implementation of a National Open Science Policy. Finally, we use the example of the University of Aveiro to demonstrate the application of these strategies.

A similar exercise, identifying moments of cooperation, which result in documents of international commitment on the positioning of the Design activity, was revised and, based on its analysis, we aligned the tripartite proposal Knowledge—Policy—Economy (University—Governments—Industry) that we present here.

Underlining the idea that, citizens have contact with science and scientific knowledge, in general, from tangible products (objects of common use), then Design, by its condition of project activity, has the power to, by drawing, mediate this relationship between Science and People. All Design is a political act. Shaping the common place, is mediate the relation between Science and Policy.

We affirm the fundamental role of research, particularly in Design, for the importance of a knowledge-based society, policy and economy, and positions Design as a privileged mediator, or wise ally, for the fulfillment of sustainable development goals of the 2030 Agenda.

Consolidating one of the objectives of the PhD research project—to make Design visible and relevant in public policies for the valorization of the territory, and due to the nature of the topics covered, this article reflects the European research strategy on the most recent framework programs, of which we highlight the thematic areas:

- Citizens and governance in a knowledge-based society (Framework Programme 6, 2002–2006) (People);
- Research for the Benefit of SMEs (Framework Programme 7, 2007–2013) (Economy);
- Innovation Union (Framework Programme 8, 2013–2020) (Places).

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Current Issues in Design Policies: Balancing Tensions



Rui Monteiro, Bruno Giesteira, Anne Boddington, and Cristina Farinha

Abstract Deriving from the scholarly debate surrounding design policies in the past 25 years, this paper proposes a novel triangulation of fundamental issues which remain unsolved, by highlighting them and analyzing how they relate to each other. The issues under analysis are innovation policies, the role of design in research, development and innovation and the multiplicity of design definitions. These are intrinsically linked with Design policies, but their interconnections are not well established or visible, leading to conflicting perspectives and tensions. Ultimately, this approach provides new insights on the rationale and construction of Design policies, towards prospective interpretations for their role and aspirations.

Keywords Design · Design policies · Innovation · Research and development

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1 Rationale

Design has been presenting itself as an asset by offering new possibilities on how to envision the world and the future, and by proposing new solutions and approaches (Lawrence 2014; Dunne and Raby 2013; Bason et al. 2012; McDermott 2007; Krippendorff 2005). In this regard, Design has been broadening its horizons and has been demonstrating how it can offer value of different forms.

It is thus not surprising that policy makers have been embracing Design, starting in the 19th Century with the first design and crafts societies, then after the Second World War with the creation and development of design councils and for the past 25 years with the emergence of dedicated public policies for Design throughout the world (Raulik-Murphy 2010), mostly on the premise to foster innovation and competitiveness.

But while there is extensive and clear evidence on how can Design contribute to innovation in a variety of fields (Concilio et al. 2019; Hernández et al. 2018; Cooper et al. 2017; Cautela et al. 2014; Filippetti 2011; Verganti 2006), when it comes to Design policies, there seems to exist an intricate, complex and many times contradictory entanglement of factors, making it difficult for deciphering them and understand how they interconnect (Gonzalez et al. 2018, Maffei et al. 2015, Cruickshank 2010), and therefore a relevant subject for analysis.

Moreover, looking at the broader picture, we are currently witnessing initial signs, at a global scale, of a sixth innovation wave. This time driven by sustainability principles, as a likely response to the intense use of natural resources (Silva and Serio 2016). Simultaneously, the world is ever more challenged by growing inequalities (United Nations 2020). And considering the aspirations, promises and prospects for Design to tackle a range of issues, it is relevant to question its role providing these big challenges.

Locating the discussion of Design Policies at a macro perspective is also useful as public policies, on one hand, do (or should) intend to solve wider societal challenges and Design Policies, on another hand, have indeed been emerging in a variety of regions throughout the world.

Moreover, the expectations and work towards the development of Design Policies continues, as can be seen by the current and active discussions on the formulation of the next generation of design policies (BEDA & Design4Innovation 2018; BEDA & PDR 2018).

The pertinence of this analysis is then reinforced if we look at two ingredients: 1) the existing groundwork and knowledge build-up on Design Policies and 2) the legitimate expectations, concerns and questions on the upcoming role for Design, in particular through Design Policies in this context.

Accordingly, this paper intends to look back at the recent construction of dedicated Design Policies, through the eyes of different scholar viewpoints, being mindful of the broader picture. The goal is to scrutinize the debate surrounding design policies, through a literature review and analysis, with a special focus on different perspectives, contradictions, and interconnections. This exercise becomes particularly useful for taking a step back and reflect on what has been reached so far on this matter.

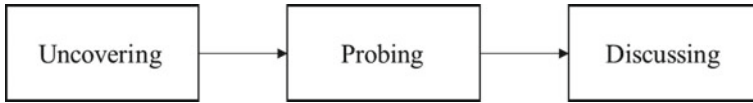


Fig. 1 Methodological stages diagram *Source:* author

2 Methodological Approach

Considering the variety of intersections and possibilities one can extract from the presented rationale to provide an analysis on the topic, a protocol is established to disclose and investigate the underlying main issues.

To do so, the methodological approach considers three sequential steps as shown in Fig. 1.

This implies that in a first moment we propose to detect the main underlying issues surrounding the scholarly debate on Design Policies (uncover), followed by an inspection on the positions and perspectives put forward by different scholars for each issue (probing), ending with an examination of such debate, bearing in mind its prospective role (discussing). For the first two stages a literature review is conducted, while for the third stage an analysis of the literature review is produced.

Provided these steps are clear, a starting point is required and, subsequently, the boundary conditions are as follows:

- Looking at Design Policies, namely related recent scholarly discussion, and in line with the timespan of the emergence of dedicated Design Policies; and
- Looking at related cross-references of this discussion, thus ensuring coverage of immediate and/or concealed narratives.

The advantage of this approach is that it recognizes the subject complexity, particularly when looking at a substantial period, especially if we keep in mind that dedicated Design Policies have been emerging for the past 25 years, and how that results in a significant amount of information. In this perspective, by reducing a manifold problem to a set of underlying main issues we can level the debate without losing sight on its depth.

3 Uncovering the Issues

Due to the recent evolution of design and design public policies we have been witnessing a debate on how to properly develop and position design policies. A debate which considers a variety of domains, such as policy formulation and evaluation, innovation studies, design methods and meanings, economic theory, design theory, among many others. It is therefore a complex formula, ever expanding, difficult to understand and to determine which variables are to be included or excluded and operations to execute.

The hypothesis under scrutiny points to an entanglement of factors within Design Policies that prevents the proper decipherment of their construction which, ultimately, might hinder their goals and success.

Therefore, to uncover the underlying factors, we propose three issues that cover fundamental pillars of Design Policies:

1. As Design Policies are fundamentally a recent phenomenon, pointing towards their role in innovation, they need to be seen in a contrasting light to innovation policies (Hobday et al. 2012; Hobday et al. 2011);
2. The range of possibilities on the role Design can/ might play on the full spectrum of research, development, and innovation processes (Hernández et al. 2018); and
3. The pointers on a limited role and understanding for Design regarding their actual expected scope of application in Design Policies (Monteiro et al. 2017; Monteiro et al. 2018).

Considering these three fundamental issues, we propose a triangulation analysis as a tool to isolate each issue, thus supporting the process of establishing boundaries, as to understand how they permeate with each other and converge towards Design Policies (see Fig. 2).

This triangulation therefore serves the purpose of understanding where design policies currently stand, by putting in perspective the existing tensions within which design policies rationales sit.

At the center, Design policies have thus been balancing these three issues:

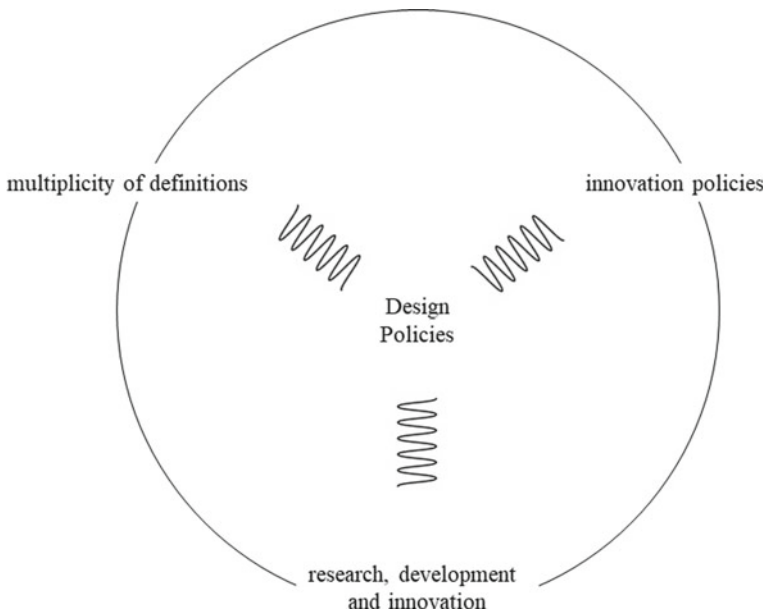


Fig. 2 Balancing tensions for design policies *Source:* author

- innovation policies, by drawing parallels and permeating knowledge between design and innovation policies;
- research, development and innovation, by looking at design methods and research, development and innovation (RDI) processes; and
- multiplicity of design definitions, by considering its own scope of what design means, stands for and can do.

In the upcoming section each of these issues is analyzed separately. This analysis is based on literature review and for each issue contrasting perspectives and/or inconsistencies are presented which highlight existing tensions. To ensure a coherent narrative, the discussion is focused on the issue at hand, but also in its connections to Design policies; moreover, touchpoints between the three issues are placed to ensure a connecting thread among all.

4 Probing the Issues

4.1 *Innovation Policies*

Since Hobday's paper on the contrasting perspectives between design policies and innovation policies (Hobday et al. 2012) it became perfectly clear the long road ahead that design policies still have on discussing how they should be positioned. The contrasting perspectives are set in the limited relationship between design policies and innovation policies in regard to their rational and conceptualization strategies, even if they refer to each other. A likely reflection on how innovation policies have been developed and extensively debated for over fifty years and have established themselves as a solid policy framework and, on another hand, how Design policies are fundamentally a recent phenomenon developed in a different context.

In this line of thought, efforts have been made to establish parallels and bring the two perspectives closer, such as is the case of developing a "Design innovation ecosystem" approach (Whicher 2017; Whicher et al. 2018), based on the "innovation ecosystem" model. By following this path, the goal has been towards providing visibility for the different Design sector actors, how they relate and interact with each other, how they sit within the overall economic and societal landscape and essentially how and where to act from a policy perspective. A systemic process which derives directly from the ecosystems modelling approach. The purpose is also to establish an easier access for policy makers by highlighting a discourse they are more familiar with such as the one found in innovation policies.

This approximation is even more relevant when considering the context of the current economic, social and technological changes, which is portrayed by "significantly improved abilities of problem-solving and the capacity for changing the world through introducing digital technologies" (Schwab 2017). A useful background for driving new policies (of any domain), without forgetting the existing considerations

on the role of Design for problem solving (Dorst 2004; Jonassen 2000), which shed light on how Design can contribute with relevant and efficient proposals.

It is also in this wider context that new relationships between design, innovation and users have been put forward, presented as “design-driven innovation”, aiming to contribute to “incremental innovations” or, when taking it a step further, to “radical innovations” (Norman and Verganti 2013). A notion which shifts the position and expectations of Design further to high impact possibilities, thus supporting and corroborating an alignment with innovation policies goals.

But this relationship also needs to be seen in contrasting perspectives, as innovation studies most often neglect design and design studies most often regard innovation as a consequence (Mortati 2013). From this viewpoint, this contradiction can lead to a layer of discrepancies between Design Policies and innovation policies.

Other efforts have also been made by establishing connecting points between Design policies and innovation policies through the Oslo Manual, a reference handbook for innovation policymaking, from which we can exemplify with the analysis put forward on the fabric of Design Policies in an innovation framework, by highlighting possible strengths and weaknesses (Gonzalez et al. 2018). On this matter, further information and analysis is provided in the upcoming section.

This evolution also needs to be analyzed from a policy rationale and theoretical background point of view, as to understand why Design policies have been put forward. The common argument lies on the systems failure theory, picking up and substantiating the ecosystems approach as it looks to the whole and identifies and examines potential failures in its parts that require attention.

In this line of quest, coupled with the potential of Design, this implies policy intervention for an increase in “the supply and demand for design to tackle failures in the way that actors and components interact in the system” (Whicher and Cawood 2012). An approach which has also been supporting current innovation policies (Whicher and Cawood 2012). Indeed, systems failure theory has gained traction and is the prevalent perspective in innovation policy studies, even though the systems failure concept is still recent (Radosevic 2012) and inconsistencies still exist on the systems versus the previously dominant market failure discourses and theories (Schmidt 2018). On a complementary and clarification note, the term innovation ecosystem is becoming the norm, replacing the term innovation system; a minor modification which essentially sets ecosystems as more organic and non-linear structures, when compared to systems. Nevertheless, the systems theory approach still stands as predominant and takes on these subtilities.

From another point of view, a previous bibliometric analysis on Design policies (Gonzalez et al. 2016) puts in perspective how this topic has been studied. Even though the 30 identified and analyzed papers are spread out in several specialized journals, it also realized that just behind Design, the second most repeated keyword is “innovation policy”. A clear evidence of the prevalent discourse.

4.2 *Research, Development and Innovation*

As an expanding field, Design has also been looking at its own methods, partially in search for clarification where Design stands within the overall Research, Development, and Innovation (RDI) processes.

Within the context of policies, this relationship is also worth exploring when looking specifically at RDI policies, with some connections and side-by-side comparisons attempts having been made in the context of Design Policies. The motivations for doing so usually reside on what are RDI policies, which can be defined as government level “activities, procedures and actions as to coordinate and direct the development of science, technology and innovation” (Piñero 2012). Therefore, encompassing a range of stages, from basic and applied research, to experimental development and then onto innovation processes and outcomes (Estrada and Pacheco 2009). The implication is that these policies target all fields, including Design.

Within this context there are two cornerstone references widely used to define what are research, development and innovation activities, namely the Frascati Manual (OECD 2015) and the Oslo Manual (OECD/Eurostat 2018), focusing on, respectively, research and development and, the later, on innovation. As foundational manuals, their reasoning has ramifications in policies all around the globe.

In one of the attempts to look at both manuals, Design is seen as an economic factor of production (Nomen 2014). From there it realizes and states that the construct of the conceptual framework of the Frascati and Oslo manuals do not provide any leeway for any easy extensions or room for Design. In fact, it goes on and affirms that Design “must fit within the established frameworks” if it wants to be recognized.

This scholar reference within the Design field is particularly relevant for this context, as an output of one of the six strategic public funded projects by the European Union within the framework of the Union Design policy. Perhaps one of the interesting parts is how this output set itself as an idea for a “Barcelona Manual on Design” towards assembling and analyzing Design data. But despite the serious and systematic work and effort put into its development, it has yet to grow into becoming an established anchor.

To highlight the difficulties found on the requirement to “fit” Design in the established frameworks, it is worth exploring here both manuals, as a way to observe this issue from an “external perspective” to Design Policies scholars.

Within the Frascati Manual, based on the five core principles to define what is an R&D activity (novel, creative, uncertain, systematic, transferable and/or reproducible), when it comes to Design it states that “Design and R&D activities are difficult to separate”. Even if it provides some examples on where it can and cannot be considered as an R&D activity, the boundaries are less than clear and are therefore reflected on lack of a definition for statistical purposes. A problem also reaffirmed later how the metrics to measure RDI do not explicitly include Design methods (Whicher 2017). Moreover, the latest edition of the Frascati Manual also declares it provides “greater emphasis (...) to the social sciences, humanities and the arts.” and continues referring that no “changes in the definitions and conventions [were

needed], but it does require greater attention to the boundaries that define what is and what is not R&D”, which in the context of the discussion of Design and RDI becomes quite relevant, as the definitions for R&D have remained almost unchanged for over 50 years since the manual has been in place.

Interestingly, the Oslo Manual also states in its rationale that “policymaking today is still largely focused on what is easier to measure”, as a note which is relevant for Design policies. And when it comes to Design, the Oslo Manual takes a different starting point when compared to the Frascati manual by affirming that “design covers experimental and creative activities that may be closely related to R&D”, even if however not meeting the full criteria to be classified as R&D, but already states that “most design work are innovation activities”.

Returning to the work on the establishment of links between Design and the Oslo Manual referred in the previous section (Gonzalez et al. 2018), one can find a more successful endeavor. Instead of looking for specific connections between Design methods and this manual, it puts forward a correspondence directly with Design Policies. The result is on matching different categories of Design Policies, such as infrastructure and institutional framework, to the systems approach of stakeholders found in the Oslo Manual. A relation which is only coherent with the ecosystems approach for Design Policies.

The difficulty in finding a place for Design within the RDI processes, particularly in what concerns Research and Development, is also reflected in Design policies. Indeed, such positioning of Design can also be found, for example, in the European Union Design Policy (European Commission 2013) as it states that a “systematic use of design as a tool for user-centered and market-driven innovation in all sectors of the economy, complementary to R&D, would improve European competitiveness”. The keyword being “complementary”. Other approaches at policy level, on the other hand, include design research methods, such as is the case at The Policy Lab, a United Kingdom government support unit for policy making (Walker and Loyd 2014), and therefore recognize Design research as its own area, and not as an extension or complement to other R&D approaches.

Notwithstanding the most widely accepted concepts of research, development and innovation which don’t seem to be appropriate for Design currently accepted roles, it is also worth noting that what has been changing is the understanding of how they interact and are positioned along the knowledge chain. Indeed, the innovation landscape has been changing substantially and with-it new models for understanding how the RDI processes and outcomes interconnect, as we are now witnessing the fifth generation of innovation models (Hobday et al. 2012). This also demonstrates how the articulation and clarification attempts for Design methods might suffer by continuously trying to catch up on a rapidly moving field as innovation policies is.

On another hand, Design research and development recognition is certainly not new and the work of, for example, Bruce Archer has helped shape its foundations (Davis and Gristwood 2016), along with many others. Moreover, the development of Design research methods precedes the recent history of Design policies and has been progressing through generational evolutions for at least 40 years (Bayazit 2004).

4.3 *Multiplicity of Definitions*

The expansion of design into new territories has led to an array of definitions for the field, ranging from broader and inclusive concepts to narrower definitions. Moreover, while the difficulties in grasping the multiplicity of definitions for Design is a long and wide debate, circumscribing it to the context of Design Policies is a more recent discussion, with limited argumentation still in place. Indeed, it has been identified as an upcoming challenge (Whicher 2017) with some initial thoughts and hypothesis having been put forward, on the possibility it might act as a limiting factor for implementing Design Policies (Monteiro et al. 2018).

As such, it is helpful that in this context we can differentiate between those definitions put forward within the design field by itself and those definitions put forward within design policies. An approach which can also help clarify how knowledge permeates and flows between these two.

A good starting point can be on the relationship between creativity and Design which, when added together, result in innovation (Cox 2005) or, in other words, design is about “creativity deployed to a specific end”. A formulation which is quite beneficial for policymaking, as it provides a simple and clear argumentation for the importance of Design.

On the commemoration of the 20th anniversary of *The Design Journal*, Paul Atkinson has also put forward a paper revisiting previous discussions on the role of Design (Atkinson 2017). By highlighting a set of papers from the journal that deal with Design in different contexts, the discussion there touches upon the variety of meanings and uses for Design, from objects, to policies, to daily life, to businesses or to sustainability. By doing so, it also intends to (re)affirm the relevance of Design and how its concept works well in different areas. On the policy dimension, it should also be noted that it is not only about Design Policies, but also about Design for developing policies, which reinforces the wide role Design can have with several efforts having been developed on this topic.

For businesses, the existing literature is also extensive and one can pick an example related to the current innovation and competitiveness digital world, as the case on the roles for Design Concepts in business-to-business manufacturing organizations, within the context of product and service Design, and how Design had a positive impact there (Pekkala and Ylirisku 2017).

But the efforts to understand or to provide new meanings for Design, go well beyond the standard discourse in Design policies, which fundamentally, as seen before, is tied to innovation and competitiveness. For example, in *The Spirit of Design* “common assumptions about sustainability, progress, growth and globalization” are challenged given that, it argues, Design practice is precisely captured by the current innovation and production discourse (Walker 2011). A statement which hints on an unsettling nature of Design and its fuzzy borders, by targeting core principles supporting Design. And a description which also points to an idea that Design, and for that matter Design Policies, are not responding to what are the global challenges in an effective manner.

In this regard, it is also relevant to highlight the evolution of Design definitions and its multiple options. An evolution which also goes along the different economic paradigms, as the 80's period with an emphasis on styling, the 90's on brand and marketing and after the 2010's on strategy (Liu et al. 2017). An evolution which is continuously pushed given the current expressive change of the social and economic landscape of where Design is located and how that is a requirement to broaden Design practices (Cope and Kalantzis 2011). A perspective which also seems to be in line with the argument that Design has been captured by mainstream discourses on innovation.

The need to define Design has also arisen in other closely related fields, such as is the case for the product development process in engineering, where we can find a proposal for four models of design definition: sequential, design centered, concurrent and dynamic (Yazdani 1999). The same author continues and goes further to establish connections between each model and its advantages and disadvantages, depending on how it will be used. This example has the advantage of placing and fitting Design as a discipline and, in that sense, its concept and definition in engineering. Doing so, by effectively creating further definitions, it dilutes boundaries and concepts.

The complexity of this discussion recalls what seems to indicate an intensive and multidimensional relationship between design, innovation, and R&D activities in industrialized countries (Tezel 2012), whatever that relationship may be. And provided the ability of Design to tackle complex, wicked problems (Hobday et al. 2012), perhaps this territory is where design can further advance. Reaffirming, perhaps, a position that is not about being an "unfinished" field, but rather one which might not yet be pleased with existing formulations and practices.

Another perspective relates to the concern of proving the value of Design to non-designers, namely within the innovation process and its importance beyond aesthetics and meaning of products (Mortati 2015). An idea which is likely tied to the need to explain what Design is and how difficult it must be to prove its value, but which ends up pointing to how Design has a clear and settled positioning regarding aesthetics and products, but not so when it is placed in more distant fields.

On the Design policies perspective, definitions for Design are also put forward. Without overextending a list of available definitions in design policies, some examples can be useful to note. Such as the design policy for Queensland in Australia which dedicates one page to the definition of Design stating that "good design is sustainable design. It is a process... joining creativity and innovation... and delivering value" (Queensland Government 2008). The European Union "Action Plan for Design-Driven Innovation" also provides its own definition, stating that Design is an "activity of people-centred innovation by which desirable and usable products and services are defined and delivered" complemented with its offer on "methodologies, tools and techniques that can be used at different stages of the innovation process (...) [and] drives business model innovation, organizational innovation and other forms of non-technological innovation" (European Commission 2013). For Iceland it is mentioned that Design is "(...) a collective term for various fields that unite creation and practical solutions (...) [linking] creativity and innovation and shapes ideas for the production of good, useful items for users and buyers" (Icelandic Government

2014). Or the case of the “Made in China” an industrial policy, but which identified a need to put forward a new concept on “Innovation Design” to represent the new role of design as leadership in innovation and setting its characteristics: “green and low carbon, network and intelligent, open and fusion, co-creating and sharing” (Liu et al. 2017). What also seems interesting to note is how these definitions take the broader and more inclusive approach, as to ensure the policy is the necessary framework to embrace a large and diffuse concept.

But independently on the chosen definition for Design, previous research also seems to indicate that another differentiating factor among Design policies is on where Design is to be applied (Monteiro et al. 2018), which to a certain extent devalues the definitions put forward as they are not mandatory to be followed.

5 Discussion

Looking at the explored fundamental issues, several contradictions are highlighted and therefore remain unsolved. These contradictions reflect existing tensions due to boundary problems, as they essentially deal with the process of exploring and setting conflicting or just different positionings.

These tensions in turn provide interesting grounds for formulating new questions that hopefully can lead to new research and answers on the topic.

Should design policies give way to innovation policies? Looking at the broader picture of the debate, it is not clear where a design policy should stand: should it be continuously developed as a stand-alone strategy or should move towards its integration into innovation policies? Or in other words, will design policies be considered successful when they dissolve and are fully integrated into innovation policies, or are they successful if they survive for years to come on their own? These questions are based on the observation that Design policies have been successfully put forward on the premise of a positive direct cause-effect relationship between Design and innovation, but also on the scholarly debate of placing side-by-side Design Policies and innovation policies.

Considering this, it is also pertinent to interrogate the theoretical background that has been used for Design Policies. Indeed, systems failure theory by itself does not seem to be a minimum condition to establish Design policies as stand-alone. For that to take place, we would need to clarify we are dealing with a system within systems framework. The former referring to the Design (eco)system and the later to the innovation (eco)system, composed by a sub-set of systems.

Following this line of thought, this implies that the Design ecosystem, with its elements and its internal connections, composed of professionals, companies, supply or demand, is already an integral part of the innovation ecosystem. What is then required to understand is how all of this comes together and specifically where are the weak ties and unbalances. This idea also suggests that a Design Policy needs not only to target its own actors and connections, but also on the relation with other

systems that form the wider innovation ecosystem landscape. The challenge is then perhaps to clearly identify the failure it intends to solve, thus implying that claiming a connection between Design and innovation per se is not enough.

From this perspective, a Design Policy only makes sense to exist for a certain period, until the failure is fixed. Moreover, if the innovation ecosystem is the dominant arrangement, Design Policies are necessarily bounded to the direction it takes.

By taking this exercise one step further and picturing a scenario in a time when that failure is fixed, one needs to ask what comes next? If we reverse this, we can go back to the question we started with: is it more useful a Design Policy stand-alone strategy or an innovation policy which explicitly includes Design from the beginning?

Raising such questions does not necessarily imply to choose from the two previous options, but rather to uncover and push for new perspectives on the matter.

Indeed, the answer does not need to lie at one of the previous two options - full integration/ dissolution in innovation policies versus design policies as stand-alone - but it can be helpful to establish two opposite end points. Doing so, can provide a better picture on the many options that exist in between, considering each context of implementation, leading to clear roadmaps on how to use Design and with what purpose. Design policies around the world do take different approaches, and perhaps only the European Union Design policy takes a clear stance for incorporating Design in innovation policies (Monteiro et al. 2019) while most Design policies do not offer any clues in this matter.

It is therefore important to further study theoretical options for Design policies, including systems failure theory, as to connect and contrast with existing innovation policy rationales and establish scenarios for Design policies.

Are design methods not “researcherly” enough? We are witnessing both a reluctance from an innovation policy scholar perspective and a challenge from a Design Policy scholar perspective when it comes to embodying design within reference standards for R&D models and approaches. Simultaneously, we are witnessing ongoing efforts in defining and settling design own methods, a process which has been happening for decades. As we have seen, these are parallel, overlapping and even contradictory paths placing Design in a sort of middle ground in Design policy, making it as not quite research and development even though it also seems to be, but rather that Design methods can be useful to foster innovation. At the end of the day, it seems the debates go in opposite directions and, thus, a contradiction that reflects on how the definition for Design is difficult to grasp.

A difficulty which is also echoed in the metrics used to measure RDI activities and outcomes. By not fully including Design methods within the standards, it creates data collection problems for Design which weaken its overall visibility. A problem which also reinforces the challenge for finding a positioning for Design Policies, as we could note earlier simply because it is much easier for policymaking to focus on what can be quickly and quantitatively measured.

Another aspect that is worth discussing and is not particularly visible within the Design Policies discussions, refers to the Design practice and its professionals. Indeed, references are provided, especially when the debate refers to the components

of the Design ecosystem or the different contexts where Design is used. And for that matter, Design Policies do require a base of professionals to exist, as they mostly represent the supply side.

But perhaps, one can hypothesize that the reason for these more concealed references might lie at the hardship of separating practice and RDI. As we noted earlier, there is a tendency for design studies to take innovation for granted (but not the opposite in innovation studies), and in this perspective, it does place design “somewhere” in the full RDI cycle processes.

The reasoning seems to lead to a dilemma: how can we prove a continuous cause-effect on innovation outcomes and RD processes, if we cannot seem to fit Design on the same standards that define RDI?

The Oslo and Frascati reference manuals also do not offer solutions for differentiating between these two perspectives nor there is agreement in the academic context. But it is interesting to note that for many other fields, these manuals do clearly and easily isolate between practice and RDI. In this light, policymaking is also easier as it becomes clearer to define policy goals. From a policy making perspective, the opposite should then also be true: as it seems to be difficult to isolate between Design practice and RDI, then Design Policy goals are more likely difficult to set.

We then must think if daily Design practice is always indeed employing “RDI methods” and perhaps most importantly if it results in innovation at all times. Exploring this idea in a systematic manner might be a useful exercise, because if this is not true there is a risk that Design Policies are not firmly grounded in Design practice.

Which leads to a need to further study Design in the context of RDI processes and in the context of its (professional, economic or social) practice, by establishing boundaries where they are to be defined and connections where they are required.

Does a broad design definition hinder its strength? By broadening the field, Design has led to an array of contexts of use and connections with other areas, which by itself strengths and solidifies the Design discipline, by continuously putting it to test and to develop new approaches and mature old ones.

Parallely, this has stretched the search for Design definitions that fit an expanding field, leading to a sort of elastic rubber problem: the more you stretch to reach other fields, the thinner some parts of the rubber will be. That same elasticity represents a clear advantage for Design: its flexibility. Departing from this angle, it is important to increase the elongation capacity of the elastic rubber, so it can stretch enough without creating holes in between or break. Which is to say that the meanings, definitions and concepts for Design is not a mere theoretical exercise, but rather one with practical consequences, particularly in the context of Design policies, where policy makers find themselves in trouble understanding what Design is.

Consequently, that is perhaps why we can witness how Design Policies put forward definitions which are broader and thus avoid dealing with what it pragmatically means. What is then missing is to understand if these wider definitions are put forward because a policy should possess some level of abstraction as a basic requirement, if it is because we are dealing with a lack of understanding on Design, or both.

The presence of definitions for Design in policies also raises an interesting aspect, by putting into light a recurring need to define it and establish a definition that fits the context and/or the strategy taken, it shows how this matter.

One of the definitions mostly used for policymaking in Design refers to the link between creativity and innovation, which is worth reflecting about. This definition looks at creativity as the generation of new ideas, innovation as the successful exploitation of new ideas and design as creativity “deployed to a specific end”. Perhaps the interesting aspect to highlight here is how it seems to consequently weaken Design as R&D, when looking at the Frascati basic principles. Indeed, a specific end does not seem compatible with the “uncertainty” principle nor it seems to provide clues on reproducibility and systematic approaches. In this perspective, this broader definition is in line with the Oslo manual, even if the Frascati manual itself says that Design and R&D activities are difficult to differentiate.

From a sector and design perspective, it is likely easier to understand the use of broader definitions as designers are the ones most aware of their skills and have a better understanding of what design is. But if design policies also aim to connect with other sectors and bring about a multi-disciplinary approach, such broader definitions might not be well understood in other sectors as, ultimately, we can also argue that the connection to creativity and innovation can be directly established through other fields without including design practice and skills in the equation. Consequently, by putting forward or disseminating a definition that englobes most if not all sectors, it might undermine and undervalue how design is understood.

6 Conclusions

By looking at Design Policies as a complex phenomenon, this paper positions and centers the discussion around three identified fundamental issues, which are closely interconnected, and therefore challenging to isolate. Consequently, it proposes that the interdependencies between these issues are in continuous tension. As such, this paper captures what considers to be some of these strains and puts forward a set of questions and possible routes to explore new answers.

Going back to the triangulation diagram and the individual discussions for each issue, we can propose a convergence between them into finding what might lie at the essence of the highlighted tensions, that require further attention and investigation.

This area of convergence is settled on what is likely hidden in plain sight: a recurring need to articulate Design Policies against other blueprints. It does so by taking innovation policies as a model, benchmarking against RDI cornerstone references or stretching Design formulations into new fields. In these processes what is also interesting to observe is the continuous back and forth between Design as a discipline and the blueprints it is looking at. Eventually, to ensure its identity is not lost or unrecognizable.

We can draw a parallel to this recurring need as the intention of fitting a jacket that is either (too) tight or (too) loose. What remains unclear is to whom the jacket belongs to: are Design Policies trying to claim ownership (even if partially) or are they hoping it suits them too? Considering how young Design Policies are as field, and perhaps and therefore inexperienced, such question can only be answered with proper time for reflection and maturation.

On a final insight, it is also useful to look back at the landscape set-out in this paper introduction. Particularly as we have established the fine balance in which the underlying issues sit and face towards each other.

The bottom-line is that decisions and options to take regarding the likely upcoming new generation of Design Policies are therefore required to carefully consider the implications (including ethical implications) on how to position Design in this context. And for that matter, how to position Design as a discipline in its own terms.

And while this dialogue is not new, there seems to exist a current window of opportunity as we are witnessing the early stages of a new innovation wave. In this perspective, and considering the comprehensive work on design and its impact on innovation, but also in light of upcoming challenges the world will face, one must raise the question: are Design Policies up to the challenge?

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Guidelines to Help Developing Projects and Activities with Individuals with Special Needs



Mafalda Sofia Almeida

Abstract An inclusive project that aims to promote accessibility, learning and fight against preconception and negative stigmatization of individuals with Disabilities or Special Needs, must be based on a set of specific values and conditions based on the recognition of the right to difference, without putting aside the rigor and quality required in the development of the work itself. The designer can play a leading role in the development of solutions, products and/or services that can effectively contribute to the social inclusion of these individuals. Today the term Special Needs is used to describe a particular group of individuals who, due to their physical or cognitive nature, require clearly differentiated procedures and guidelines. When we are willing to work with this type of target group, we must take into account some important acting factors. This article aims to expose a set of practices and considerations, which are considered important in the development of research projects and/or activities, with individuals with Special Needs, particularly with children, young and adults with disabilities. The practices and considerations referred here are directly related to fieldwork, research and professional experience.

Keywords People with Special Needs · Normalization · Inclusive design · Aware designer · Guidelines to help developing projects/activities

1 Introduction

It is exposed in the 2011 World Report on Disability, of the World Health Organization, that more than one billion people worldwide are affected by some type of disability, of which about 200 million live with considerable functional disorders. These numbers tend to increase, because, on the one hand, we have an increasingly older population and, on the other hand, we have a very significant increase in chronic diseases (diabetes, cancers, mental disorders,...). Worrying trends, for which an informed designer must be aware, because it will be able to start from him, the

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possibility of creating a more favorable conditions to the individual and community life of these individuals.

The process of social inclusion of people with disabilities or special needs has evolved positively over the past few years. If, until the beginning of the 20th century, people with some type of special need were marginalized and socially excluded, today, we can say that there has been great progress, in the sense of integrating and including this type of people, at the most varied levels. However, inclusion can only take place if there is recognition and respect for difference and diversity.

It all started in 2014, when for the first time we ventured to develop an animation project with young people and adults with disabilities of various order and also individuals with Special Needs. At the time, when we presented the work and looked for partnerships, it seemed like a project without any possibility of a satisfactory result, not least because most people did not believe that it was possible for these individuals to do animation. But after several reflections and constant adaptations, the result was something that surprised the whole community, because it was possible to develop, in addition to animations, several optical toys and some graphics and visual narratives (Almeida 2015). It was from this project, and subsequently with the realization of similar ones, that we began to better understand how we should act before such a diverse target group.

When we are willing to work with these type of groups, we must take into account some important factors of action. This communication aims to expose a set of practices and considerations that are considered important in the development of research projects or activities with children, youth and adults with special needs and particularly with individuals with disabilities.

2 Special Needs, Normalization

The term Special Needs is commonly used to describe individuals who require some kind of assistance. Having a special need indicates not being able to perform some kind of activity. This disability can result from a physical or mental disability and can be temporary or permanent. Every individual is a unique being, with or without limitations.

According to the World Health Organization, limitation is a condition to which we are all subject at some point in our lives. Every human being can, for some reason, be temporarily or permanently disabled, and as we get older this becomes more evident because over time, we face more and more obstacles and other types of difficulties (OMS 2011).

Jiménez (Bautista 1997), refers that the concept of normal and abnormal, is not found inside people, but outside them, this labeling is done by the perception that others have of these people. The same author alerts us to the need to change society's thinking and attitude, towards the more or less different individual, and not, like many times we try to do, that is to change the individual himself. Within this context, normalization as a philosophy means accepting each other's differences, adapting

what is necessary and offering the best possible conditions for the maximum development of individual capacities, providing the same opportunities, services and support for normal life (Almeida 2015). This concept of normalization is not intended to indoctrinate or convert a person with a disability or special needs, but to accept him as he is, recognizing the same rights as others and offering him the conditions and services necessary to that they can develop their full potential and live a life as normal as possible (Bautista 1997).

In order to fully live this philosophy of normalization, according to Cação (2007), it will be necessary to overcome taboos and preconceptions, in order to be able to see the person with special needs like all the others, although with some constraints and limitations, which they must in no way impede the experience of life's pleasures.

3 Inclusion and Inclusive Design

The process of including people with disabilities or special needs has evolved positively over the past few years. If, until the beginning of the 20th century, people with some type of special need were marginalized and socially excluded, today, we can say that there has been great progress, in the sense of integrating and including this type of people, at the most varied levels. However, inclusion can only happen if there is recognition and respect for difference and diversity. And, according to Sánchez (Fávero et al. 2009), to speak of diversity is to speak of a very comprehensive concept that can encompass multiple contexts, which go far beyond physical and/or intellectual difference, we may be talking about cultural diversity, religious, social, gender, linguistic, linked to intra and interpersonal factors, special educational needs centered on and associated with individuals with intellectual disabilities or giftedness.

Rodrigo (2014), explains that the word inclusion appears, in the fields of education, sociology and politics, as an alternative to the word "integration". The word inclusion was part of a new vision and a new concept of action, that is, if integration predicted that who had to adapt to the institutions and society was the individual absolving the institutions and the rest involved from making any movement to facilitate the integration of these people. The word inclusion, brought with it the obligation and co-responsibility for institutional structures, in the sense that they should now also create the necessary changes and conditions to approach the individual. Thus, we move from an integration, normally passive, to an inclusion, which was expected to be more active and participatory.

In a simplified way, the term inclusion, in addition to others, means action or result of encompassing, incorporating or involving (Léxico 2014). Therefore, an inclusive project is one that gives everyone the opportunity, without exception, to actively participate in all, or part, of the process. The following image shows in a simplified way what the inclusion of individuals with Special Needs really is Fig. 1.

According to Rodrigo (2014), being included is the antidote against exclusion and is also to be welcomed, to all types of institutions, services, groups and projects.

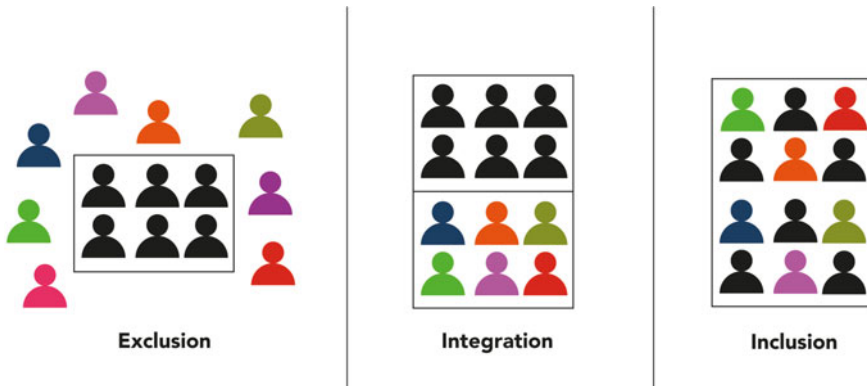


Fig. 1 Graphical representation from social exclusion to social inclusion of individuals with disabilities or special needs. *Source: prepared by the author based on Silva (2009).*

It was in 1994 that Coleman first used the term inclusive design, revealing to the English industry and market, the potential of designing and market products for older people and/or people with disabilities (Clarkson and Colman 2015). An inclusive society is one that is oriented towards all, is one that respects diversity and takes into account the different human characteristics and needs, guaranteeing all citizens their basic rights at all levels of life (health, work, housing, leisure, education, culture, information,...) (Mohr et al. 2012). Therefore, inclusive design gains strength in structures and societies that are more aware of the issues of inclusion, however, and as Cristian (2013) points out, inclusive solutions are for all citizens, and not just for some, although some individuals will feel a greater benefit from its implementation, as they will also become integrated and included like everyone else. On the other hand, this issue must not be based on a policy of solidarity with others, but must be part of permanent education, for all citizens, in order to ensure a more just and egalitarian society.

4 Aware Designer and Its Social Role

It is Papanek, in the 70s, with the launch of his book, “Design for the Real World”, which highlights the social role of designers, proposing to professionals one posture and responsible design approach, considering social values, moral and ecological. Here the author made a strong call for projects to take people’s needs into account, and not to promote values and desires that are often superfluous (Papanek 1985).

A designer can contribute to social innovation, creating and developing products and/or services that can generate very significant changes at many different levels. Manzini (2008), refers that social innovation is a new way of acting with a view to solving problems or creating opportunities. Social innovation can also mean profound

changes within a particular context, linked to new ways of understanding, acting and supporting certain more vulnerable groups.

According to Whiteley (1998), a designer who is committed to social issues is a professional with added value, that is, a “valued designer”, because he has a critical view of the values that underlie design and is courageous and audacious. This is because it is not linked to consumption values, but to higher social and cultural values. A designer of this nature has the ability to contribute to the construction of a more just and inclusive society.

There are several designers who adopt models of practical action in the search for solutions and answers to the reduction of social problems, designing products that also respond to a social need, however, and as Margolin (2002) refers, markets are very demanding and heterogeneous and do not always include all types of populations, usually the poorest people or those with special needs are left out. The same, describes an action research methodology, in which the designer integrated in a multidisciplinary team, works directly with the “marginal” populations, being able to make a more precise analysis of what happens in the client-system (individual, group, organization, community...). A project that intends to create a product or service for this type of populations, most excluded, must contemplate all aspects, cultural, social, physical, psychological, among others, of the client-system.

We believe that a designer with an active conscience is one who perceives, in depth, the client-system, manages to design truly efficient products and services. He is the one who has the ability to carefully observe what surrounds him and to understand whether the means offered are adequate or not for their intended purpose. It is the one that leaves aside the appreciation of individual authorship to emphasize the collaborative authorship. It is one that approaches and works directly with the target population. It is the one who integrates into the group and once integrated, turns obstacles into challenges, seeking to develop activities, projects, products or adapted services with the active participation of users...

5 Guidelines to Help Developing Projects and Activities with Individuals with Special Needs

The fundamental thing for a designer or researcher is not to defend one method or another, but to select, according to the objectives set and the nature of the context where the work/investigation will take place, the method or methods that best present themselves for the development and construction of knowledge (Graue and Walsh 2003).

Although aware that each author is free to seek the strategies and methodologies that best fit the elaboration of his works. However, it is considered pertinent to share some practices and considerations, which we believe to be important and which can assist in the development of intervention or research projects or activities with people with disabilities or special needs.

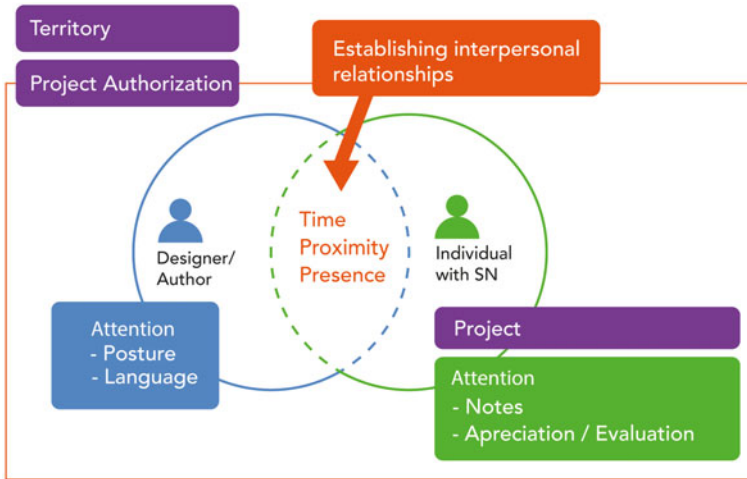


Fig. 2 Summary of guidelines and considerations to help developing projects and activities with individuals with special needs. *Source: prepared by the author.*

The guidelines and considerations mentioned below are directly related to activities and fieldwork investigation experiences and professional, developed over the last few years, with these individuals. we can see in Fig. 2 the different topics and their relationship.

5.1 Territory

It is the competence of the designer who wishes to develop the activity or project to go to the desired territory. Since these types of individuals feel more comfortable and available when they are in their usual environment.

5.2 Authorization

Before starting any work process, the designer must request authorization from the entity with whom he intends to develop the project, as well as request authorization from the respective persons responsible for the individuals, who for the most part have little or no autonomy. Authorization can range from the simple practical intervention of individuals in the project, to data recording, film and photographic capture and subsequent dissemination.

5.3 Time

In a project or activity, with this type of target audience, a certain initial period of time should be contemplated, the needed time varies depending on the period of stay in the place, to establish interpersonal relationships. It is important for the subjects first get used to the presence of a new element.

5.4 Proximity

Before moving on to the desired project or activity, develop simple activities that allow you to create close relationships (make simple games, sit next to them and establish a conversation,...). Let yourself be touched here it is very important to go prepared for physical contact.

5.5 Presence

Make yourself noticed, ask questions and ask for help to do simple things, as if you were not able to do them yourself. Questions like: "I need help, can someone help me?" or "Can you help me with this?" This way individuals are more willing and encouraged to collaborate.

5.6 Posture

Try not wear formal clothes, you should act in a relaxed way so that everyone feels at ease. Remember that all sessions are new challenges, so you must adopt a tolerant, optimistic and positive attitude. It is the author's competence to create the necessary conditions (physical and material) that encourage individuals to perform tasks. You should also be mentalized and trained for appreciation and acceptance (if the individual painted the sun blue, so be it and remains, do not forget that freedom of expression and creativity should have no limits or impositions).

5.7 Language

You must adopt simple and accessible language, however, you must prepare yourself to have to explain the same "thing/situation" in several different ways, until

they understand it. Sometimes giving practical examples or showing pictures can make the process easier.

5.8 Project

- The project must be simplified and adjusted to the maximum so that everyone can do it. Sometimes it becomes necessary to subdivide a project by activities and these by different stages with specific tasks;
- It is important an action plan, however, the plan should be flexible and able to be adjusted at any time;
- A calm and relaxed but responsible environment must be created;
- The author must be patient and give the necessary time to perform the tasks, however they develop more quickly when there is a constant presence and motivation by the author;
- Whenever possible, creative ways of acting (changing or reorganizing spaces, exploring new materials, etc....) should be sought;
- The author must continually demonstrate to the individual with Special Needs, their importance in the performance of the task/activity.

5.9 Notes

During the activities, the author must be entirely dedicated to his task and not interrupt what he is doing to take notes, because he can lose the dynamics created or that the individuals stay distracted and dispersed, which will make the process most difficult and painful. Notes should be taken at the end of each session. If it is really necessary to take some notes, during the activity, we suggest that you use a pen and a small and discreet notebook;

5.10 Appreciation/Evaluation

Whoever conducts the activity should refrain from making value judgments or make any kind of evaluation. In case the individual feels that he is being evaluated, his posture changes radically, which will condition his performance. He becomes more anxious and afraid of making mistakes, failing to act naturally. If it is necessary to make an assessment/evaluation, it must be done at the end of each activity/task, without the individual's presence.

6 Conclusion

Currently, inclusion is an increasingly relevant topic, since diversity, in all its scope,¹ is part of our society. Creating products, services and environments that encourage, stimulate and promote the active participation of individuals with special needs, in projects or activities, can be a very challenging task that can only be overcome, with hard work, dedication, goodwill, predisposition and of course a lot of creativity.

As we have seen, inclusive design aims to design accessible and usable products and services for everyone, regardless of age, ability, gender, culture, difficulty or disability. Being its main objective, to contribute, through the design of products and services, to non-discrimination and mainly to the social inclusion of all individuals.

It is well known that a designer has the ability to contribute to social innovation, creating and developing products and/or services that can generate very significant changes at various levels. However, to give more appropriate answers, the designer must seek from the source all the necessary information, for this he must work with multidisciplinary teams and try to integrate himself in the target groups, in order to live closely with their own realities. In this way, he will be able to make a more precise analysis of what happens in the client-system (individual, group, organization, community...).

To assist in this integration, some guidelines are exposed in this article, which are considered relevant for those who, like us, want to actively involve these types of individuals in the design and development of projects. A small contribution, so that designers can have an idea of how they can act. These guidelines were born from the experience of research in field and professional work, which has been developed with these individuals, over the past few years. However, we alert you to the fact that each author is free to adopt the strategies and methodologies that best fit their needs, because each group and individual has very specific and particular characteristics.

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¹ According to Sánchez (in Fávero et al. 2009), to speak of diversity is to speak of a very wide-ranging concept that can encompass multiple contexts, which go far beyond physical and/or intellectual difference, we may be talking about cultural diversity, religious, social, gender, linguistic, linked to intra and interpersonal factors, with special educational needs focused on and associated with individuals with disabilities or gifted people.

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Point of View on Dialectics in the Commercial Scenario of the Circular Economy



Caio Vitoriano Carvalho 

Abstract This paper discusses the current scenario regarding the relationship between design, advertising and consumers/users in a circular economy context. In that sense, there is a bifurcation between the desire for products and services, and the engagement towards solutions concerning environmental impacts. I propose three views as examples of the contradictory thinking of the economy: the product in a new promise; the product with in a new destination; the product in an anti-waste cycle. The protagonists of this scenario are a group that expresses heterogeneous behavior, consisting of Millennials and the so-called Generation Z, in addition to Generation X. Thus, this analysis aims at discussing how design can contribute to criticism by confronting waste, advertising and consumer market. I will not reach neither a specific nor a conclusive answer in terms of solution; instead, I seek to discuss a few panoramic contemporary perspectives about a consumer's market and its contradictions, along with some political and economic implications.

Keywords Design · Dialectic · Circular economy

1 Introduction

We live in an era subjected to a continuous process of update due to the fact that the future is no longer a target, but a reality that serves the present (Branzi 2013). This perspective is associated with topics such as information society or information age, sustainability, circular economy, consumption, and power of advertising as a communication vector. The point is that the world has changed considerably since Vitor Papanek published *Design for the Real World*, in 1971, mainly on account of the development and popularization of the digital environment in the last two decades, changing the economic, social, cultural and political scenarios. The book discusses the absence of human values in the modernist axiom and sterilization of products, and it is still relevant in debates concerning design and sustainability. The problems as

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pointed out by Papanek, such as misery and exploitation, degradation and violence, have not yet ceased to exist, and many of them have probably worsened. For instance, issues concerning environmental crisis and its consequences, overconsumption and its possible solutions are increasingly latent. In this paper, I will propose a critical and analytical perspective in relation to part of this scenario.

My perspective highlights the current context of unrest in several fields of scientific and pragmatic thinking, where companies reconsider product concepts from the perspective of design and environmental impacts, influencing and being influenced by consumers/users. Market discourses and standpoints are assessed in terms of sustainability and how much of this really is altruistic or a simple case of greenwashing (appropriation of environmental virtues through the usage of marketing techniques and public relations). Thus, the German phenomenologist philosopher Peter Sloterdijk (Muno 2009) proposes an almost imperative advertising slogan when he says “if you cannot change the world, you can change yourself.” With a reasoning such as this, attitudes in the example of freeganism [“free” + “vegan”] arise. It is a “decentralized movement that merges freedom and the lack of monetary costs, increasing the resistance to consumption, as well as boosting the vegan lifestyle. It expands to anarchism by boycotting everything that leads to human exploitation” (Wasted waste 2018).

As activities connected to the economy, design and advertising create an amalgam while trying to propose solutions to certain consequences that were often caused by their own incentives in a society which, according to Bauman (Bauman 2001), is increasingly individualized, even though digital communication has torn down demographic and geographical barriers. The same happens to consumed products, which become more individualized—or “customized”, as stated by Rafael Cardoso (Cardoso 2013) during a conversation in agreement with sociologist Zygmunt Bauman. With the development of production technology, it is reasonable to affirm that varying and reproducing items, while giving them multiple aspects, have become easier and cheaper. What happens today is the antithesis of what had been argued by advocates of functionalism [an important current of thought in the history of design that spanned from 1920 to 1950]. They used to propose that it was a matter of time until all items had a typical and perfect shape.

Thackara (2005), in his book *In the Bubble: Designing in a Complex World*, reasons that the transition from products to services is associated with participative concepts [including the user] of creation and development when designing: from “designing for” to “designing with”, and from “design as a project” to “design as a service”. The author further emphasizes that, in order to develop new services for everyday life, most solutions must involve connections and integrative alliances between designers and locations and between people. Those solutions and opportunities must be sought by narrowing connections, as well as observing places and citizens and their habits.

Miller (2007) discusses whether “the modern consumption is in fact a kind of activity that is different in intention and nature from the mere use of goods in earlier times”, concerning hedonist issues, the investment of meanings, desire and greed, or even fetishists (Cardoso 1998). In a practical example, “We buy 400% more than we

used to buy only two decades ago”, Livia Firth points out [*Eco Age*] in the documentary *The True Cost* (2015). Those are data that show how voracious the fast fashion consumption of clothing is and, hence, how strong its environmental impacts are. From a sales perspective, Kotler (Setiawan 2017) considers that “marketers need to embark on the shift to a more horizontal, inclusive and social business scenario [...]”. According to the author, consumers have been consistently distrustful of communication, instead choosing to consult with friends in the wake of the disastrous actions undertaken by certain brands. This rather defiant feature on the part of the consumers is inherent to Generation Z, which uses digital media and personal connections to search, highlight or report a brand.

Surely, advertising, with its seductive narrative, is one of the vectors that trigger consumerism and the ensuing attachment to objects for status or fashionable purposes. That being said, it is important to affirm that we all consume in the contemporary society, from the most primary [food] to the most complex and personal consumption activities [holiday trips]. However, it is not possible to demand that poor countries reduce their consumption, since they need great amounts of food or medicine.

In this current complex panorama of discussion, it is important to contemplate and to understand the contemporary scenario of intense change that is happening in people’s behavior and consumption proposals. Thus, from the perspective of production, we arrive at imperatives such as Sharing Economy, Circular Economy, Fair Trade, among others. They try to make amends to the current industry mechanics and therefore aim at reducing environmental impact, even if minimally. From another perspective, it is the case that communication and marketing want people to feel attracted by the brands, so that they consume them and refer to them. “The rule of the ephemeral governs the production and consumption of objects” (Lipovetsky 1989). On the other hand, the company/institution seeks to take a stand as an entity concerned about social and environmental causes.

2 Dialectics

I propose three points of view as examples of, sometimes contradictory, thinking of the economy focused on the product and its design solution strategy: the product in a new promise; the product with in a new destination; the product in an anti-waste cycle. The protagonists of this scenario are a group that expresses heterogeneous behavior, consisting of Millennials and the so-called Generation Z, in addition to Generation X. And the scenario is the Circular Economy, which, at its core of intention and practice, aims to interfere in the life cycle [manufacture, distribution, experience, disposal or reuse] based on proposals for objects or services that provide less environmental impact. Making them more durable or more permanent in people’s lives, impacting them through emotional and/or practical ways; postponing disposal and interests for new editions and services.

2.1 The Product in a New Promise

When discussing responsible and sustainable product designs, we generally think of manufacturing processes and distribution management. In the present-day, we also think about matters such as withdrawal and post-usage or service-related issues. The International Solid Waste Association [ISWA] has surveyed and reviewed the literature on marine pollution and estimated that 25 million tons of waste are dumped into the oceans each year. And worst: 80% of this volume is a result of the poor management of solid waste in cities (Ecycle 2018). Tanya Streeter, the world apnea diving record holder, says in the documentary *A Plastic Ocean* (A Plastic 2016) that “in the [...] last ten years, we have produced more plastic than in the last century.”

In an attempt to mitigate this kind of environmental impact, the German company Adidas has been oddly proposing a model of sneakers made from plastics pulled out from the oceans. And according to *Época Negócios* magazine (Negócios and Época 2018), what “was supposed to be just a promotional line to help raise awareness around the world about the dangers of plastic in the high seas ended up becoming a huge sales success [...] the company reached the amount of one million pairs of the model sold by the end of 2017.” Proposals such as these end up in the paradoxical setup of what sustainable marketing is [in terms of brand positioning] and employability of the design towards the development of a new line of products, which becomes a success and, in the end, returns to the world everything that it had once collected. A real concern or simply greenwashing? (Fig. 1).

It is from Italy, specifically from Rome, that the proposal for an experimental circular economy emerges: “+ Ricicli + Viaggi” [in English “+ Recycle + Travel”]. While newly implemented [July 2019], it allows the subway passenger to exchange

Fig. 1 Exchange station for plastic bottles for metro tickets *Source* Público.pt



plastic bottles for discounts with the assistance of an application in devices installed at designated stations. If the experience goes well, new spots will then be made available, and the 12-month project period will be extended. Each bottle is worth five Euro cents. “The circular economy strategy can also motivate people to pick up plastic bottles that are thrown on the ground all over the city” (Público 2019), while bringing a concept of paid and responsible disposal. Would the unsold Adidas sneakers be accepted? Well, the question remains.

In October 2019, Unilever issued a manifest pledging to strongly engage in the circular economy and to substantially reduce the usage of virgin plastic in its packaging, collecting more than selling up to 2025 (Unilever 2019). Alan Jope, Unilever CEO, states that “this requires us to introduce new and innovative materials, as well as to expand new business models, such as layouts for reusing and recharging, at unprecedented speed and intensity.” The company takes responsibility for producing huge amounts of plastic by pledging to collect and drive global demand for recycled plastic towards the circular economy (Unilever 2019). The proposal is challenging. However, the re-education process must be extended to the consumers, creating a mutual protagonism in relation to those who manufacture and those who consume, providing, thus, with a more assertive development. “The consumption of less disposable plastic would be ideal,” says Italian Environment Minister Sérgio Costa (Público 2019) (Fig. 2).

A more consistent proposal to fight the “disposable culture” comes from the Swedish government, in a coalition formed between the Social Democratic Party and the Green Party. They are “introducing tax incentives for the repair of anything, from bicycles to washing machines, so that throwing away old or broken items and buying new ones would become pointless” (Orange 2016), among other policies to

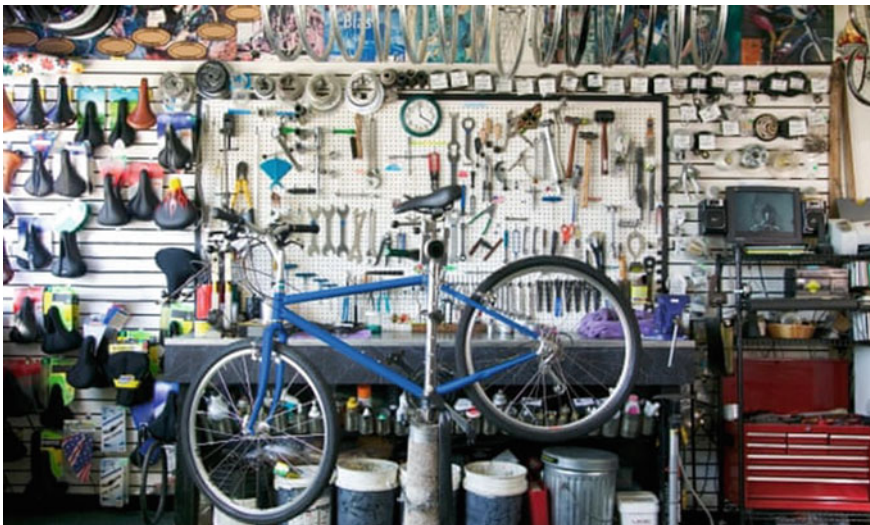


Fig. 2 Swedish government encourages the repair of objects Source [theguardian.com](https://www.theguardian.com)

reduce carbon emissions. I call “zeal” and not attachment attitudes like these that encourage a more lasting relationship with the product, with the purpose of reducing the impact of too much consumption. When it comes to Sweden, there is another proposal in this regard coming from Ikea. The company is changing its business model and promoting circular economy by proposing the rental of its products: “Instead of throwing away furniture, we can restore and sell them again, extending the life cycle of products,” says Torbjörn Lööf [CEO of Inter Ikea] to the *Financial Times* (Reis 2019). They are proposals for services associated with products that seek a contemporary proposal to adjust to a commercial scenario in which customers are increasingly informed, and sometimes engaged in attitudes to minimize the impacts of their consumption.

2.2 The Product with in a New Destiny

Companies in multiple industries are committing to making their products and packaging more sustainable. Since September [2019], the KitKat chocolate brand [belonging to the Swiss company Nestlé] is replacing their packaging made of plastic wrap paper for paper packaging in Japan. In this way, the product will reduce its point-of-sale impact by switching from a glossy to a matte wrapper. The release strategy, initially aimed at KitKat Mini, consists in introducing the new packaging design with instructions on how to shape it into an origami shape after eating the snack. There is an ideological interaction between packaging design and emotionally appealing advertising, which involves both brand positioning and the intent to continue on selling well (Fig. 3).



Fig. 3 Packaging with modeling proposal Source [fastcompany.com](https://www.fastcompany.com) [Nestlé Japan]

However, Nestlé has “announced in January that it had committed to exclusively issue 100% recyclable packaging for its candy by 2025 [...] the market for KitKats, of which about 4 million are sold every day—is expected to cut down on roughly 380 tons of plastic each year” (Brown 2019). Strictly speaking, this switch to recyclable materials can indeed lead to significant effects, according to certain projections. Ideally, this will ensure that the paper remains in use for longer. From a manufacturing perspective, large-scale plastic requires less energy to be produced than paper products.

Seeking to eliminate its packaging, Samsung announced (Alves 2019) a new policy on sustainability that involves changing the packaging of products such as smartphones, tablets and wearables. The material is made out of recycled plastic and bioplastic, which consists of biomass such as vegetable shortening, cornstarch or sugar cane.

In a more effective case, Cove has been recently developing a fully biodegradable model for bottles, which is manufactured with a biopolymer that dissolves in contact with microbial activity present both on the soil and in the ocean. “Cove’s bottle material requires only the contact with naturally occurring microbial activity on the soil or in the ocean, making it easier for the package to dissolve in different environments and independently of human action” (Fiore 2019). Solutions with innovative transformations require investments, which often cannot be afforded by some companies. Margolin (2000) reinforces that “design is also an integrative activity that broadly combines knowledge of multiple fields and disciplines to achieve specific results.” Thus, the reuse is suitable since, instead of technology, it seeks advertisements to verbalize its intentions (Fig. 4).

It is noticeable the palliative to change the packaging substrate [now recyclable] and continue to manufacture on huge scales, in addition to consuming more energy, or



Fig. 4 Biodegradable cove bottle Source B9.com

just postpone the disposal with marketing proposals. Besides that, encourage more consumption. In this scenario, it is always necessary to consider which solution is more viable and through it to have a proposal with less environmental impact inserted in the reality of each company. It is undeniably satisfying the customers and required commercial standards. Therefore, reuse is applicable because it does not need technology, but an educational communication design verbalizing intentions.

2.3 *The Product in an Anti-waste Cycle*

Now, we will consider the present-day food consumption along with its waste chain as an example. According to the documentary *Sustainable* (2016), \$ 800 billion are spent annually on treating diet-related illnesses [industrialized products with low nutritional values are highly consumed] and physical inactivity in the US. Consumerism is associated to [food] waste, which brings a negative environmental impact. And, according to the latest statistics, each Portuguese person produces 400 kg of waste per year (Wasted waste 2018). This amount consists mostly of food, which also leads, obviously, to a lot of packaging.

One third of the food on the planet goes to waste, a waste that could otherwise feed around 870 million people (FAO 2019). There is an obvious leniency on the part of the industry and of the governments regarding consumerism, with further incentives to advertising contributing in tandem. There is a contradiction in encouraging excessive consumption knowing that there is an imminent possibility of waste.

When observing this scenario, there are proposals for different services that seek solutions, in avoiding the [sometimes purposeful] waste of food, such as the online market Good After (2019), Refood (2019) or the cooperative Fruta Feia (2019).

The Good After sells products that are near their preferable limit date for consumption, outdated, or that are even part of some obsolete, discontinued line. It creates a new economic cycle for all of these products that are no longer suitable for regular sales points, either because of the aforementioned reasons or because of other seasonal reasons.

The Refood consists of volunteers reusing soon-to-be-wasted good food at minimal operating Refood is the reuse of good food that would be wasted by shopping malls or restaurants, for example. And all the service is done by volunteers at minimal operating costs and distributed to people in need.

Another proposal is the cooperative *Fruta Feia*, which fights waste by absorbing “defective” fruits and vegetables that are out of the sales pattern practiced by the bigger markets. The idea is to create a cooperative market that respects and values farmers and consumers: “[...] in this transition process, design can play an important role, facilitating methods of systematic innovation on a day-to-day basis” (Manzini 2004) (Fig. 5).

Non-industrialized products or raw materials are also on the radar of sustainability and, consequently, in the performance of design, creating services and proposals that equate an increasingly effective degree of solution moving the economy. The search



Fig. 5 Volunteer of the refood project Source re-food.org

Table 1 Scale from “Weak to Strong” in circular economy from the group of examples



for not wasting food substantially influences the reduction of spending on recycling, landfills and pollution. And finally, they feed people in need and can provide a cycle of food reeducation for the whole society (Table 1).

3 Concluding Remarks

These three perspectives are part of a larger system that includes others. This discussion can work as a greater reflection, narrowing responsibilities in between design, advertising, and consumers. The chosen examples are conflicting because they consist of proposals and counter-proposals that either provide new realities of consumerism or try to remedy a symptom of an addicted and harmful market in the paradoxical setup of what a sustainable marketing really is.

Sustainability has long ceased to be an idyllic vision, becoming an urgency in building an intelligent society that thinks about the present future. One of such paths is the responsible coexistence, in everyday circumstances, among education, design, and industry associated with notions of social and individual well-being. Great changes have taken place, and now conscious consumption is not an utopia anymore. This is a planet where each generation suffers with the negligence of the previous one. There is a culture of responsibility and irresponsibility, so we must make immediate preparations towards a reality more aware of these facts.

On a diplomatic level, several nations have been working together to comply with the ambitious goals set by the Paris Agreement, signed in 2015, in order to curb the advance of climate change. There is a willingness to rapidly meet the objectives of the agreement, even though they are voluntary and hardly operational. The UN General Secretary called out for ambitious measures during the Climate Action Summit meeting in September [2019], convened by 60 countries.

Progress has been steady, and the reduction of environmental impact substantially interferes in design and advertising. A new economy needs to be devised in order for such a thing to happen. And this is due to the fact that the greatest sources of pollution are power generation, transport and extraction, and the burning of fossil fuels. This “new economy” may as well be the circular economy that is still in search of a suitable path to take. It is estimated that what we have today might be enough, since production goes beyond what consumption actually needs. Yet, what we need is an educational mindset oriented to the avoidance of waste [of energy and food, for instance]. There is no need to permanently stop going to supermarkets, stores or similar businesses. It is possible to preserve the “welfare” of a 21st century ordinary citizen, even if it means to minimize overall expenses and consumption.

In this context, we must set the design within a dynamic process in which services, products and information merge to bring a reality of new solutions in producing, designing and consuming [or using] while demanding that the designer take over the leadership in the innovation process with user help. One must be versatile and apply the ability of observing our current scenarios, associating design with other subjects or areas of research that might be needed to solve any given problem. Perhaps a cross-sectional relationship between design and biology, given the proposal elaborated by Cove [extremely volatile biopolymer], is currently the most assertive or innovative. Nevertheless, economic liberalism governs most of the globalized world. The paradox lies in the strength of the market, which defines what direction the market itself should follow. Sustainability, thus, must be primarily seen as an ethical attitude, or otherwise we will always behave as if we were running in “shifting terrain”.

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This One or that One? Certification Marks in the Purchasing and Consumption Decision Process of Brazilians



Diego Normandi, Cibele Taralli, and Franklin de Sousa Torres

Abstract Every day, we consume and purchase a wide range products and services. As consumers, we look for quality, safety and reasonable prices. The advertising market seeks, whenever possible, to publicize the qualities of products and services to convince us – the final consumers – that their messages are enough for our purchasing decisions. However, to consolidate our choices, it does not seem appropriate to rely on only superficial advertising messages. Collective, certification, geographical indication and warranty marks can contribute in a more qualified way to consumption decisions, as they are based on carefully defined parameters, which can ensure benefits, reduce possible risks in the use of products and services, in addition to align interests related to social welfare, inclusion and sustainability of business and customers/users. This paper, which integrates a Ph.D. research in Service Design field, seeks, through a quantitative method carried out with people who live in big cities localized in all major regions of Brazil, in order to identify if the Brazilian consumer has knowledge about certification marks, as well as if they value and recognize their importance at the time of decision to purchase and/or consume products/services.

Keywords Certification marks · Service Design · Consumption · Design for social innovation

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1 Introduction

This paper is a part of one wide research about the inclusion of people with disabilities to cinema service from a Service Design–SD perspective. We believe the SD approach is able to propose a model to include, in a same movie session, people with different sensory perceptions. However, it's necessary proposing of tools to encourage the transformation of the cinema market quality¹ towards inclusive services through appropriate artifacts and services. In this context, we indicate the use of certification marks concerned to the inclusive capacity levels as a strategy which should be considered. Such as a study carried out in Brazil, we want to know the relation between the Brazilian costumers and the certification marks.

1.1 Certification Marks

Certification marks are part of our daily routine - even though we never realize them, those marks are present in a wide range of products and services. According to the 123 article from the 9.279/96² Brazilian Law, which regulates the applicable rights and requirements to the industrial property, it is presented according to the definitions, such as certification mark³:

- I product or service brand: it is used to distinguish one product or service from another which is identical, similar or from different origin (Figs. 1 and 2);

Fig. 1 3 Corações Coffee brand logo (product) *Source* Google (accessed on 20 Mar, 2020)



NETFLIX

Fig. 2 Netflix Logo *Source* Google (accessed on 20 Mar, 2020)

¹“Reflecting inclusion back to a client as an issue of quality can be compelling, as all companies like to see quality as a core part of their brand, and quality is also fundamental to market differentiation and competition.” (Pullin and Bontoft 2003, p.209).

²In this Law context, the “collective mark” is also classified, regarded to the idea of proposing the quality of a certain product or service, when this one is part of a collective: “that one used to identify products or services provided from members of a particular company.”

³Uzcátegui (2004) argues that certification marks are synonymous with guarantee marks.

Fig. 3 Energy Star, a kind of mark which refers to efficient energy *Source* Google: (accessed on 20 Mar, 2020)



Fig. 4 ABIC, a Brazilian mark regarded to purity in the coffee production and sale *Source* Google. Accessed on 20 Mar, 2020



- II certification mark: That one used to certify the product or service conformity related to particular norms or technical specifications, notably towards the quality, origin, material used and applied methodology (Fig. 3);
- III collective mark: it is used to identify products or services from members of a certain entity (Fig. 4).

It is easy to realize certification marks as an allied to consumer, as they allow to select, access and consume safety products and services, based on criteria satisfying client interests that are in addition to the practical and common benefits that products and services can offer.⁴ Certification marks, therefore, must attest to products/services quality and efficiency. As certifications, they present themselves as an instrument to base consumers in face of their choices, since they can legitimize real benefits of a product/service, which are beyond the brand value of those who manufacture and sell⁵ them.

According to the common sense, expensive products bring more benefits than the cheap ones. On the other hand, certification marks are not established by advertising volume invested in brand value, but in technical parameters carefully defined by public and/or private entities, which have a considered reliability degree in society. In the Design for Social Innovation and Sustainability context (Manzini 2008), for instance, such as certifications marks could be used to social legitimization, inclusive and sustainable values linked to the processes of production and products/services delivery. It should be observed, certification marks do not link their registers to advertising investments, the advertising universe uses these brands to elevate the quality sensation of its products/services through their customers, such as airlines which “spread” enthusiasm for having more space between chairs (see Fig. 5), vehicles which pollute less the environment, as well as hotels and their stars (from 1 to 5)

⁴A fruit has characteristics related to nutrition, flavor, beauty, shape, etc. However, the same species of fruit, when certified by a production method without pesticides, without the participation of child and/or slave labor, as well as free distribution of pollutants, adds, for example, the prospect of attracting customers that identify themselves with such values.

⁵We refer to the subjective value stimulated by advertising and marketing and branding efforts.

Fig. 5 Information regarded to the spacing between chairs of a Brazilian Airline company *Source* Personal collection



and even private colleges that are valued for good evaluation obtained according to MEC⁶ criteria.

This paper, which composes a Ph.D. research in the Service Design field, seeks through quantitative research carried out virtually, with economically active people living in big cities in five regions⁷ of Brazil, to investigate the understanding of Brazilian public about the theme “certification marks” and evaluating their predisposition to consume certified products and services, as well as their reliability and empathy on the certified products/services to criteria such as including people with disabilities, social innovation and sustainability, which could not be consumers essential needs.⁸

1.2 Certification Mark and/or Collective Mark

Legally, in Brazil, there are differences between certification marks and collective marks. The most pronounced differences rely on the process of applying for a certification mark and in the classification of who can make use of each modality. According to INPI - National Institute of Industrial Property (2017):

1. Collective brand: it can only be required by legal entities which represent collective class, such as producers and cooperatives associations. Therefore, if you are not a collective representative entity, but have several products or services and you want to register different brands for them, the collective mark is not indicated for you. You must choose a product or service brand. (INPI 2017)

⁶Brazilian Education Ministry. The MEC evaluation is not a certification mark, but in this study, there is a certain similarity in public impact generated on society, once the good grade achievement is evaluated, it “certifies” the high quality of an educational institution service, based on requirements and technical support from the Ministry of Education, or the approach with a proposal for collective brands (explained above).

⁷North, Northeast, West-center, Southeast and South.

⁸For example, when it is preferred to consume a certain brand whose use benefits amputees people even when the consumer of this product/service is not qualified in that group, nor the same consumer has any relative one in that condition (amputees).

While:

2. Certification mark: it attests the products and services conformity to certain technical standards. However, anyone who acts directly in the industry or in the trade of these products and services cannot belong to a brand of this nature. (INPI 2017).

According to the World Intellectual Property Organization (WIPO), a certification mark is “the one used for the products and services of any company, generally distinct from the trademark holder, which fits certain common characteristics or standards” (WIPO *apud* Uzcátegui 2004, p.2).

It is important to highlight the certification mark holder can be a public or private entity that has certification practice within the scope of its corporate purpose, and it cannot be used the proposed brand to distinguish or classify its own products and services. However, it is necessary a public entity supervise the control process established by the trademark owner. According to the PhD research⁹ theme, which inspires this paper, for example, we understand the cinema theaters network could not propose a certification mark in order to be used by the entire exhibition market, to which it is a part. On the other hand, INMETRO¹⁰ could attest, in the cinema exhibition context, the quality of the seats in the projection rooms. Thus, an association formed by exhibitors in Brazil could launch a collective brand, in this case, to identify that exhibitor is part of this collectivity and, therefore, it meets certain conditions that benefit society or the market¹¹ itself.

Related to the distinctions between certification marks and collective marks, Uzcátegui (2006) considers the first one (certification) is a specific modality which is meant to a collective mark. Likewise, Barbosa (2013) points out these definitions are confused in different countries such as Spain, Italy and Greece, while Portugal the certification is also understood as a collective brand modality. Related to the understanding concerned at this research, which there is no interest in studying deeply the issues related to the Law field (whose this technical distinction belongs to), we are considering collective and certification marks such as similar instruments, regarding to the benefit that they (collective and certifications marks) could generate to the consumer, since both of them are able to guarantee criteria of quality, safety and origin between others for those who need products and services embraced by these certifications. However, in this study, we will refer only to the term **certification mark**.

⁹That investigates the inclusion of people with disabilities in the cinematographic market context, based on the Service Design process.

¹⁰In Brazil, the National Institute of Metrology, Quality and Technology.

¹¹For example, the cultural project case which dedicates part of the ticket office money to film clubs or film schools.

2 Research Methodology

This field research focus on understanding the interviewed public perception and acceptance about brands with certification marks, and if they are an important factor on decision in the process of buying products and services. For this purpose, a quantitative research was carried out (Creswell 2014), with exploratory and descriptive characteristics, made through an on-line form with available questions on the Google Forms platform, in February 2019 period, focused on people who live in Brazilian metropolises.

The first stage of this research was the profile definition of the public interest:

- a. Men and Women, between 20 and 65 years old, who are economically active (working or recently retired).
- b. People who lives in Brazilian cities - at least one capital city in each major region.
- c. Well-informed people, who are presented on social networks and consume culture such as reading, cinema, music or attend exhibitions.

The interview script was based on statements related to the certification marks theme and their relationship between interviewees purchase and consumption decision. The interview begins with a range of items that identify the person¹² such as gender, place where he/she lives, educational background, income and consumption habits of cultural products and services.

As a filtering tool for interviews, there is a question about the knowledge about “certification mark”, even if it is superficial. Those people who answer negatively have their interview closed. Those who answer positively remain in the process until the end.

We based on items whose answers are presented on a Likert scale (Rogers et al. 2013). All statements were affirmative, which the interviewee has the option of classifying each one between five possible parameters: totally agree, partially agree, neither agree nor disagree, partially disagree and totally disagree. With this options range, it is believed that the data analysis should be more reliable to the real interviewees identification with the statements. The questionnaire statements can be found below:

1. Certified products and services are more reliable.
2. Every certified product is more expensive than a non-certified one.
3. A certified product for low energy consumption is more attractive.
4. A three-star certified hotel is better than a one-star certified.
5. I agree to invest a little more in certified products and services.
6. When consuming products and services, I usually check that they are certified.
7. I prefer to consume products and services with certified social engagement (e.g. preserving the environment, including people with disabilities, not exploiting child labor, respecting human rights and diversity, combating racial intolerance, among others ones).

¹²We want to include “age” in the final questionnaire.

8. I trust product and service certification instruments.
9. Certification of products and services are used to enhance them commercially.
10. Certification of products and services are instruments that benefit consumers.
11. I feel well served by the Brazilian consumer protection system.
12. Brazil's commercial system is consumer friendly.

2.1 Nature of the Study

Concerning to the purposes, this research can be classified as exploratory and descriptive. Exploratory research approach was chosen because it is carried out through an area which there is a little accumulated and systematized knowledge and in addition to its probing nature, it does not contain hypotheses, however, that may arise during or at the end of the research (Vergara 2005). This type of research often appears as the first stage of an investigation, which should be further developed. According to Prodanov and de Freitas (2013, p.52), exploratory research occurs “*when the research is in the preliminary phase, it aims to provide more information on the subject that we are going to investigate, enabling its definition and delineation*”.

On the other hand, descriptive research is the one that seeks to know the reality studied, its characteristics and its problems and it proposes to “*accurately describe the facts and phenomena of a given reality*” (Triviños 1987, p. 100).

Such research observes, records, analyzes and orders data, without manipulating them, i.e. without interference from the researcher. It seeks to discover the frequency which a fact occurs, its nature, its characteristics, causes, relations with other facts (Prodanov and Freitas 2006, p.52).

Among the different techniques for obtaining quantitative data, this study chooses conducting a survey that collects informations from a people group about the studied problem and then, through quantitative analysis, conclusions are reached corresponding to the data collected (Prodanov and Freitas 2006).

2.2 Population and Sample

The selected population for this research is formed by people who live in Brazilian metropolises¹³; who are part of the economically active population; who hold cultural consumption habits (reading, cinema, theater, exhibitions, musical shows); and who have at least heard something about certification marks.

In order to carry out the initial survey, a form link was sent to about 400 people,¹⁴ expecting a 10% return rate. We obtained 51 responses, corresponding to 12.75% from the forms sent.

¹³We have chosen Brazilian big cities because these are the ones which their inhabitants have access to a wide range of products, services, cultural entertainment such as movie theaters.

¹⁴These people are from a previous survey database from one of the researchers.

2.3 Instrument and Data Collection

Direct interviews through digital and virtual media, using a structured questionnaire with a previously established and standardized script. The questionnaire has 12 statements and items related to the profile respondents.

A pilot research (previous test)¹⁵ was carried out, with the objective of validating the elaborated questionnaire. This previous test is being used to analyze the questions that inspire this paper.

2.4 Data Tabulation and Analysis

For the final results, the data were tabulated in statistical software and then, a descriptive and exploratory analysis of the data was made. We crossed variables, elaborated tables and graphs, in order to a better result viewing.

3 Results

In summary, we show the diagrams (Figs. 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 and 18) corresponding to the answers obtained from this research and also an infographic which illustrate the geographical location of all respondents. In Appendix session, there are 4 tables with the survey answers regard to respondents' profile (gender, country region, education level and income). Then, we proceed with analysis and crossing of primary data.

After accessing the answers from the 51 respondents, we can verify that most of the them have higher education, do paid work and have an income above 1 national

Fig. 6 Location map from respondents in Brazil



¹⁵51 respondents.

Fig. 7 Percentage of responses to statement 1

1. Certified products and services are more reliable.

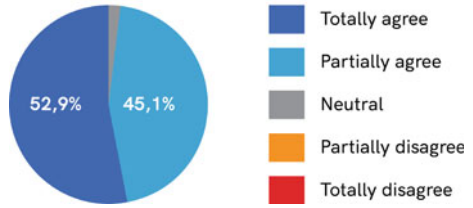


Fig. 8 Percentage of responses to statement 2

2. Every certified product is more expensive than a non-certified one.

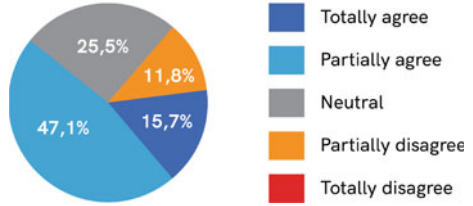


Fig. 9 Percentage of responses to statement 3

3. A certified product for low energy consumption is more attractive.

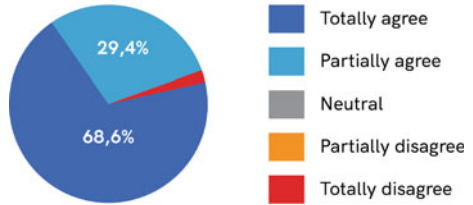


Fig. 10 Percentage of responses to statement 4

4. A three-star certified hotel is better than a one-star certified.

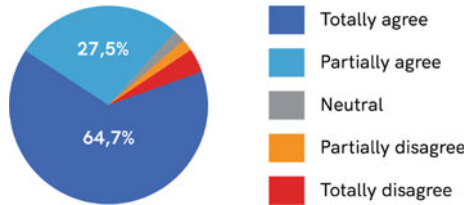


Fig. 11 Percentage of responses to statement 5

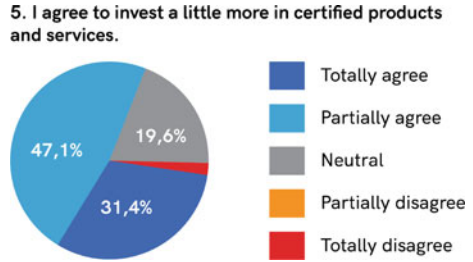


Fig. 12 Percentage of responses to statement 6

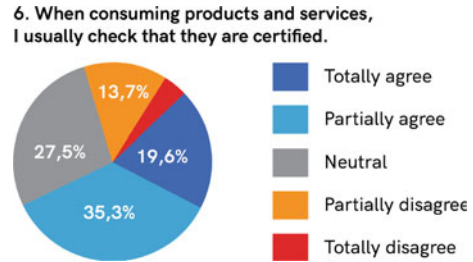


Fig. 13 Percentage of responses to statement 7

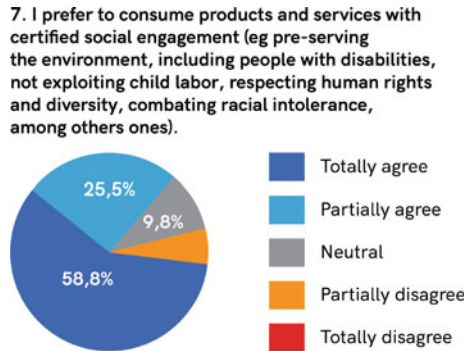


Fig. 14 Percentage of responses to statement 8

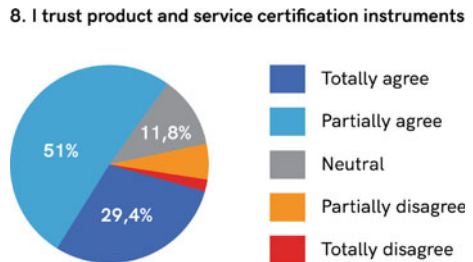


Fig. 15 Percentage of responses to statement 9

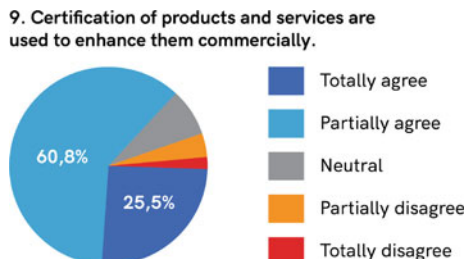


Fig. 16 Percentage of responses to statement 10

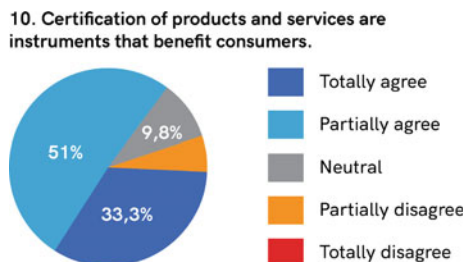


Fig. 17 Percentage of responses to statement 11

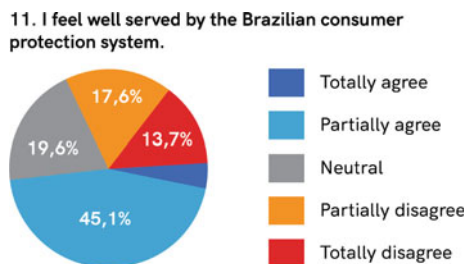
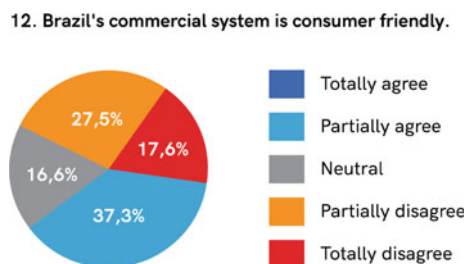


Fig. 18 Percentage of responses to statement 12



minimum wage.¹⁶ Most of them attend cultural activities and have ever heard about certification marks.¹⁷ Related to the gender, there was a percentage balance - not purposeful - between men and women.¹⁸

About the first statement - “certified products and services are more reliable”- we can affirm that the most of respondents tend to agree in part or totally with the sentence. None of the interviewees chose to “partially disagree” or “totally disagree”. Considering “totally agree” and “partially agree” are items that reveal tendency or total agreement with the statement, we can say that 98% of the respondents agree to the statement.

The conclusion about the item 1 reinforces the answers from item 5 - “accept to invest a little more in certified products and services”. In all, 79% of respondents tend to agree with the statement, while 19.2% were neutral and only 1 respondent disagreed completely.¹⁹ If 98% of respondents agree that certified products are more reliable, the data from question 5 suggests that the products and services certification could be good instruments for decision purchases from the interviewed public.

As a result, the responses obtained with item 9 - “certification of products and services are used to commercially value them”- we can see that more than 85% of respondents agree, while 3 respondents tend to disagree or totally disagree. This issue is important, considering that crossing these data to the fact can be realized through the first statement - consumers believe certified products are more reliable - and these same consumers tend to accept paying a little more for certified products and services. It is possible to suggest to product manufacturers and service providers the certification of their production in order to achieve more consumers, likely retaining them.

The item 10 ratifies the consumers friendly position related to the certification marks, according to 84.6% respondents which tend to agree with the statement “the certification of products and services are instruments that benefit consumers”. The relation between items 9 and 10 is interesting because the perception that certification marks are used commercially in order to value products and services could start from a negative understanding, as if the certifications were purely commercial processes. Only 3 respondents tended to disagree with the statement, and no one completely disagreed. In other words, if the majority of respondents had disagreed with item 10, it would reveal that, in fact, certification could be reduced to just the sales efforts.

¹⁶In Brazil the minimum wage is just below R\$1.000,00 (US\$266 – dollar exchange rate in February 2019).

¹⁷Initially, we thought that the question regarding prior knowledge about the certification mark would be the filter item in this interview, that is, those who did not have this notion, would have their interview ended when the item was negative. 8 people negated the item. However, due to technical problems with the tool used, the filtering did not act as expected. Thus, all responses to the pre-test phase questionnaire were considered valid.

¹⁸In absolute numbers, there are 26 women and 25 men respondents.

¹⁹Interestingly, the person who totally disagreed with this statement totally agreed with the first one. Interacting his responses with the salary information, it is possible to verify that he claimed to be in the income range of 1 minimum wage, which may have influenced his indisposition more robust investments, even when he agrees that certified products and services are more reliable.

However, when understanding the instrument as beneficial to the consumer, and at the same time as a resource of commercial valorization, it indicates to manufacturers and service providers that not only the certifications are important, but they must also be informed when they exist in some product or service.

We realize that the respondents showed more divergence when answering about item 6 - "I usually check if they are certified". Crossing the data already commented, we can assume, for example, that product certifications have been poorly presented to consumers, since even considering the importance and the benefit which these instruments represent to the consumer, 43.2%²⁰ tend not to verify the products and services they have purchased/consumed are certified.

Looking at the main theme of the Ph.D. research, which guides this paper,²¹ the item 7, which indicates 58.8% respondents say they totally agree, 25.5% tend to agree and only 3 people partially disagree. It points out to a stimulating trend: the respondents are interested in buying/consuming products and services which have social engagement. In other words, the certification should not be oriented exclusively to the consumer interests, but in supporting an important cause, such as the inclusion of disabled people, as well as social innovation and sustainability.

Finally, more than 80% respondents trust in products and services certification instruments. We also noticed that there is a considerable balance between trust and mistrust about the consumer protection system, which, even so, it is greater than the respondent's empathy related to the Brazilian commercial system. It should be noted the items 11 and 12 - "well served by the Brazilian consumer protection system" and "the Brazilian commercial system is consumer friendly", respectively - were the only ones in which the "totally disagree" option had a relevant presence, showing 13.5% and 17.3%.²² Crossing data, we can point out the Brazilian consumer needs instruments that provide a higher level of confidence face to commercial relations with manufacturers and service providers. We suggest they need a better perception of security and protection from the government. Possibly, the promotion of brands and certification processes could be strategies to improve these feelings of these Brazilian consumers.

4 Conclusions

We can realize these respondents trust in the certification marks as beneficial instruments to the consumer and they tend to accept paying more for certified products and services. It was very important to verify that even certifications that were not directly linked to the products and services consumption (e.g. social engagement) were interesting for the most of the interviewees. Moreover, the data obtained is not enough to conclude more general definitions, but it is possible to catch them to guide broader researches as of more respondents. At the same time, it is important

²⁰23 out of 51 respondents.

²¹Inclusion of people with disabilities.

²²Or 7 and 9 votes, respectively.

to use qualitative approaches to investigate the real relationship among Brazilian consumers and the certification marks.

Analyzing the data, we can say that, based on the respondents opinion, certification marks represents the purchase and consumption guarantee of good products and services. Therefore, the certifications are worth the efforts of manufacturers and service providers in adequation parameters and, of course, disseminating these qualifications in the contact points they preserve face to their customers, through advertising and marketing actions or by the interfaces which make up their products and services.²³ Thus, groups and laboratories related to the context of Design for Social Innovation and Sustainability (Freire 2017) can find in the certification procedures a great support to scale products and services from this perspective of production and delivery.

Acknowledgements We thank the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) for the support and financing of this research, conducted by the 2017/13180-8²⁴ protocol.

Appendix

See Figs. 19, 20, and 21

| | | Gender | | | |
|---|------------------------------|--------|--------|-------|--------|
| | | Female | | Male | |
| | | Count | % | Count | % |
| 1 Produtos e serviços certificados são mais confiáveis | I agree | 25 | 96.2% | 25 | 100.0% |
| | I neither agree nor disagree | 1 | 3.8% | 0 | 0% |
| | I disagree | 0 | 0% | 0 | 0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 2 Todo produto certificado é mais caro do que um não certificado | I agree | 17 | 65.4% | 15 | 60.0% |
| | I disagree | 2 | 7.7% | 4 | 16.0% |
| | I neither agree nor disagree | 7 | 26.9% | 6 | 24.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 3 Um produto certificado para baixo consumo de energia é mais atraente | I agree | 25 | 96.2% | 25 | 100.0% |
| | I disagree | 1 | 3.8% | 0 | 0% |
| | I neither agree nor disagree | 0 | 0% | 0 | 0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 4 Um hotel certificado com três estrelas é melhor do que um certificado com uma estrela | I agree | 23 | 88.5% | 24 | 96.0% |
| | I disagree | 2 | 7.7% | 1 | 4.0% |
| | I neither agree nor disagree | 1 | 3.8% | 0 | 0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 5 Eu aceito investir um pouco mais em produtos e serviços certificados | I agree | 18 | 73.1% | 21 | 84.0% |
| | I disagree | 0 | 0% | 1 | 4.0% |
| | I neither agree nor disagree | 7 | 26.9% | 3 | 12.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 6 Ao consumir produtos e serviços, normalmente verifico se são certificados | I agree | 15 | 57.7% | 13 | 52.0% |
| | I disagree | 4 | 15.4% | 5 | 20.0% |
| | I neither agree nor disagree | 7 | 26.9% | 7 | 28.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 7 Eu prefiro consumir produtos e serviços com engajamento social certificado (ex preservação do meio ambiente, inclusão de pessoas com deficiência) | I agree | 21 | 80.0% | 22 | 88.0% |
| | I disagree | 2 | 7.7% | 1 | 4.0% |
| | I neither agree nor disagree | 3 | 11.5% | 2 | 8.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 8 Eu confio nos instrumentos de certificação de produtos e serviços | I agree | 21 | 80.0% | 20 | 80.0% |
| | I disagree | 2 | 7.7% | 2 | 8.0% |
| | I neither agree nor disagree | 3 | 11.5% | 3 | 12.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 9 Certificação de produtos e serviços são utilizados para os vendedores comercialmente | I agree | 23 | 88.5% | 21 | 84.0% |
| | I disagree | 1 | 3.8% | 2 | 8.0% |
| | I neither agree nor disagree | 2 | 7.7% | 2 | 8.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 10 Certificação de produtos e serviços são instrumentos que beneficiam os consumidores | I agree | 22 | 84.6% | 21 | 84.0% |
| | I disagree | 1 | 3.8% | 2 | 8.0% |
| | I neither agree nor disagree | 3 | 11.5% | 2 | 8.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 11 Me sinto bem atendido pelo sistema de defesa do consumidor brasileiro | I agree | 13 | 50.0% | 12 | 48.0% |
| | I disagree | 7 | 26.9% | 9 | 36.0% |
| | I neither agree nor disagree | 6 | 23.1% | 4 | 16.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |
| 12 O sistema comercial do Brasil é amigável ao consumidor | I agree | 13 | 50.0% | 10 | 40.0% |
| | I disagree | 6 | 23.1% | 3 | 12.0% |
| | I neither agree nor disagree | 7 | 26.9% | 12 | 48.0% |
| | Total | 26 | 100.0% | 25 | 100.0% |

| | | Education level | | | |
|---|------------------------------|-----------------|--------|----------------------------|--------|
| | | High school | | Higher education / college | |
| | | Count | % | Count | % |
| 1 Produtos e serviços certificados são mais confiáveis | I agree | 7 | 100.0% | 43 | 97.9% |
| | I neither agree nor disagree | 0 | 0% | 1 | 2.3% |
| | I disagree | 0 | 0% | 0 | 0% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 2 Todo produto certificado é mais caro do que um não certificado | I agree | 6 | 85.7% | 26 | 59.3% |
| | I disagree | 1 | 14.3% | 5 | 11.4% |
| | I neither agree nor disagree | 0 | 0% | 13 | 29.3% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 3 Um produto certificado para baixo consumo de energia é mais atraente | I agree | 7 | 100.0% | 43 | 97.9% |
| | I disagree | 0 | 0% | 1 | 2.3% |
| | I neither agree nor disagree | 0 | 0% | 0 | 0% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 4 Um hotel certificado com três estrelas é melhor do que um certificado com uma estrela | I agree | 6 | 85.7% | 41 | 93.2% |
| | I disagree | 1 | 14.3% | 2 | 4.5% |
| | I neither agree nor disagree | 0 | 0% | 1 | 2.3% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 5 Eu aceito investir um pouco mais em produtos e serviços certificados | I agree | 5 | 71.4% | 35 | 79.5% |
| | I disagree | 1 | 14.3% | 0 | 0% |
| | I neither agree nor disagree | 1 | 14.3% | 9 | 20.5% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 6 Ao consumir produtos e serviços, normalmente verifico se são certificados | I agree | 5 | 71.4% | 23 | 52.3% |
| | I disagree | 2 | 28.6% | 7 | 15.9% |
| | I neither agree nor disagree | 0 | 0% | 14 | 31.8% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 7 Eu prefiro consumir produtos e serviços com engajamento social certificado (ex preservação do meio ambiente, inclusão de pessoas com deficiência) | I agree | 6 | 85.7% | 37 | 84.1% |
| | I disagree | 0 | 0% | 3 | 6.8% |
| | I neither agree nor disagree | 1 | 14.3% | 4 | 9.1% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 8 Eu confio nos instrumentos de certificação de produtos e serviços | I agree | 6 | 85.7% | 35 | 79.5% |
| | I disagree | 1 | 14.3% | 3 | 6.8% |
| | I neither agree nor disagree | 0 | 0% | 6 | 13.6% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 9 Certificação de produtos e serviços são utilizados para os vendedores comercialmente | I agree | 7 | 100.0% | 37 | 84.1% |
| | I disagree | 0 | 0% | 3 | 6.8% |
| | I neither agree nor disagree | 0 | 0% | 4 | 9.1% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 10 Certificação de produtos e serviços são instrumentos que beneficiam os consumidores | I agree | 7 | 100.0% | 36 | 81.8% |
| | I disagree | 0 | 0% | 3 | 6.8% |
| | I neither agree nor disagree | 0 | 0% | 2 | 4.5% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 11 Me sinto bem atendido pelo sistema de defesa do consumidor brasileiro | I agree | 3 | 42.9% | 22 | 50.0% |
| | I disagree | 2 | 28.6% | 14 | 31.8% |
| | I neither agree nor disagree | 2 | 28.6% | 7 | 15.7% |
| | Total | 7 | 100.0% | 44 | 100.0% |
| 12 O sistema comercial do Brasil é amigável ao consumidor | I agree | 1 | 14.3% | 18 | 40.9% |
| | I disagree | 5 | 71.4% | 18 | 40.9% |
| | I neither agree nor disagree | 1 | 14.3% | 8 | 18.2% |
| | Total | 7 | 100.0% | 44 | 100.0% |

Fig. 19 Gender and Education level of respondents

²³As is the airlines companies' case that advertise the adequacy of their seat spacing within planes, or products that have certification seals and geographical indication on the packaging (see Fig. 5).

²⁴The opinions, hypotheses and conclusions or recommendations expressed in this material are the responsibility of the author (s) and do not necessarily reflect the view of FAPESP.

| | | Income | | | | | | | |
|---|------------------------------|----------------|--------|-------------------------|--------|--------------------------|--------|----------------------------|--------|
| | | 1 minimum wage | | 1-5 minimum wages range | | 5-10 minimum wages range | | More than 10 minimum wages | |
| | | Count | % | Count | % | Count | % | Count | % |
| 1 Produtos e serviços certificados são mais confiáveis | I agree | 3 | 100,0% | 15 | 93,8% | 14 | 100,0% | 18 | 100,0% |
| | I neither agree nor disagree | 0 | ,0% | 1 | 6,3% | 0 | ,0% | 0 | ,0% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I disagree | 2 | 66,7% | 10 | 62,5% | 9 | 64,3% | 11 | 61,1% |
| 2 Todo produto certificado é mais caro do que um não certificado | I disagree | 0 | ,0% | 3 | 18,8% | 1 | 7,1% | 2 | 11,1% |
| | I neither agree nor disagree | 1 | 33,3% | 3 | 18,8% | 4 | 28,6% | 5 | 27,8% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 3 | 100,0% | 16 | 100,0% | 13 | 92,9% | 18 | 100,0% |
| 3 Um produto certificado para baixo consumo de energia é mais atrativo | I disagree | 0 | ,0% | 0 | ,0% | 1 | 7,1% | 0 | ,0% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I neither agree nor disagree | 2 | 66,7% | 15 | 93,8% | 12 | 85,7% | 18 | 100,0% |
| 4 Um hotel certificado com três estrelas é melhor do que um certificado com uma estrela | I disagree | 1 | 33,3% | 1 | 6,3% | 1 | 7,1% | 0 | ,0% |
| | I neither agree nor disagree | 0 | ,0% | 0 | ,0% | 1 | 7,1% | 0 | ,0% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 0 | ,0% | 13 | 81,3% | 12 | 85,7% | 15 | 83,3% |
| 5 Eu aceito investir um pouco mais em produtos e serviços certificados | I disagree | 1 | 33,3% | 0 | ,0% | 0 | ,0% | 0 | ,0% |
| | I neither agree nor disagree | 2 | 66,7% | 3 | 18,8% | 2 | 14,3% | 3 | 16,7% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| 6 Ao consumir produtos e serviços, normalmente verifico se são certificados | I disagree | 1 | 33,3% | 3 | 18,8% | 1 | 7,1% | 4 | 22,2% |
| | I neither agree nor disagree | 0 | ,0% | 2 | 12,5% | 5 | 35,7% | 7 | 38,9% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 2 | 66,7% | 11 | 68,8% | 8 | 57,1% | 7 | 38,9% |
| 7 Eu prefiro consumir produtos e serviços com engajamento social certificado (ex preservação do meio ambiente, inclusão de) | I disagree | 0 | ,0% | 1 | 6,3% | 1 | 7,1% | 1 | 5,6% |
| | I neither agree nor disagree | 1 | 33,3% | 0 | ,0% | 1 | 7,1% | 3 | 16,7% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 3 | 100,0% | 12 | 75,0% | 13 | 92,9% | 13 | 72,2% |
| 8 Eu confio nos instrumentos de certificação de produtos e serviços | I disagree | 0 | ,0% | 2 | 12,5% | 1 | 7,1% | 1 | 5,6% |
| | I neither agree nor disagree | 0 | ,0% | 2 | 12,5% | 0 | ,0% | 4 | 22,2% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 3 | 100,0% | 13 | 81,3% | 13 | 92,9% | 15 | 83,3% |
| 9 Certificação de produtos e serviços são utilizados para os valorizar comercialmente | I disagree | 0 | ,0% | 1 | 6,3% | 0 | ,0% | 2 | 11,1% |
| | I neither agree nor disagree | 0 | ,0% | 2 | 12,5% | 1 | 7,1% | 1 | 5,6% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 3 | 100,0% | 13 | 81,3% | 12 | 85,7% | 15 | 83,3% |
| 10 Certificação de produtos e serviços são instrumentos que beneficiam os consumidores | I disagree | 0 | ,0% | 1 | 6,3% | 2 | 14,3% | 0 | ,0% |
| | I neither agree nor disagree | 0 | ,0% | 2 | 12,5% | 0 | ,0% | 3 | 16,7% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 2 | 66,7% | 6 | 37,5% | 9 | 64,3% | 8 | 44,4% |
| 11 Me sinto bem atendido pelo sistema de defesa do consumidor brasileiro | I disagree | 1 | 33,3% | 7 | 43,8% | 4 | 28,6% | 4 | 22,2% |
| | I neither agree nor disagree | 0 | ,0% | 3 | 18,8% | 1 | 7,1% | 6 | 33,3% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 1 | 33,3% | 7 | 43,8% | 6 | 42,9% | 5 | 27,8% |
| 12 O sistema comercial do Brasil é amigável ao consumidor | I disagree | 1 | 33,3% | 8 | 50,0% | 6 | 42,9% | 8 | 44,4% |
| | I neither agree nor disagree | 1 | 33,3% | 1 | 6,3% | 2 | 14,3% | 5 | 27,8% |
| | Total | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |
| | I agree | 3 | 100,0% | 16 | 100,0% | 14 | 100,0% | 18 | 100,0% |

Fig. 20 Income level of respondents

| | | Country Region | | | | | | | | | |
|---|------------------------------|----------------|--------|----------|--------|-------|--------|---------|--------|-------|--------|
| | | Centro Oeste | | Nordeste | | Norte | | Sudeste | | Sul | |
| | | Count | % | Count | % | Count | % | Count | % | Count | % |
| 1 Produtos e serviços certificados são mais confiáveis | I agree | 5 | 100,0% | 12 | 92,3% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| | I neither agree nor disagree | 0 | ,0% | 1 | 7,7% | 0 | ,0% | 0 | ,0% | 0 | ,0% |
| | I disagree | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 2 Todo produto certificado é mais caro do que um não certificado | I agree | 4 | 80,0% | 10 | 76,9% | 6 | 66,7% | 11 | 64,7% | 1 | 14,3% |
| | I disagree | 1 | 20,0% | 2 | 15,4% | 0 | ,0% | 1 | 5,9% | 2 | 28,6% |
| | I neither agree nor disagree | 0 | ,0% | 1 | 7,7% | 3 | 33,3% | 5 | 29,4% | 4 | 57,1% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 3 Um produto certificado para baixo consumo de energia é mais atrativo | I agree | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 16 | 94,1% | 7 | 100,0% |
| | I disagree | 0 | ,0% | 0 | ,0% | 0 | ,0% | 1 | 5,9% | 0 | ,0% |
| | I neither agree nor disagree | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 4 Um hotel certificado com três estrelas é melhor do que um certificado com uma estrela | I agree | 5 | 100,0% | 12 | 92,3% | 8 | 88,9% | 15 | 88,2% | 7 | 100,0% |
| | I disagree | 0 | ,0% | 1 | 7,7% | 0 | ,0% | 2 | 11,8% | 0 | ,0% |
| | I neither agree nor disagree | 0 | ,0% | 0 | ,0% | 1 | 11,1% | 0 | ,0% | 0 | ,0% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 5 Eu aceito investir um pouco mais em produtos e serviços certificados | I agree | 5 | 100,0% | 10 | 76,9% | 7 | 77,8% | 13 | 76,5% | 5 | 71,4% |
| | I disagree | 0 | ,0% | 1 | 7,7% | 0 | ,0% | 0 | ,0% | 0 | ,0% |
| | I neither agree nor disagree | 0 | ,0% | 2 | 15,4% | 2 | 22,2% | 4 | 23,5% | 2 | 28,6% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 6 Ao consumir produtos e serviços, normalmente verifico se são certificados | I agree | 2 | 40,0% | 10 | 76,9% | 5 | 55,6% | 8 | 47,1% | 3 | 42,9% |
| | I disagree | 0 | ,0% | 2 | 15,4% | 1 | 11,1% | 5 | 29,4% | 1 | 14,3% |
| | I neither agree nor disagree | 3 | 60,0% | 1 | 7,7% | 3 | 33,3% | 4 | 23,5% | 3 | 42,9% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 7 Eu prefiro consumir produtos e serviços com engajamento social certificado (ex preservação do meio ambiente, inclusão de pessoas com) | I agree | 3 | 60,0% | 12 | 92,3% | 8 | 88,9% | 14 | 82,4% | 6 | 85,7% |
| | I disagree | 0 | ,0% | 0 | ,0% | 1 | 11,1% | 2 | 11,8% | 0 | ,0% |
| | I neither agree nor disagree | 2 | 40,0% | 1 | 7,7% | 0 | ,0% | 1 | 5,9% | 1 | 14,3% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 8 Eu confio nos instrumentos de certificação de produtos e serviços | I agree | 3 | 60,0% | 12 | 92,3% | 9 | 100,0% | 12 | 70,6% | 5 | 71,4% |
| | I disagree | 0 | ,0% | 0 | ,0% | 0 | ,0% | 3 | 17,6% | 1 | 14,3% |
| | I neither agree nor disagree | 2 | 40,0% | 1 | 7,7% | 0 | ,0% | 2 | 11,8% | 1 | 14,3% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 9 Certificação de produtos e serviços são utilizados para os valorizar comercialmente | I agree | 4 | 80,0% | 12 | 92,3% | 9 | 100,0% | 14 | 82,4% | 5 | 71,4% |
| | I disagree | 1 | 20,0% | 0 | ,0% | 0 | ,0% | 1 | 5,9% | 1 | 14,3% |
| | I neither agree nor disagree | 0 | ,0% | 1 | 7,7% | 0 | ,0% | 2 | 11,8% | 1 | 14,3% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 10 Certificação de produtos e serviços são instrumentos que beneficiam os consumidores | I agree | 5 | 100,0% | 12 | 92,3% | 8 | 88,9% | 13 | 76,5% | 5 | 71,4% |
| | I disagree | 0 | ,0% | 1 | 7,7% | 0 | ,0% | 1 | 5,9% | 1 | 14,3% |
| | I neither agree nor disagree | 0 | ,0% | 0 | ,0% | 1 | 11,1% | 3 | 17,6% | 1 | 14,3% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 11 Me sinto bem atendido pelo sistema de defesa do consumidor brasileiro | I agree | 4 | 80,0% | 6 | 46,2% | 5 | 55,6% | 8 | 47,1% | 2 | 28,6% |
| | I disagree | 1 | 20,0% | 5 | 38,5% | 1 | 11,1% | 6 | 35,3% | 3 | 42,9% |
| | I neither agree nor disagree | 0 | ,0% | 2 | 15,4% | 3 | 33,3% | 3 | 17,6% | 2 | 28,6% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |
| 12 O sistema comercial do Brasil é amigável ao consumidor | I agree | 1 | 20,0% | 6 | 46,2% | 4 | 44,4% | 6 | 35,3% | 2 | 28,6% |
| | I disagree | 3 | 60,0% | 4 | 30,8% | 2 | 22,2% | 10 | 58,8% | 4 | 57,1% |
| | I neither agree nor disagree | 1 | 20,0% | 3 | 23,1% | 3 | 33,3% | 1 | 5,9% | 1 | 14,3% |
| | Total | 5 | 100,0% | 13 | 100,0% | 9 | 100,0% | 17 | 100,0% | 7 | 100,0% |

Fig. 21 Country region of respondents

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Music, Musicology and Music Education

Auditory Alarms Design Tool: Spectral Masking Estimation Based on a Psychoacoustic Model



Frederico Pereira, Rui Marques, and Joana Vieria

Abstract Human ability to detect auditory alarms in the presence of noise has been identified as an issue in various working environments, with potentially serious consequences. Spectral masking of alarms is recognized as a contributing factor to response failures. In this paper, a *GNU OCTAVE* code implementation for the estimation of spectral masking is detailed. The method is based on a psychoacoustic model of the peripheral human auditory system and is suggested as a tool to support the design of efficient auditory alarms. Three scenarios are investigated using standardized clinical auditory alarms as test stimuli: (1) pair of same priority alarms; (2) pair of different priority alarms and (3) alarm in the presence of environmental noise. The implemented method offers a visualization of estimated masked signal spectral components, enabling the sound designer to evaluate manipulations for masking avoidance.

Keywords Masking · Auditory alarms · Psychoacoustics · Healthcare

1 Auditory Alarms

Audibility of warning signals and alarms by professionals in the presence of noise is an issue in various working environments: healthcare, traffic control, industrial production lines, power plants (Stanton 1994), to name a few. In such environments, a pre-programmed machine emits an auditory signal to draw attention and convey information to a human, about some context specific situation. Alarm systems warn of a threshold crossing, while additional sonification allows the listener to infer relationships in the data (Janata and Edwards 2013). There are several advantages of using auditory warning signals and alarms: hearing is the sensorial modality with the fastest

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reaction time (ISO 2005), and it allows for eye-free monitoring of the environment and a peripheral awareness of the state (Hinckfuss et al. 2015) of equipment, products or patients. However, poorly designed auditory alarms can hinder such advantages. Consistent failure on the detectability of an alarm is, as per definition, undesirable and deems such alarm inefficient. These incidents in safety-critical contexts such as healthcare may have serious consequences, which is not uncommonly reported, as evidenced in the listing of auditory alarms as a top hazard in healthcare by the ECRI Institute since 2013 (ECRI Institute 2013, 2018). Stemming from underlying alarm philosophy and sound design, several reasons have been pointed as leading to these incidents:

- the desensitization of professionals due to the elevated number of false alarms, which is known as “alarm fatigue” (Busch-Vishniac 2019; Edworthy 2011);
- an excessive number of auditory alarms in the working environment may cause habituation, distraction and annoyance, resulting in an involuntary tendency of the brain to tune-out those repetitive sounds, a phenomenon called the “cry wolf effect” (Cvach 2012; Edworthy et al. 1995);
- working environment noise levels and characteristics resulting from a variety of sources as equipment, personnel, room properties and other alarms, may in instances render an auditory alarm inaudible (Busch-vishniac et al. 2005; Edworthy 2011; Kracht et al. 2007; Stanford et al. 1985). This effect is what is known in psychoacoustics as “masking”.

In psychoacoustics, a sound that renders other inaudible to a human listener is called *masker*, with the inaudible one the *maskee* (Fallis 2009). In detectability tasks, where it is asked to a participant to listen for and report on the audibility of a target signal in noise, usually the maskee is the target signal, with the masker taken as the *noise* signal. Noise can have much more power than a target signal, but if the spectral regions of noise and target are sufficiently distant, the target will be audible. On the other hand, if both regions coincide, noise needs only to have residual more power than the target to mask it. This is the fundamental of spectral masking of two simultaneous sounds. Spectral masking does not entirely depend on the total power of masker and maskee, but rather on their relative power distribution along frequency (Zwicker and Fastl 2013). One objective of good alarm sound design is so it can be reliably detected at relatively low volume levels, preventing buildup of overall ambient sound levels in the work environment, which have been shown to have adverse effects on healthcare workers, and patients (Ecophon 2018; Edworthy et al. 2018; Patterson 1982; Graneto and Damm 2013).

In healthcare settings, up until the early 1990’s the technology implemented in medical equipment limited the range of alarm types, with most having only capability for simple beeps and buzzes. Today’s equipment with micro-electronics are capable of complex sounds reproduction, enabling a valuable contribution to the issue of masking through careful alarm sound design (Edworthy 1994).

This paper describes a method for the prediction of spectral masking for auditory alarms in healthcare settings. The application context concerns the recent update of

the global standard IEC 60601-1-8 which proposes a set of new auditory alarms optimized for the environmental noise in healthcare facilities. Considering stakeholders will be allowed to design their own set of alarms, the proposed tool intends to support the design process of better and more efficient auditory alarms. The method is based on a psychoacoustic model and was implemented using GNU OCTAVE compatible code (Eaton 2020). First, relevant work related to prediction of masking in alarm design is discussed. Follows a review of the perceptual phenomenon of masking and the modeling of the peripheral hearing system. Finally, the method is applied to three use cases and is described in detail.

2 Masking in Alarm Design

Roy D. Patterson pioneered the study of design methods for auditory alarms based on the human peripheral auditory system processing of sound (*auditory filters*). Patterson's timely work identified key deficiencies and established four principles of alarm design which resulted in a set of guidelines, one of which recommending alarms sound levels. Alarms should be at a level that guarantees detectability, but below levels that result in disruption of performance and annoyance. On a published study investigating warning systems on civil aircraft, the problem of alarm masking by background noise inside the flight-deck was described, and a *power spectrum model* method for its prediction was presented (Patterson 1982). This method implemented a model of the auditory filters based on a mathematical function that correlated well with experimentally measurements (Patterson 1976). Through a power spectrum analysis of background noise and alarm signals, it would be possible to determine the appropriate sound levels for the alarms so to guarantee its audibility in statistical terms. This method predicted the *masking thresholds* of steady non-tonal noise in function of frequency. The threshold is the predicted level for a target to have a detectability with 75% correct answers (Green and Swets 1966). Patterson's alarm design criteria set alarm levels to be +15 dB above this threshold. This value minimizes undesirable near-threshold effects such as interference, poor frequency discrimination and poor localizability (Scharf 1964). The criteria also established an upper limit for the alarm warnings at +25 dB above masking, noting that, from a certain level, the improvement in detectability with increasing level reaches a ceiling, with the aggravating factor that high levels lead to issues of annoyance and communication breakdown, thus increasing potentially hazardous situations.

To date, various methods for masking prediction have been developed, with several based on psychoacoustic models. Psychoacoustic models relate human perception to physical quantities of sound, using mathematical functions that are based on a large number of experimental data. Models that mimic the human excitation patterns on the basilar membrane have proven successful on the prediction of masking (Hasanain et al. 2015). Such methods have long been applied on speech coding systems, where properties of masking are exploited to render digital noise inaudible (Schroeder et al. 1979). More recently, these have also been used on the digital coding of high-quality

audio (*perceptual coding*), for broadcast, internet, and portable audio players. In perceptual coding, masking is estimated for the removal of inaudible audio, so to compress data and reduce file size, yet leaving the decompressed audio perceptually equivalent to the original (Bosi and Goldberg 2003).

In the healthcare context, various researchers have considered the issue of alarm masking (Edworthy 1994; Konkani et al. 2012; Toor et al. 2008). In a recently published study (Bolton et al. 2019); the prediction of spectral masking using a previously established method (Hasanain et al. 2017) was experimentally validated with application to IEC60601-1-8 conformant clinical alarms (AAMI 2013). The experiments evaluated the simultaneous masking of two concurrent (tonal) alarms, with masking prediction based on the alarms' primary harmonics interaction. The method employed is underpinned by the psychoacoustic model of the Bark scale (Zwicker 1961), a mapping of audio signal frequency in hertz (Hz) to excitation patterns of the hearing system, that has been extensively used and validated. Results confirmed that participants had more difficulty on detecting signals the method predicted as masked, with misses close to 50%.

2.1 Auditory Alarms in IEC 60601-1-8

The global medical device standard IEC 6060-1-8 was developed includes general requirements for the design of the alarms used in medical equipment. The rationale consists in simple melodic alarm sounds to distinguish the alarm sources (Vieira et al. 2019), intended to help clinicians discriminate the source of the alarms. The alarm philosophy behind this medical standard is based on patient harm, and is related with one of seven risk categories, plus a "general" category. These categories are "Cardiac", "Ventilation", "Temperature/Energy delivery", "Equipment or supply failure", "Artificial perfusion", "Oxygen", "Drug or fluid delivery" and "General". For each category there are variations for medium and high priority.

The alarms proposed in the standard are under major updates (Edworthy, McNeer et al. 2018; Edworthy et al. 2018b) which come as a response to experimental research that systematically identified several problems with the standards' auditory alarms. The major problem was that the melodies were hard to learn and easily confused with each other (Edworthy et al. 2013; Wee and Sanderson 2008). The updated standard proposes the replacement of the melodies with the use of experimentally tested auditory icons, which are everyday sounds that can act as metaphors for what they represent (e.g.: the sound of a rattling pillbox can be associated with the "drug administration" alarm function). This update allows stakeholders and manufacturers to develop their own set of auditory alarms, if they obey the standard's performance and usability metrics.

3 Human Peripheral Auditory System Modeling

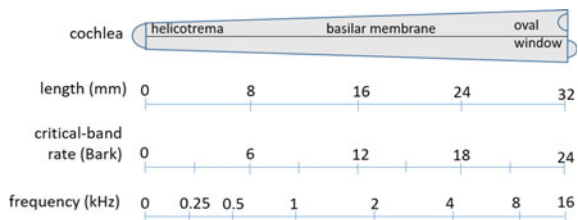
The psychoacoustics of simultaneous masking consist of a mathematical formulation of the physiologic processes of hearing, modelling the effects of spectral and temporal physical characteristics of a sound on the production the perceptual masking phenomenon.

Sound undergoes non-linear transformations as it travels from the outer ear through the middle ear and to the inner ear. In the inner ear, along cochlea’s coiled length, the basilar membrane hair cells resonate at distinct locations according to a distinct range of excitation frequencies (*critical bandwidth*), akin to a decomposition of the signal into frequency components, acting as a spectrum analyser. These excitation patterns are well described in terms of distances along the basilar membrane and give explanation for the sound discrimination ability of the human hearing. Conveniently, a mapping of hair cells position in the basilar membrane to frequency has been derived, resulting in the Bark scale (Zwicker and Fastl 2013). Critical bandwidths measure one Bark of length, a constant distance along the basilar membrane (Fig. 1).

The Bark scale enables a perceptual modelling of the auditory system cochlear “spectrum analyser” as a set of overlapping band-pass filters with bandwidths equal to the experimentally measured critical bandwidths. It translates from sound frequency content to regions of excitation on the basilar membrane, a feature used for the prediction of simultaneous masking. Considering a sound that is exciting determined region of the basilar membrane, if an added concurrent sound is to excite that same region, but having such an intensity that causes only a minor increase of overall hair cells excitation, it will be imperceptible (masked).

Data collection on experimental measurements of masking curves demonstrated how the masking curve shape changed with distance from the masker frequency as well as its dependence on masker level. The masking curve level would decrease with this distance, explained by the downward spreading of masker’s excitation energy along the basilar membrane. Mathematical description of this behaviour resulted in formulation of masking *spreading functions* (Bosi and Goldberg 2003).

Fig. 1 Schematic representation of the mapping along basilar membrane position to Bark critical-band rate and frequency



4 Masking Estimation Method

The proposed masking estimation method is fundamentally a computation of the global masking threshold for a given audio signal, and its implementation is based on the psychoacoustic model 1 developed by MPEG (Moving Pictures Expert Group) as standardized in ISO/IEC 11172-3:1993. MPEG model 1 is built upon the psychoacoustics principles presented in Sect. 3. As relative temporal and spatial positions between masker and maskee are not under the control of the designer (nor predictable), temporal masking and sound image spatial segregation factors are intentionally left unconsidered. Therefore, the method only accounts for spectral masking of tonal and non-tonal components, disregarding temporal and binaural cues effects on masking. Specifically then, the calculated threshold is a simultaneous masking curve. For its calculation, three variables must be evaluated: (1) the absolute threshold in quiet (LT_q), and (2) the decomposition of a complex sound in tonal and (3) non-tonal components.

LT_q , represents for noiseless conditions, the level required for the audibility of a pure tone in function of its frequency. This curve is here approximated with values as specified in ISO/IEC 11172-3:1993. Audio signals that fall below the curve are predicted imperceptible for a normal hearing human.

The tonal and non-tonal components from a complex sound are identified through a Fast Fourier Transform (FFT) analysis of the masker signal. Calculating its power spectral density, local spectral peaks within a critical-band are identified as tonal components, while the remaining are deemed to be non-tonal (noise-like). This discrimination is necessary as the masking abilities of these types of components differ, with non-tonal being better maskers than tonal (Bosi and Goldberg 2003).

Clinical experience has shown that values between 45 dB and 85 dB can be reliably detected without being too intrusive in most situations (AAMI 2013), as such, on the presented implementation description, alarm signals are set to 80 dB equivalent level (Leq).

Spectral analysis of a masker signal is performed in (n) blocks. As specified in ISO/IEC 11172-3:1993, for layer I, a 512 point-FFT is applied to each block of 384 samples size. Blocks are evaluated successively, and for each, the following steps describe processing:

- 1- Spectral analysis via FFT
- 2- Tonal and non-tonal components identification
- 3- Tonal and non-tonal components decimation
- 4- Individual masking calculation for tonal and non-tonal components.
- 5- Global masking threshold computation

All steps are detailed in the following sub-sections and the respective code provided in the Appendix.

4.1 Step 1: Spectral Analysis (FFT)

An FFT with 512 points is performed to the current analysis block. In order to minimize edge effects, a Hann window with 512 samples size (N) is applied (ISO/IEC 11172-3:1993):

$$h(n) = \sqrt{\frac{8}{3}} \times \frac{1}{2} \times \left[1 - \cos\left(\frac{2\pi n}{N}\right) \right] \quad 0 \leq n \leq N - 1 \quad (1)$$

Next, the power spectral density (PSD) estimate calculation for the analysis block:

$$X(k) = 10 \log_{10} \left| \frac{1}{N} \left[\sum_{n=0}^{N-1} s(n) \cdot h(n) \exp\left(-j \frac{2\pi nk}{N}\right) \right] \right|^2 \quad 0 \leq k < \frac{N}{2} \quad (2)$$

With $X(k)$ being the values of power, and $s(n)$ the input signal.

4.2 Step 2: Tonal and Non-tonal Components Identification

Identification, Listing and Level Calculation of Tonal Components. Tonal maskers within each critical band are identified from spectral peaks if the maximum level is at least 7 dB higher than neighbouring components within a specified frequency distance. Critical band boundaries are specified in ISO/IEC 11172-3:1993. Tonal components are verified with the following conditions:

$$X(k) \geq X(k + 1) \ \& \ X(k) \geq X(k - 1) \quad (3)$$

$$X_{(TM)} = \{X(k) | [X(k) - X(k \pm D_k)] \geq 7 \text{ dB}\} \quad (4)$$

D_k represents the frequency distance around the local maximum, given by:

$$D_k \in \begin{cases} \{\pm 2\} & 2 < k < 63 \quad (0.17 - -5.5 \text{ kHz}) \\ \{\pm 2, \pm 3\} & 63 < k < 127 \quad (5.5 - -11 \text{ kHz}) \\ \{\pm 2, \pm 3, \dots, \pm 6\}, & 127 < k < 250 \quad (11 - -20 \text{ kHz}) \end{cases} \quad (5)$$

Values of D_k in the range of $250 < k < 257$ are not considered, as in this region masking is assumed to be dominated by the threshold in quiet.

Next, considering the additive property of spectral masking, the power level of each identified component is estimated:

$$X_{TM}(k) = 10 \log_{10} \left\{ 10 \frac{x(k-1)}{10} + 10 \frac{x(k)}{10} + 10 \frac{x(k+1)}{10} \right\}, \text{ em dB} \quad (6)$$

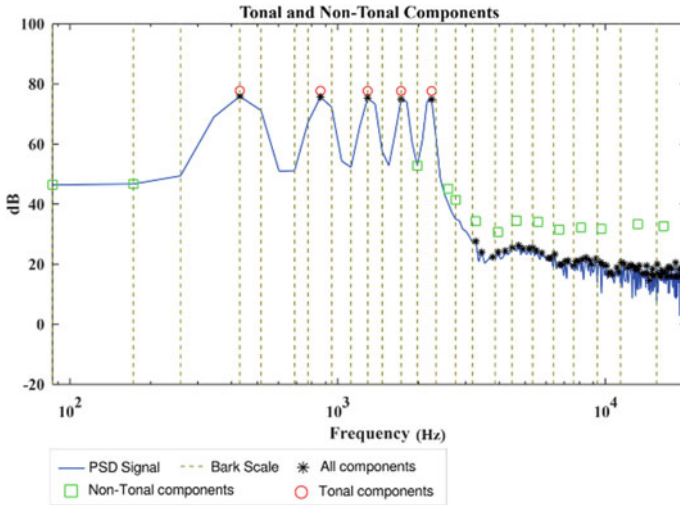


Fig. 2 The plot shows tonal components (red circle), non-tonal components (green squares) and all components contributing to masking (black asterisks). Note that non-tonal spectral lines are encapsulated into a single non-tonal component per critical band in Barks

Identification, Listing and Level Calculation of Non-tonal Components. The remaining of spectral lines which were not qualified as tonal components are taken as non-tonal (Fig. 2). In each critical band, these are summed up to give a single non-tonal component:

Non-tonal components SPL is obtained from:

$$X_{NM}(\bar{k}) = 10 \log_{10} \sum_j \left[10 \frac{X(j)}{10} \right] \forall P(j) \notin S_{TM} \tag{7}$$

4.3 Step 3: Decimation of Tonal and Non-tonal Masking Components

Not all identified components are taken into account in the global masking estimation. Evaluation of relevance of each component is according to:

- Only components above absolute threshold in quiet (LT_q) are relevant for masking.

$$X_{TM} \geq LT_q(k) \text{ ou } X_{NM} \geq LT_q(k) \tag{8}$$

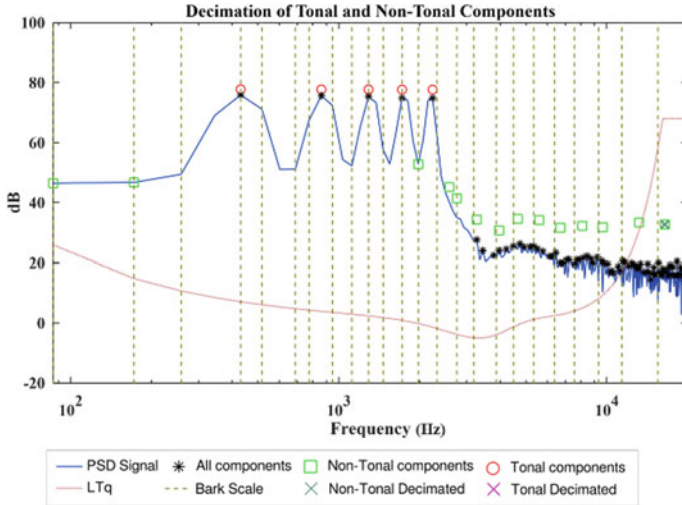


Fig. 3 After the decimation procedure, only a number of components are kept for the masking estimation. The plot relates to Fig. 2's identified components that remain after decimation

With $LT_q(k)$ the values of threshold in quiet for frequency index (k).

The spectral distance between tonal components within a critical band is also evaluated. If components are within 0.5 Barks, only the highest power component is accounted for in masking estimation (Fig. 3).

4.4 Step 4: Tonal and Non-tonal Individual Masking Estimation

After decimation, the individual masking threshold is calculated for each kept tonal and non-tonal components. From all of the 256 frequency components (512-point FFT) indexed by k , the psychoacoustic model 1, considers only a subset on the masking computation (indexed by i). ISO/IEC 11172-3:1993 specifies the subset according to sampling frequency and model layer. Individual masking thresholds are computed for tonal components (9) and for non-tonal components (10), with the equations below:

$$LT_{tm}[z(j), z(i)] = X_{tm}[z(j)] + av_{tm}[z(j)] + vf[z(j), z(i)] \text{ dB} \quad (9)$$

$$LT_{nm}[z(j), z(i)] = X_{nm}[z(j)] + av_{nm}[z(j)] + vf[z(j), z(i)] \text{ dB} \quad (10)$$

Where LT_{tm} and LT_{nm} are respectively the tonal and non-tonal individual masking thresholds in a critical band rate z in Bark.

For tonal maskers:

$$av_{tm} = -1,525 - 0,275.z(j) - 4.5 \text{ dB} \tag{11}$$

For non-tonal maskers:

$$av_{nm} = -1,525 - 0,175.z(j) - 0.5 \text{ dB} \tag{12}$$

The masking spreading function vf is characterized by different slopes, depending on the Bark distance $dz = z(i) - z(j)$ to the masker. The critical band rates $z(j)$ and $z(i)$ can be found in ISO/IEC 11172-3:1993. The tonal and non-tonal masking spreading functions are defined as below:

$$vf = 17.(dz + 1) - (0,4.X[z(j)] + 6) \text{ dB for } -3 \leq dz < -1 \text{ Bark} \tag{13}$$

$$vf = (0,4.X[z(j)] + 6) \text{ dB for } -1 \leq dz < 0 \text{ Bark} \tag{14}$$

$$vf = 17.dz \text{ dB for } 0 \leq dz < 1 \text{ Bark} \tag{15}$$

$$vf = -(dz - 1).(17 - 0.15.X[z(j)]) - 17 \text{ dB for } 1 \leq dz < 8 \text{ Bark} \tag{16}$$

The term $X[z(j)]$ is the SPL of the j^{th} masking component. For simplicity, masking is only considered if $-3 \leq dz < 8$ Bark.

Figure 4 demonstrates an attenuation relative to signal PSD and individual

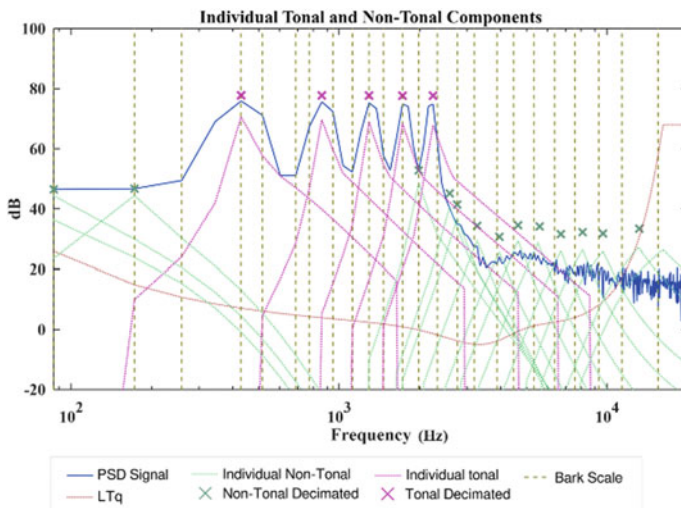


Fig. 4 Individual masking threshold of tonal and non-tonal components

maskers. This derives from application of the masking index (av), a term that varies in agreement with the masking spreading function (vf) (Bosi and Goldberg 2003).

4.5 Step 5: Global Masking Threshold Computation

The global masking threshold $LT_g(i)$ is derived from an envelope of the individual tonal and non-tonal masking thresholds resultant from each block analysis at the frequency i , while taking the threshold in quiet into account as well. $LT_g(i)$ is computed summing the powers corresponding to the envelope of tonal and non-tonal individual masking thresholds and the threshold in quiet, as per the Eq. (17) below:

$$LT_g(i) = 10\log_{10}\left(10^{LT_q(i)/10} + \sum_{j=1}^m 10^{LT_{tm}[z(j), z(i)]/10} + \sum_{j=1}^n 10^{LT_{nm}[z(j), z(i)]/10}\right) \tag{17}$$

To find the envelope total global masking correspondent to the whole time signal, we need to extract the maximum values from each block analysis:

$$LT_g Total = \max(LT_g(i)) \tag{18}$$

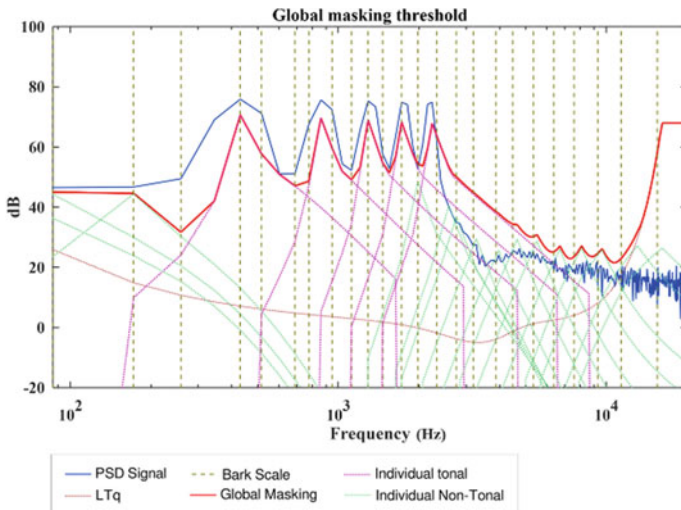


Fig. 5 The estimated (total) global masking threshold

Figure 5 shows the estimated total global threshold, which takes the maximum values from individual and in quiet thresholds after all blocks analysed. It is in a sense, an envelope of the global masking threshold resultant from all blocks that comprise the whole signal duration.

5 Case Studies

For auditory alarms, two masking scenarios are usually foreseen, (1) environmental noise that renders an alarm inaudible, and (2) alarms that render another alarm inaudible (Lacherez et al. 2007).

In this section three case studies are presented, with two investigating masking between alarm signals and a third examining the audibility of an alarm in the presence of environmental noise. The alarms analyzed were designed in agreement with the updated specifications of ANSI/AAMI/IEC 60601-1-8:2006, with alarms' structure comprising of two "audio blocks": a priority ID signalling followed by a category indication. For environmental noise maskers, levels were set after calibrated measurements taken by the authors, in real hospital settings during different surgeries. Table 1 characterizes alarms categories and environmental noise with their corresponding reproduction level.

5.1 Same Priority Alarms (HP)

For the two High priority (HP) alarms (Fig. 6), the analysis shows similar spectral components around the primary harmonic range (445 Hz), as expected from the same HP ID signalling used. In such cases of two simultaneous HP alarms, none should have detectability preference over the other. For the example presented,

Table 1 Categories and levels for each of the signals used in the three case studies

| Signal categories and priority | Priority ID primary harmonic (Hz) | LeqA (dBA) |
|---|-----------------------------------|------------|
| Cardiac alarm (High priority) | 445 | 80 |
| Ventilation alarm (High priority) | 445 | 80 |
| Oxygen alarm (Low priority) | 218 | 80 |
| Perfusion (Medium priority) | 218 | 80 |
| Environmental noise (Urology surgery recording) | n/a | 73 |

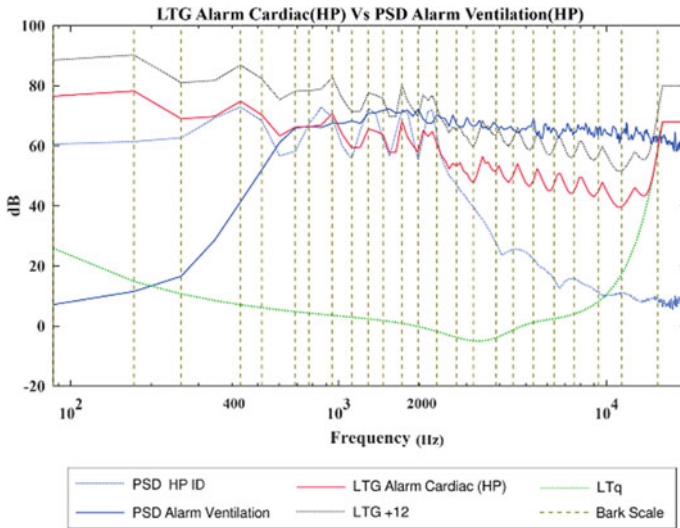


Fig. 6 Masking analysis between two same priority alarms (High priority) with different categories (Cardiac and Ventilation)

where masking of Ventilation by a Cardiac alarm is evaluated, a compromise solution is to have Ventilation components floating around masking threshold levels. As for instance from around 1 to 2 kHz, where components of the Ventilation alarm show slightly above masking threshold, suggesting that in that range, the Ventilation signal will be audible, although at reduced loudness. From 2 kHz upwards, the Ventilation components appear significantly above masking threshold (>12 dB), the sound designer could then decrease these Ventilation higher components to levels floating around the masker threshold, if possible with intercalated critical bandwidth (Bark scale) peaks such that some components of each alarm will be discriminated, hinting at the presence of two distinct signals.

5.2 Different Priority Alarms (High Priority and Medium Priority)

In this example, a HP alarm audibility is evaluated in the presence of a Medium priority (MP) masker alarm (Fig. 7). The HP primary harmonic level at 445 Hz is marginally above threshold, with the upper harmonics in the 800 to 2500 Hz range, appearing close to threshold levels. An HP signalling ought to be well audible over the MP alarm, thus, its harmonics should be manipulated to levels around +12 dB above masking threshold. The HP alarm Oxygenation category signalling energy is mostly on the lower frequency range, with levels significantly above masking threshold. In order to avoid interference with the HP ID primary harmonic at 445 Hz, the category

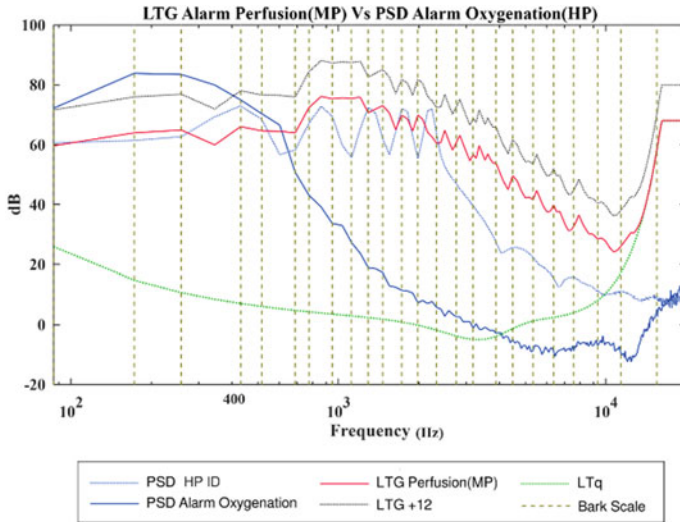


Fig. 7 Masking analysis between two alarms of different priorities and categories. Medium priority Perfusion alarm (masker) and High priority Oxygen alarm

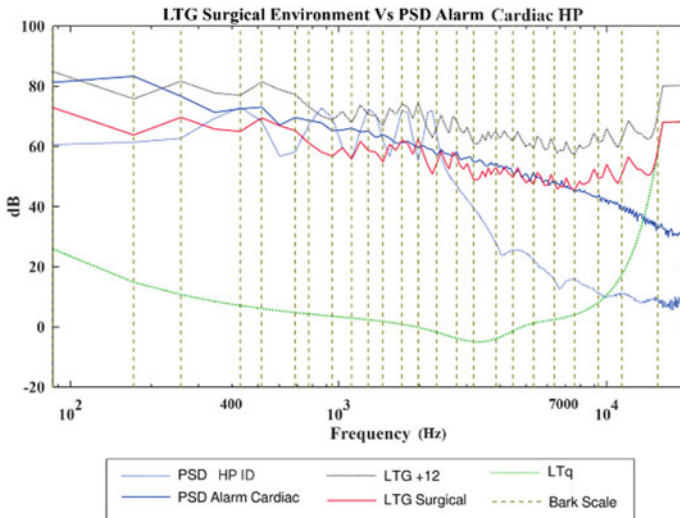


Fig. 8 Masking threshold estimation of environmental noise from an urology surgery against a High priority Cardiac alarm's spectral components

signal may be reduced in this region, while increasing its energy at midrange to masking levels This solution aims at inducing perception of two distinct alarms, while giving a preference to HP ID signaling detectability.

5.3 *Environmental Noise as Masker and High Priority Alarm*

Figure 8 shows the estimated global masking threshold for the environmental noise against spectral components of a HP Cardiac alarm. The alarm's spectral components are, up until 7 kHz, above the estimated masking curve. However, the relative gain is not as significant as to clearly avoid near-threshold effects, particularly for the HP ID primary harmonic (445 Hz). Therefore, although audible for a listener, the alarm signal might suffer from noise interference, poor frequency discrimination and poor localizability. It is suggested that in such a scenario, with no possibility of manipulation of masker (environmental noise), a level gain applied to the alarm should be considered, so its components are well above masking threshold.

6 Conclusion

A method implementation for the estimation of global masking threshold was presented. The method, based on the psychoacoustic model 1 as specified in ISO/IEC 11172-3:1993, identifies tonal and non-tonal components of a complex sound and from these, based on the additive properties of spectral masking, estimates a global masking threshold. Spectral masking of alarms is to be avoided, and the presented method is suggested as a useful tool to aid the design of alarms, producing a visualization of the predicted spectral masking regions. From the visual inspection of generated plots, it is possible for the sound designer to discern if a given alarm's components are above or below the estimated global threshold. From these depictions, the alarm can then be manipulated so to have components above the global threshold curve. The alarm sound designer may then perform frequency energy manipulations as to circumvent the masker threshold, enhancing audibility for the analyzed scenario.

It should be noted that the suggested method accounts for spectral masking only, and care must be taken to consider the effects of temporal masking. In general, alarms emitted from different locations will benefit from the ability of the human binaural hearing system for source spatial discrimination (Uchiyama et al. 2007).

6.1 *Future Work*

The method is based on sound psychoacoustic models, hence, it is expected to correlate well with human perception. However, experimental measurements with human participants should be carried out to validate the proposed implementation of global masking estimation for the specific intended use of alarm audibility in the presence of a masker. Inclusion of this validation in this paper has not been feasible

due to the impossibility of collecting experimental measurements with participants, consequence of the Covid19 pandemic restrictions.

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APPENDIX

Global Masking Threshold Estimation Octave GNU Code

Step 1: Spectral Analysis (FFT)

Equation (1)
 $h = \sqrt{8/3} * \text{hanning}(512, \text{'periodic'})$;

Equation (2)
 $X = \max(20 * \log_{10}(\text{abs}(\text{fft}(s .* h)) / \text{FFT_SIZE}), \text{MIN_POWER})$;

Step 2: Tonal and Non-tonal Components Identification

Equation (3)
 $\text{if}(X(k) > X(k-1) \ \&\& \ X(k) \geq X(k+1) \ \&\& \ k > 2 \ \& \ k \leq 250)$

Equation (4)
 $\text{for } j = J,$
 $\text{is_tonal} = \text{is_tonal} \ \&\& \ (X(k) - X(k + j) \geq 7);$
 end

Equation (5)
 $\text{if}(2 < k \ \&\& \ k < 63)$
 $J = [-2 \ 2];$
 $\text{elseif}(63 \leq k \ \&\& \ k < 127)$
 $J = [-3 \ -2 \ 2 \ 3];$
 $\text{elseif}(127 \leq k \ \&\& \ k < 250)$
 $J = [-6:-2, 2:6];$
 else
 $\text{is_tonal} = 0;$
 end

Equation (6)
 $\text{Tonal_list}(1, 2) = 10 * \log_{10}(10^{X(k-1)/10} + 10^{X(k)/10} + 10^{X(k+1)/10});$

equation (7)
 $\text{power} = 10 * \log_{10}(10^{(\text{power}/10)} + 10^{X(k)/10});$
 $\text{weight} = \text{weight} + 10^{X(k)/10} * (\text{TH}(\text{Map}(k), \text{BARK}) - \text{TH}(\text{CB}(i), \text{BARK}));$

Step 3: Decimation of Tonal and Non-tonal Components

Equation (8)

```

if (Non_tonal_list(i, SPL) < TH(Map(k), ATH))
  DFlags(k) = IRRELEVANT;
else
  DNon_tonal_list = [DNon_tonal_list; Non_tonal_list(i, :)];
End

if (Tonal_list(i, SPL) < TH(Map(k), ATH))
  DFlags(k) = IRRELEVANT;
else
  DTonal_list = [DTonal_list; Tonal_list(i, :)];
End

```

Step 4: Tonal and Non-tonal Individual Masking Estimation

equation (9)

$$LTt(k, i) = \text{Tonal_list}(k, \text{SPL}) + \text{avtm} + \text{vf};$$

equation (10)

$$LTn(k, i) = \text{Non_tonal_list}(k, \text{SPL}) + \text{avnm} + \text{vf};$$

equation (11)

$$\text{avtm} = -1.525 - 0.275 * z_j - 4.5;$$

Equation (12)

$$\text{avnm} = -1.525 - 0.175 * z_j - 0.5;$$

Equation (13,14,15,16)

```

if (-3 <= dz && dz < -1)
  vf = 17 * (dz + 1) - (0.4 * X(j) + 6);
elseif (-1 <= dz && dz < 0)
  vf = (0.4 * X(j) + 6) * dz;
elseif (0 <= dz && dz < 1)
  vf = -17 * dz;
elseif (1 <= dz && dz < 8)
  vf = -(dz - 1) * (17 - 0.15 * X(j)) - 17;
end

```

Step 5: Global Masking Threshold Computation

Equation (17)

$$\text{temp} = 10^{(LTq(i) / 10)} + 10^{(LTt(j, i) / 10)} + 10^{(LTn(j, i) / 10)};$$

$$LTg(i) = 10 * \log_{10}(\text{temp});$$

Equation (18)

$$LTgTotal = \max(LTg(i));$$

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Epistemic Virtues as Theoretical Bridges Between Design and Arnold Schoenberg's String Quartet op. 7



Washington Morales Maciel

Abstract Arnold Schoenberg's refusal of ornaments is usually interpreted as a refusal of an entire epocal *sense* and *sensibilia*. In particular, modernism, *art déco*, or *Jugendstil* design seem to have embodied that rejected sensibility by Schoenberg. It seems that music can call into question certain forms of life by calling into question a materialization of these forms. Nevertheless, the immediate systematic communication between design and music is not obvious, because it is also not obvious at all which the relationships between music and the forms of life are. From Egon Friedell's notes on his experiences visiting Vienna interior designs, I isolate a set of general assumptions implied in Vienna's indoor spaces. Everyday life in Vienna can be better comprehended by analyzing these notes than a collection of interpretations of *art déco* pieces. That set of assumptions is compared with a set of epistemic virtues involved in the composition of the String Quartet op. 7 by Arnold Schoenberg. His technical problems emerged from the specific non-technical beliefs. It is not an analogical level what determines the communication of design and music, but precisely the pre-theoretical level of each discipline. I argue that the String Quartet op. 7 is the acoustic embodiment of a Schoenberg's critical statement, that is, a complex disjointed unity of elements is not a condition of a more authentic expression.

Keywords Arnold schoenberg · Modernist design · Theoretical virtues

1 Preliminary Notes

“Music should not be decorative, but true” (*die Musik soll nicht schmücken, sie soll wahr*).

That aphorism, attributed to Arnold Schoenberg, has become one of the most analyzed statements on the relationship between modern music and modernist design. It is present in several academic writings according to which it is a fact that we can find a rejection of some trends in modernist design in Schoenberg's music. As it has been

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pointed out more than once, that aphorism allows us to reach theoretical intersections among different characters of Schoenberg's Vienna. It seems that the fight against the uses and abuses of ornaments was common to philosophy, to design, to architecture, to literary criticism, and to music too. If we assume material, methodological and instrumental identities among these practices, the theses about the schoenbergian refusal of heavily ornamented interior, industrial, and visual design would not be problematic. Nevertheless, it is a real theoretical problem.

In order to determine connections from schoenbergian music and industrial and interior design, it seems also necessary to transcend the question concerning the analogical level of our language when referring to lines, ornaments, and symmetry in music, as well as lines, ornaments, and symmetry in industrial and interior design. According to Walter Frisch, 'In fact, line in music, by which we usually mean a coherent succession of tones, might not necessarily fulfill the same technical or aesthetic function as line in a drawing' (Frisch 1990, 143). That analogical level defines many approaches to Schoenberg's music and modernist design. What I'm looking for here is to provide another strategy to specify this relationship between music and design. I do not pretend to dissolve the analogical or metaphorical nature of transdisciplinary terms as *line*, *symmetry*, and *ornament*, that is, I do not intend the impossible task of translating every content-specific concept of one practice into another of another practice. Rather, I determine the general rational principles tacitly shared by design and music, I mean, I determine some epistemic virtues implied in a pre-technical level of each practice. On one hand, the materials of interior and industrial Viennese design production were organized through a principle of complexity of elements and, on the other hand, the schoenbergian composition was organized by epistemic virtues such as economy and simplicity.

I hold that the technical level (problems and solutions) of Schoenberg's String Quartet op. 7 implies the rejection of the following modernist design assumption: the more (numerically) complex a piece of design is, the more success that piece will have. In the first section, I describe the predominant Vienna's social sensibility in order to characterize some design's underlying rational virtues. I am interested in the qualities of the standard Viennese interior and industrial design, because, as mentioned, it shows us more clearly than visual design and arts what the Viennese everyday sensibility was. Although the visual arts, such as painting, has had - and still has - an enormous influence on visual design and, for its part, the visual design was a great part of everyday Viennese life, by means of industrial and interior design, we can better approach the most private aesthetic valuations of Viennese population, so we can better approach the private Viennese sensibility. Industrial and interior design are not merely sets of technical practices and objects; they are also materializations of forms of life. In the second section, I try to elucidate schoenbergian comments on his own work in order to isolate the epistemic virtues chosen by him to compose his String Quartet op. 7. In the final section, I compare the results from the two previous sections.

2 Everyday Life in Design

It is a well known historical fact that design assimilated different visual arts throughout history, especially painting. Let us think, for example, of the connections between *art déco* posters and secessionist paintings. We can point out some conditions which have allowed that cultural peculiarity. The sophisticated technical reproduction of images played its part in that process, as well as the general economic European context, that is, the industrial revolution. In general terms, everyday life was becoming more and more aestheticized, because designers had the suitable means to produce high amounts of printed design pieces, functional designed pieces for everyday life and, of course, the most efficient means to design indoor spaces. For its part, another extraordinary process has happened over the years. The European expansion around the world introduced a lot of anthropological valued objects from 'exotic' regions. The museums of natural history showed great interest in those objects, as masks, stamps, fabrics, clothing, and musical instruments. Nevertheless, the museums were not the only institutions interested in appropriating these objects, but also the famous and much attended World Fairs. Art reproductions, occidental industrial objects, and objects from distant regions of the globe constituted the set of materials used to decorate and design everyday life. In order to take a quick look at the absorption of these trends by everyday life, we can analyze the notes by Egon Friedell (1932) on the interior design, industrial design and visual indoor characteristics in the Schoenberg's Vienna.

According to Friedell, the interiors were irritating, because they were '... overcrowding, overloading, overfurnishing' (Friedell 1932, p. 209); and by virtue of that overloading aspect, the '... rooms [...] were not living-rooms, but pawnshops and curiosity-shops' (idem). Moreover, according to Friedell, '... the taste for ornament and polychromic made itself felt. The more twists and scrolls and arabesques there were in the designs, the louder and cruder colour, the greater the success. In connexion with this there is a conspicuous absence of any idea of usefulness or purpose; it was all purely for show' (Friedell 1932, pp. 299–300). The exhibitiv character has become to such an extent that 'We note with astonishment that the best-situated, most comfortable and airy room in a house (the 'best room') was not intended to be lived in at all, but was only there to be exhibited to friends. We see, too, a number of things which, though costly, contribute nothing to comfort.' (idem). The diversity of objects, regarding their geography, style, and anthropology, gives to those interiors the appearance of a pocket edition of a World Fair. Statues, desiccated animals, distant printed fabrics, design objects overloaded of arabesques made the interior escapes of the Vienna's houses.

From that description, it is interesting to emphasize four main facts: firstly, the great amount of objects posited in the indoor spaces of these houses, secondly, the great and disconnected nature of that set of objects, thirdly, the 'proper' characteristics of every object, that is, *overloaded* and *exotic* objects, and, fourthly, the social objective pursued by their use. All these four facts point out to a specific axiological decision concerning, on one hand, a preference for no organic character

of a complex whole and, on the other hand, a preference for the direct relationship between complexity and success. Given that the success was well defined, according to Friedell, by an exhibitivistic goal, then the more disconnected complex whole of interior objects, the greater social appraisal of the houses' interiors. Numerical complexity of elements and their disjointed character were the conditions for a successful interior, visual, and industrial design. The sociological nature of interior design can be clearly determined by the high relevance of posting a lot of exotic objects to the detriment of an organic conjoint unity.

That disjoint character of the whole was the distinctive social note among the different agents. Therefore, we have the following interconnected levels in design: its diverse materials, its basic axiological and epistemic assumptions, and its social signification. The modernist design's preference for higher numerical disjoint complexity also implies the naturalization of that assumption and, finally, a game of social distinctions. The social relationships involved in diverse sensibilities went through the design materiality of that time (all its forms and contents diachronically viewed).

3 Epistemic Virtues: From World to Music and Vice Versa

Design has always carried iconographic, symbolic, and iconic meanings.¹ Its immediately thematic connection with the world compels us to transcend a formalist aesthetic point of view in music in order to determine some kind of communication between these two disciplines. If we accept, for example, the classic formalist doctrine by Eduard Hanslick, music becomes incommensurable with any other art or verbo-visual practice. In that formalist framework, the meaning of music is only determined by its 'tonally moving forms' (Hanslick 1986, 29). Therefore, there is no place for an imaginative or gestural connection between the dynamic set of music sounds and any forms of perceiving or organizing the world. If we compare music to language, verbo-visual productions or material design pieces, the specificity of music impels us to see more than merely sounds in music.

Theodor W. Adorno saw in Schoenberg's music the embodiment of a formalist trend, but precisely by virtue of that trend, schoenbergian music had great success in showing its social context of production. In Adorno's words '... one possible answer to the question about the dignity of Schoenberg's work would be the fact that it leaves itself without windows to its own tendency, it encapsulate, without a doubt, the whole spirit of its time' [my translation] (Adorno 1982, 344). How is it possible? The answer given on Adorno's texts is not a clear and rigorous one. Nevertheless, he pointed out that the ornamentless character of schoenbergian composition conducted the *Jugendstil* to expressionism; that transition was not a consequence of a stylistic decision by Schoenberg, but, according to Adorno, the consequence of dealing with particular compositional problems involved in rejecting ornaments in music. The elucidation of the uses of "ornament" in each disciplinary context can be an old

¹Associated to modernist design, it is a very interesting reading Harland and Liguori (2019).

possible way out of the adornian vagueness; however, despite the great hermeneutic value of analogies, there is not a possible univocal semantic behavior of “ornament”. We can accept different semantic analogies of using “ornament” in different contexts and, at the same time, take a step back from the technical level and analyze the non-technical convictions and appraisals implied in the technical level. Adorno’s comment on the schoenbergian bridge between technical problems and rejecting ornaments is my starting point. Schoenberg’s remarks about his own String Quartet op. 7 can be a tool to elucidate that technical-non-technical connection.

In 1946, Schoenberg wrote: ‘Some forty years ago I was composing my String Quartet No. 1, Op. 7. Usually taking morning walks, I composed in my mind forty to eighty measures complete in almost every detail. I needed only two or three hours to copy down these large sections from memory’ (Schoenberg 1950, 166). Actually, Schoenberg composed his first string quartet during 1904 and 1905, which is itself a very strange musicological fact, as Schoenberg did not use to spend a long time in his compositions. The ambitious initial Schoenberg pretensions compelled him to a hard discontinuous work during that year. That inspired beginning stopped intermittently and gave the way to other compositions less problematic. The quartet can take almost fifty minutes to play, but it is not a traditional sonata constituted by four separated movements. That final result of almost fifty minutes consists in an integral movement that can be analyzed in terms of a traditional sonata; however, the whole acoustic piece’s appearance is a unity. According to Schoenberg, ‘... I learned, from the ‘Eroica,’ solutions to my problems: how to avoid monotony and emptiness; how to create variety out of unity; how to create new forms out of basic material; how much can be achieved by slight modifications’ (Schoenberg 2003, 358). That economic, full, and axiomatic unity set out a big challenge to Schoenberg, because the pretension of reducing an entire musical building to a simple or basic material did almost contradict the also ambitious pretension of making up a long unity.

We shall see two elements involved in Schoenberg’s solution to that temporary contradiction. On one hand, I introduce two schoenbergian categories of musical analysis which are not strictly technical ones. They are implied in Schoenberg’s musical analysis and compositions, and they also imply a set of epistemic virtues. On the other hand, I briefly introduce a thesis held by Mark Benson (1993) according to which a program or a somewhat abstract schematic story written by Schoenberg itself served as a heuristic tool to him. Finally, as I already mentioned, in the fourth section of this paper, I summarize the above conclusions from Egon Friedell’s notes in the light of Schoenberg’s organicist assumptions.

3.1 Epistemic Virtues and Organicism

In *Fundamentals of Musical Composition*, Schoenberg explicitly states that the big fundamental problem of a musical composition is the labile equilibrium between intelligibility and monotony, because intelligibility in music “... seems to be impossible without repetition” (Schoenberg 1967, 20) and, at the same time, ‘... repetition

without variation can easily produce monotony' (idem). Here, not only the Schoenbergian general solution to that question is interesting to us, but also the main philosophical keys assumed in that general compositional problem, which, for its part, made all sense to Schoenberg. Departing from his answer to his own question, we can reach some hints to determine the general aesthetic (and metaphysical) assumptions of that problem. Concerning his answer, Schoenberg also wrote: 'Only so much variation as character, length, and tempo required should be admitted the coherence of motive-forms should be emphasized' (idem). How did Schoenberg understand the musical compositions? Why did he understand them in terms of intelligibility and monotony? What did he give priority to coherence?

A musical piece is a *musical thought*, according to Schoenberg. I explicitly translate 'Gedanke' as 'Thought', because German has other more precise words to refer to an idea as a simple representation, for example 'Darstellung'. 'Thought', in turn, is connected, in the German philosophical tradition, to other important terms as 'objectivity', 'meaning', and 'truth', as we clearly can see in Gottlob Frege's 'Der Gedanke' usually translated as 'The Thought'. Therefore, a musical thought is not entirely subjective; on the contrary, as we shall see, the phenomenological psychology of the listener is obligated to grasp an essence from the artwork beyond its 'external appearance' (Schoenberg 2011, 289). But what is a *musical thought*? According to Schoenberg, a musical piece is constituted by (1) the set of successive sounds (vertical and horizontal), which, for their part, are constituted by a central nucleus and the acoustical distance from that nucleus, and (2) the successions of sounds which restore that initial central nucleus. In Schoenberg's words, a state of imbalance '... grows throughout most of the piece, and is enforced further by similar functions of the rhythm. The method by which balance is restored seems to me the real *idea* of the composition' (Schoenberg 1950, 49). A musical piece is a set of problems (tensions) resolved by a set of technical decisions. Therefore, the whole identity of a musical piece implies a more or less numerical complex rest point, variations on that point (tensions), and finally a resolution of these tensions coming back (not necessarily in an identical way) to that rest point. In that context, *coherence* refers to an axiological virtue that enables us to judge a musical piece and also refers to the complex of problems and solutions. A musical thought also implies another non-strictly-technical term, that is, a *Grundgestalt*. A musical piece and its coherence depends on a 'basic form' in order to achieve a global identity, i.e., in order to achieve an intelligible musical piece.

According to Schoenberg, 'The features of a motive are intervals and rhythms, combine to produce a memorable shape or contour which usually implies an inherent harmony. Inasmuch as almost every figure within a piece reveals some relationship to it, the basic motive is often considered the 'germ' of the idea' (Schoenberg 1967, 8). Thus, *Grundgestalt* refers to that 'memorable contour' that laces up every set of unities into parts and also connects every part to one another and into an entire piece. Every varied *Grundgestalt* gives to a piece an identity over its development. Following the analysis by Severine Neff (1984), the basic form of the String Quartet op. 7 has three motives that we can call *a*, *b*, and *c* (see Fig. 1). 'Each motive is based on a characteristic interval: motive *a* on the minor second, motive *b* on the

organicism (Hubbs 1990, 3), because beyond biology, we can also recognize metaphysical terms almost always involved in biology as *finality* and *essence*. However, that distinction between internal musical nature and external appearance of musical events also refers to a development aimed at achieving essential finalities which are not obvious at all over a musical piece. Aristotle's metaphysical physics is implied in that aesthetic conception, because the tendencies have intrinsically an essence, an aim and, for its part, a comprehension of these tendencies presupposes a process of determining essences from appearances.

Therefore, there are three main elements implied in Schoenberg's music: (1) That specifically musical (harmonic and metrical structures), (2) Epistemic virtues which are organizing the specifically musical events, and (3) that organicist schoenbergian point of view. Epistemic virtues are the links between the musical and non-musical level, because they translate to technique the conditions of organicism. Unity, simplicity, and coherence are the requests of organicism, because an organism, in its metaphysical nature, is constituted by parts, stages of development, a final fulfilled essence, and finally a whole becoming articulated.

Precisely, starting from that organicist point of view, it is not strange to read the following lines in a Schoenberg's text: 'The inspiration is not the theme, but the whole work. And it is not the one who writes a good theme who is inventive, but the one to whom a whole symphony occurs at once' (Schoenberg 1950, 18). As already mentioned, Schoenberg did not compose the whole structure of his String Quartet op. 7 at once; it was necessary to write a schematic program in order to inspire the resolution of the entire piece. His productive formal – organic – composition strategies did not surpass certain heuristic limits, as if it were not possible to compose musical pieces only regarding his hermetic organicist conception. In the following section, I briefly introduce the schoenbergian program.

3.2 *Anxiety Over a Love Relationship*

These are the words chosen by Mark Benson in order to sum up the subject of Schoenberg's 'private' program of the String Quartet op. 7 (Benson 1993, 378). According to Benson, 'Apparently unable to invent a satisfactory musical continuation for his principal group, [Schoenberg] assigned expressive labels to its three component themes, and invented a programmatic scenario to help him invent new themes'. At that point, it is very interesting that Schoenberg has not achieved to compose the entire quartet without extra-musical help. Schoenberg attributed to that initial structure of three motives a programmatic interpretation from which he extended a history to finally made the opposite heuristic movement, i.e., to attribute music to these programmatic extensions. Schoenberg held a non-strictly formalist aesthetic conception, because despite his clearly hermetic division between aesthetics and psychology, he also emphasized the important role of extra-musical information at composition time. In Schoenberg words, '... from the viewpoint of psychology, our capacity for

mental emotional associations is unlimited as our capacity to repudiating them is limited. Thus every ordinary object can provoke musical associations' (Schoenberg 1967, 93).

The whole entire structure of Schoenberg's first string quartet is linked to an abstract story of tensions between two lovers; let us see, for example, titles as 'dejection' and 'despair' (corresponding to the first part of the quartet), as well as the title 'Comfort, Relief (She and He)' (corresponding to a mild reply to that first part); finally, we can read a hard reaction to the second moment and a almost Hegelian *Aufhebung* (sublation): 'New outbreak: Dejection, Despair; and Transition to [...] Struggle of all the motives with the determination to begin a new life' (Benson 1993, 379). The set of these three parts is the sample of the whole quartet in a unity of tensions and distensions. Actually, there are not a 'concrete' set of references, but a succession of knots, as if Schonberg, following Schopenhauer, was conceding to music the power of acoustically mapping the Will (White 1984, 48).

4 Final Remarks: Music and Design

Given the Egon Friedell's notes on the Viennese interior design, in the second Sect. I concluded that a numerical complexity of elements and their disjointed character were the conditions to a successful interior design. From that, I determined a relationship among three elements involved in design: its diverse materials, its basic axiological and epistemic assumptions, and its social signification. As a social sample of a dominant sensibility of that time, Friedell's notes allow us to determine the general preference for a certain interior design in Vienna. In particular, the general appraisal of 'disorganic' sets of elements was a social fact in Vienna. For the contrary, Schoenberg held three main epistemic virtues incompatible with that inorganic design. These virtues are unity, simplicity, and coherence, all of them grounded in an organicist aesthetic conception. Every musical piece is an organ constituted by parts, stages of development, a final fulfilled essence, and finally a whole becoming articulated. As Holly Watkins (2008) points out, the wide and dominant interpretation of Schoenberg's Vienna reduces every intellectual claim – from design to literature, passing through philosophy and architecture – to a refusal of ornaments (Watkins 2008, 124). *Wittgenstein's Vienna* by Stephen Toulmin and Allan Janik argued in that direction (Toulmin and Janik 1973, 102 y ss.). Nevertheless, Schoenberg's appraisal of *art déco* design has nothing to do with ornaments or embellishments themselves, but with the non-organic nature of *art déco*'s collections of objects. In that sense, that interior design described by Friedell seems more, in Schoenberg's eyes, a random set of objects than organized collections of objects developing an essence over the time. A question that arises, however, is if the rigid commitments of organicism are the only entrance to musical composition; is it possible to compose music without appealing to extra-musical inspiration? And another question that arises is, for its

part, if there is an obligation to accept the schoenbergian equation between essentialism and authenticity. Playing with randomness and, at the same time, determining a non-essentialist starting point is an alternative to both ways of seeing design.

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The Polichoral Mass of Las Palmas de Gran Canaria by Manuel de Tavares



Luísa Correia Castilho 

Abstract Manuel de Tavares (c. 1585–1638) was a Portuguese composer who accomplished his professional career in several Spanish cathedrals and occupied the position of Master of chapel in Las Palmas, in Gran Canaria between 1631 and 1638. In this city the composer developed and reinforced the polychoral style. From this core of pieces which remain till the present days we can find a polychoral mass. So, this paper is about the characterization of this mass according to the following items: codicological analysis and from the musical contents and its normal framing; and between text and music and polychoral writing: type of voices and combination of clefs, movement of parts from bass and harmonical independence in tutti passage and antiformal change.

Keywords Mass · Manuel de Tavares · Polychorality · Polyphony · Antiphonal change

1 Codicological Description

The Mass of Manuel de Tavares is composed for 8 voices (2S 2A 2T 2B), two choirs, thorough bass and is located in the cathedral of Las Palmas, Gran Canaria, catalogued with B/I-3 quota. It is composed by nine single sheets, measuring 0.388×0.242 m for all voices, except the bass from the 2nd Chorus, which is 0.297×0.219 m; the thorough bass is 0.303×0.217 m. It contains ten pentagrams per sheet for all voices, except for the bass from the 2nd Chorus and the thorough bass which have a variable number. It is released in black ink, with notations and handwriting in the same color. The authorship is marked at the top right, at the beginning from the separate part of each voice.

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2 Description from the Music Contents and its Normative Framework and Macro-Formal Structure

Being the most sacred part from the service, the Mass developed a ceremonial rite that converted it in the central artistic achievement of Christian culture. Music plays here an extremely important role. In fact, this Mass lead to the composition of more music by other composers, than any other liturgical ceremony of all time (Hoppin 1991).

In the seventeenth century the Mass was always sung, when celebrated in the cathedrals and main churches: on ordinary days in plainchant, and in polyphony on Sundays and solemn feasts, depending on the celebrated feast. Since the middle of the century it was an exception to find masses written up to four voices, usually it was composed for eight or more voices, including the thorough bass (Torrente 2016).

The five sung texts which belong to the Ordinary—Kyrie, Gloria, Credo, Sanctus and Agnus Dei—establish the basis of the Mass. Its invariable texts, which were constantly used throughout the liturgical calendar, were more attractive to those composers of more elaborate musical versions, than the texts of the Proper, which appeared no more than once a year. Manuel de Tavares devoted to this musical genre quite a reasonable percentage in the total of his work, according the catalogue of D. João IV (Nery 1990) [1], however only a mass of his own survived.

Kyrie, the first heading of the ordinary Mass, consists only two of two Greek phrases, or invocations: *Kyrie eleison* (Lord have mercy on us) and *Christe eleison* (Christ have mercy on us). These two sentences, which beg for mercy, are repeated according to concrete rules, which aim to reinforce its meaning.

K K K

C C C

K K K

The alternation between plainchant and polyphony formed one of the basic archetypes of polyphonic tradition, and so happened with the Kyrie execution, especially from the Council of Trent on. Thereby, there were two possibilities of polyphonic treatment of the Kyrie text, which is presented as follows:

Model 1:

| | | | | |
|---------------------|---|----------------------|---|---------------------|
| Kyrie (Plainchant) | / | Kyrie (polyphony) | / | Kyrie (Plainchant) |
| Christe (polyphony) | / | Christe (Plainchant) | / | Christe (polyphony) |
| Kyrie (Plainchant) | / | Kyrie (polyphony) | / | Kyrie (Plainchant) |

Model 2:

| | | | | |
|---------------------|---|---------------------|---|----------------------|
| Kyrie (polyphony) | / | Kyrie (Plainchant) | / | Kyrie (polyphony) |
| Christe Plainchant) | / | Christe (polyphony) | / | Christe (Plainchant) |
| Kyrie (polyphony) | / | Kyrie (Plainchant) | / | Kyrie (polyphony) |

If we only perform the polyphonic parts we'll have the following options of executing the rubric: option 1 consisting of 4 elements; option 2 consisting of 5 elements.

2° Kyrie / 1° Christe / 3° Christe / 2° Kyrie

1° Kyrie / 3° Kyrie / 2° Christe / 1° Kyrie / 3° Kyrie

The formal organization model number 2 was, according to Rui Cabral Lopes, the most widespread in the Iberian Peninsula and Italy throughout the 16th and 17th centuries in pro defunctis Mass (Lopes 1996). However Manuel Cardoso uses model one, either in the pro defunctis masses or in the six *Ab initio ante saeculo creata sum do Liber tertius Missarum* masses (Lopes 1996; Oliveira 1996). Following the tradition, Manuel Tavares' Kyrie employs model 2, in a more or less free version.

Being a polychoral composition, the mass has a greater fragmentation on the themes or motifs into smaller sections, with alternate dialogues from the choirs, instead of the thorough flow of the melodic line. Moreover, until the seventeenth century the predominant tendency in the polyphonic tradition was to derive the musical form of the morphology of the text, seeking to symmetrically balance the dimensions from the various sections. This situation happens at Kyrie, which can be seen in the following table:

Analyzing Table 1, it doesn't seem to exist a proportional regularity between the various sections, however at the end of Christe there is a cadence to the mode *finalis*, which being followed by a general pause, originates a two-dimensional split of the entire piece: by adding the first *Kyrie* to the *Christe* these two sections, we reach approximately 50% of the piece. We are therefore in the presence of a formal search for equilibrium inherent to the sacred polyphonic tradition.

Gloria, the second section of the ordinary Mass, is certainly, according to Georges Chevrot (1957), one of the oldest songs used in the Church that has Greek origin. It is also known as *hymnus angelicus*, because the opening phrase is the chant of angels on Christmas Eve (Luke: 2:14). Before being inserted inside the the Mass, it was part of the morning prayers as a song of praise or doxology. It is called the great doxology, comparing it with the small doxology with which the way each psalm ends: the *Gloria Patri et Filio*. The opening phrase "Gloria in excelsis Deo" was sung in the plainchant while the rest of the text was composed in polyphony, performed antiphonally. Unlike Kyrie, Gloria does not make part of every Masses, as it is omitted during Advent and Lent, or in times or days of penance.

Table 1 Number and percentages of metric units in *Kyrie*

| | Number of metric units | Percentage (%) |
|---------|------------------------|----------------|
| Kyrie | 14 | 31,8 |
| Christe | 8 | 18,2 |
| Kyrie | 22 | 50 |
| Total | 44 | 100 |

Table 2 Number and percentages of metric units *Gloria*

| | Number of metric units | Percentage (%) |
|----------|------------------------|----------------|
| Gloria A | 54 | 50,5 |
| Gloria B | 53 | 49,5 |
| Total | 107 | 100 |

Due to its extension *Gloria* is often divided into several separated periods, which vary from author to author and piece to piece. The most frequent option was to divide it into two periods: the first until «*Domine Deus, Agnus Dei, Filius Patris*», in which the divine entity is praised and glorified, and the second from «*Qui tollis peccata mundi, miserere nobis*» in which God's mercy is beseech (Rubio 1983). Manuel de Tavares follows the dispositions of tradition by respecting the sectioning on «*Qui tollis peccata mundi, miserere nobis*» [2].

As can be seen from Table 2, it is easily concluded that *Gloria* is split in half, we are in the presence of an absolutely symmetrical proportion. This circumstance is more prominent as it points to a kind of formal expression adjusted into clear principles of internal structural balance.

The *Credo*, the third title in the Ordinary, was formulated in the Council of Nicea (325) and finalized by the Council of Constantinople (381) (Tourault 1996). Its first use was as a baptismal *Credo* and only later, in the sixth century, was it introduced at Mass, first in the East, and then in Spain, the Frankish Kingdom and the Germanic countries (Hoppin 1991). Only in 1014 did it see its acceptance by the Church of Rome, but its use was restricted to Sundays and holidays (Rubio 1983). Later it also took place at the celebrations of Christ, the Virgin, the Angels, the Apostles, the Doctors of the Church and some other more solemn celebrations. This late adoption was one of the factors that limited the medieval versions of the *Credo* to a minimum amount of melodies; another factor was its role as a profession of faith throughout the assembly. In many places, the choir's performance was accompanied, chanted or recited, by the assembly, long after the other Ordinary songs were assumed exclusively by the choir. Its length, which exceeds that of the *Gloria*, may also have been an impediment to the frequent composition of new melodies.

As in the *Gloria*, the first sentence, “*Credo in unum Deum*”, was sung in plain chant, while the rest of the text was sung in polyphony, performed either in a thorough or an antiphonal way. According to Samuel Rubio (1983), the division of the *Credo* is less uniform. Until the “*Qui propter nos homines et eter nostram salutem descendit de caelis*”, it commonly constitutes a unique period, since it focuses on the profession of faith in God the Father and his Son, Jesus Christ; the ‘*Et incarnatus*’ is normally treated with complete independence from the rest of the work, and it highlights the evocation of the theme of the Incarnation. From the ‘*Crucifixus*’ to the end, the number of periods varies from one to three, as the case may be, but the division of this part into two periods is the most frequent: the first, from the ‘*Crucifixus*’ to ‘*cujus regni non erit finis*’, which tells the story of the Passion and Resurrection, completed by the prophecy of the second coming of Christ as Supreme Judge in the Last Judgment; the second, from “*Et in Spiritum Sanctum*” to the end, which refers

Table 3 Number and percentage of metric units in the Credo

| | N.º metric units | Percentage (%) |
|---------|------------------|----------------|
| Credo A | 63 | 34,1 |
| Credo B | 25 | 13,5 |
| Credo C | 45 | 24,3 |
| Credo D | 52 | 28,1 |
| Total | 185 | 100 |

to the evocation of the Third Person of the Trinity, the Holy Spirit, as well as to the profession of Faith in the Church, in its Sacraments and in eternal life. Manuel de Tavares, once again, follows the provisions of tradition by following this division in four periods, respecting the different meanings of the text (Table 3).

With regards to the various parts that make up the Credo, there is a relative dimensional equivalence between parts A and D. In turn, parts B and C, together, are of a length comparable to each of the individual sections A and D. As such, a more or less balanced dimensional partition of the Credo formed by the three groups is verified: A, B + C and D. In this way, an attention to the rules of proportionality is also verified.

The *Sanctus*, the fourth title of the Ordinary, combines passages from the Old and New Testaments in its text. The first words are those that the prophet Isaiah heard (Isaiah 6: 3), being “Deus Sabaoth”, a Hebrew expression that marks the exclamation of the angels. The liturgy added to this text the cry with which the people greeted Jesus when he entered Jerusalem (Matthew 21: 9): “Hosanna in excelsis”, which also contains a Hebrew expression. In the Benedictus, which follows, it is the prophet Jesus Christ who is acclaimed (Chevrot 1957; Hoppin 1991). It is divided according to the logic of a prayer, highlighting the value of each phrase. The first parts of the Sanctus and the Benedictus, are formed as two autonomous and complementary bodies within the same section, appearing in most cases separated from each other. In the case of Manuel de Tavares, the Sanctus and the Benedictus are autonomous, since the composer does not write music for the Benedictus, which would probably be done in plain chant. As for the part of the Sanctus, which continues with the sectioning by phrases, thus falling within the current tradition, it has, however, only one section. But comparing it with those of other composers, especially those of Fray Manuel Cardoso in his six Masses *Ab initio before saeculo creata sum do Liber tertius Missarum*, the length of this section is of approximately 31 metric units, which also occurs in Manuel de Tavares, in which case it is 32 metric units long (Cf. Oliveira 1996).

The *Agnus Dei*, fifth and last section of the Ordinary, is related to the Kyrie due to the fact that their texts also originate in the litany and both are common elements in the Eastern liturgies before their introduction into the Roman Mass. In the case of the Agnus Dei, this introduction took place in the pontificate of Sergio I (687–701). At first, the triple Agnus Dei ended with the phrase ‘miserere nobis’, but in the 10th and 11th centuries, ‘dona nobis pacem’ became the final sentence of the last Agnus (Hoppin 1991). With its tripartite form, it gave rise to several musical-textual

Table 4 Number and percentage of metric units in the Agnus Dei

| | N.º metric units | Percentage (%) |
|-------------|------------------|----------------|
| Agnus Dei A | 16 | 44,4 |
| Agnus Dei B | 8 | 22,2 |
| Agnus Dei C | 13 | 36,1 |
| Total | 36 | 100 |

interpretations. One option followed the principle of alternation between plain chant and polyphony, and in this case there were two hypotheses: polyphonic treatment of the first and third phrases, keeping the second sentence in plain chant, or the first and third phrases in plain chant, keeping the second sentence in polyphony (Oliveira 1996). Another option was that, to each of the invocations, the composers equated an independent polyphonic section, each preceded by monodic intonations on the words 'Agnus Dei' (Lopes 1996). Another option was for the three polyphonic sections to follow each other consecutively, without alternating with the plain chant of the section. Manuel de Tavares favoured the latter option of performance (Table 4).

The Agnus Dei is structured in three sections, with a noticeable symmetry with respect to the proportions, where parts A and C are larger and B smaller.

The results of the present research confirm that Manuel de Tavares, in his Mass, offers us a clear testimony of his respect for the rules of proportionality and formal balance inherent in the polyphonic tradition of the late XVI century.

3 The Use of the Mode

Manuel de Tavares' music naturally fits in the concept of the modal system of late Renaissance, as this extended through the sixteenth century and early seventeenth century, but already entering into account with the expansion of this system proposed in 1547, by *Glareano* in *Dodecachordon*, extending the eight traditional modes to twelve. In the case of mass, which is in E mode, we find modal hybridisms, by introducing heterodox procedures, thereby broadening a series of rules underlying the theory of modal counterpoint, which results in coexistence of elements linked to tradition with other more modernizing ones. These fugues occur, mainly, in the scope of voices, which are often surplus, in the exploitation of cadences foreign to the chosen mode and in the application of chromaticism. Mode III provides a fruitful and abundant palette of divergences through dialectics between the traditional dimension, with its characteristic constitution of cadential processes, and the modern dimension induced by constant *eolization* of the phrygian mode, as well as by the cadential design of triadic inspiration, prescribed by the Zarlilian system in advance of the tonal future [3]. This is exceedingly pressing in Mass, as can be seen by the following example (Fig. 1):

c. 23

ra glo- ri- a tu- a

ra glo- ri- a tu- a

ra glo- ri- a tu- a

ra glo- ri- a tu- a

Fig. 1 Santus c. 23–27

Table 5 Movement of the parts of the bass and harmonic independence in tutti passage

| | Movement of parts of the basses | Choir I | Coro II |
|------------------|--|--------------------------------|------------|
| Mass (SATB-SATB) | They imitate each other in opposite motion or parallel movement in unison or octaves | Harm. Ind. except Creed c. 184 | Harm. Ind. |

4 Polychoral Writing

Although Tavares' work is quite heterogeneous concerning the number, combinations and types of parts of choirs, at Mass uses two equal choirs (SATB), that is, with symmetrical voices, as it was more current in Rome (Torrente 2016). Regarding the combination of claves are used the usual: C1C2C4F4.

As can be seen, by Table 5 the movement of the lower parts in the *tutti* sections, are prone to two types of movement: one when moving in opposite motion and the other when moving in parallel, in unison or octaves. Choirs tend to be independent in the harmonic plane, but occasionally they may lose that independence. This happens when the fifth of the chord is the lowest part of a choir, which may indicate that these compositions have not been written for scattered individual choirs, that is, that choirs are not distributed in spaces other than an enclosure (Carver 1981). This suggestion can be reinforced by the tendency not to bend the third of the chord in *tutti* passages, such as in *Credo*, c. 184.

4.1 Antiphonal Change

Antiphonal change is the largest tool in polychoral writing. Antiphonal phrases can be short or long-lasting and can be applied to a single word, such as the word *Sanctus*,

or to a lengthy sentence of 6 or more whole notes, such as Gloria' phrase *miserere nobis*, which is sung by choir 1, then by choir 2 and then again by choir 1 (c. 76–80). Antiphonal changes are used in different ways through the repertoire. There is antiphonal repetition when an excerpt sung by a choir is repeated antiphonally by another choir(s) (Carreras and Felon 2013). However, there are several variants of antiphonal repetition:

- exact repetition—when an excerpt is sung by a choir and repeated with the same text and the same song;
- transposition to a different tone;
- melodic, harmonic modification or rhythmic details (Fig. 2 and 3);
- the beginning is the same but the end different, or vice versa;

The image displays a musical score for a choir, divided into two systems of four staves each. The first system shows a choir with four parts (Soprano, Alto, Tenor, Bass) singing 'A- men, a- men, a-'. The second system shows a choir with four parts (Soprano, Alto, Tenor, Bass) singing 'li. A- men, a- men, a-'. The music is in 4/4 time and features melodic modifications between the two systems.

Fig. 2 Credo, melodic modification (c. 181–183)

Fig. 3 Gloria, harmonic and rhythmic modification (c. 60–62)

- e) extension of repetition by adding the next sentence of the text, or continuation with a *tutti*;
- f) transposition of the bass (usually by fourths and fifths) which results in an antiphonal sequence (Fig. 3). In this case, the following antiphonal sequence is verified: A-D-G-C. The use of an antiphonal sequence, along with strong homophonic texture and rapid declamation, produces an energetic harmonic rhythm with tonal progressions and preference for perfect cadences, increasing the general harmonic feeling (Fig. 4);
- g) antiphonal repetition with the Bass imitated by soprano, or vice versa;

The musical score for Gloria, bass transposition (c. 76-80) is presented in two systems. Each system contains four staves: three vocal staves and one bass staff. The first system features the lyrics "mi-se-re-re no-bis" repeated twice. The second system features the lyrics "tris mise-re-re no-bis Quo-" repeated twice. The bass line is transposed down an octave, as indicated by the number "8" in the first measure of each system. The key signature is one sharp (F#) and the time signature is 4/4.

Fig. 4 Gloria, bass transposition (c. 76–80)

- h) music repetition with different texts;
- i) antiphonal repetition with text change (Fig. 5).

All these antiphonal techniques are widely explored throughout the mass. In general, the antiphonal change is rapid and short. Sometimes successive antiphonal repetitions with short pauses between them produce an effect of *quasi-tutti*.

Tutti sections also play an essential role in polychoral music in general and in Tavares in particular. They are often used as punctuation marks, being systematically applied to textual finals and musical sections. They are also used to break the monotony or to emphasise some textual words or phrases, such as the two times the words *Jesus Christe* appearing the *Glory of Mass*, c. 42–45 and 92–96. Often after

The image displays a musical score for a Gloria, specifically focusing on a text change between measures 33 and 41. The score is presented in two systems, each containing four staves. The first system shows the text "De-us Pa-ter om-ni-po-tens." repeated across the four staves. The second system shows a text change to "Do-mi-ne De-us Rex cae-le-stis Do-mi-ne Fi-li u-ni-ge-ni-te" across the four staves. The notation includes treble and bass clefs, a key signature of one sharp (F#), and various rhythmic values. A measure number "29" is visible at the start of the second system.

Fig. 5 *Gloria*, text change (c. 33–41)

a *tutti* section, Tavares introduces a general pause towards a more demarcated score or to produce a dramatic effect such as in *Gloria*, c.87.

4.2 Instrumental Accompaniment

At the Mass, the thorough accompaniment was not for the first choir, as several scholars relate (Lópes-Calo 1983; Stein 1987) but for both choirs, for the expression «general accompaniment» is referred. The accompaniment is following both choir I and choir II. Another aspect in which Tavares might have been original is the fact that he wrote apart the sheet music the accompaniment as an autonomous line. Although Manuel Tavares is quite innovative for his age, concerning this issues of the use of the thorough bass for the several choirs and recurrence, we must investigate the articulation between the instrumental accompaniment and the texture of the choir(s);

Table 6 Instrumental accompaniment

| | Accompaniment doubles the voice number of musical bars | | Independent accompaniment number of musical bars | |
|-------|---|-------|---|------|
| Missa | 400 | 98,8% | 5 | 1,2% |

that is to say, until what level the instrumental line doubles the vocal parts, or on the other hand, it assumes a rhythm-melodic autonomy. Therefore, we proceeded to the clearance of the total of metric units (bars) from the parts of the instrumental accompaniment.

Table 6 shows the proportion of the metric units, of the instrumental accompaniment, in which it only double(s) the voice(s); the proportion of metric units in which the accompaniment is independent from the voices, i.e., it assumes a rhythm-melodic behaviour independent from the voices. We can note, right away, that besides the instrumental line doesn't assume the same function in the counterpoint texture, the major part (98,8%) only doubles, in unison or to the octave, the voice of the bass. That way, it is more an instrumental accompaniment obliged in the line of the polyphonic tradition of the Renaissance, more with a character of *basso seguente*, limiting to reinforce the texture. However, even being the deeper voice of choir I or II, the voice is systematically reinforced, it allows the tendency to endow the texture of proto-harmonic elements. Anyway, in this aspect the composer shows himself as more conservative.

4.3 *The Expressive Relationship Between the Text and the Music*

There was an expressive preoccupation and respect of Manuel de Tavares, as well as of other composers of his time, about the text, i.e., they adapted the music to the meaning of the words, showing the strength of each different emotion. Therefore, impelled by the desire of serving efficiently and in detail the words of the text, they used an illustration technique [4] or a musical symbolism in which were used in compositions of extramusical relations, such as melodic and rhythmic configuration, chromaticisms, dissonances, melismas about certain syllables, false relations, ornaments, contrasts introduced in counter point texture, etc. After, there are some examples used at the Mass:

Rhythmic and Melodic Configuration

In *Creed* there is a musical illustration of the word *descendit* (of *coelis*), in which several melismas in all voices, of the two choirs, make a descendent configuration, with shorter rhythmic values

($\pm \pm \pm \pm$), describing in a musical way the movement of descent; on the other hand, the sentence *Et ascendit in caelum*, makes an ascendant configuration, shorter than the first, only done by choir I and with rhythmic values also shorter ($\sqrt{\pm \pm} \sqrt{\pm \pm}$).

Melodic Jumps

The melodic jumps are quite expressive and appear in association with certain words, as an effective resource of the text illustration. These motives are commonly accompanied to chromaticisms and false relations. The «*Et incarnatus est*» belongs to one of the most important parts of the Creed, the theme of the incarnation is illustrated here with several jumps of the perfect fourth, highlighting to the perfect fourth followed by a diminished fourth, beyond that with the other voices there are several dissonances such as the harmonic tritone (Fig. 6).

Chromaticisms

The use of chromatic accidents such as the musical illustration technique of the text is a resource commonly used by Manuel de Tavares. In *Gloria* there is an emphasis of the sentence «*Qui tollis peccata mundi*», through chromatic accidents, that we can see in Fig. 7.



Fig. 6 Melodic Jumps (*Creed*, c. 64–68)

Fig. 7 Chromaticisms (*Gloria*, c. 57–60)

5 Conclusion

We can declare that we stand before a musical repertoire in which a modern *stile antico* and a *stile moderno* join together, extended to new elements of an harmonic writing, that aggregates the fundamental polychoral discourse, supported by the technique of the thorough bass. The interpolated usage of different stylistic codes by the composer, according to the preferences of the circumstances, seems to indicate a musical position typical of the baroque aesthetic.

Notes

- [1] The library of D. João IV, one of the best equipped of his time, with a very rich musical collection, was unfortunately destroyed in the Lisbon 1755 earthquake and only the first part of the printed catalogue survived. This had been edited in 1649, in Lisboa, by Paulo Craesbeeck and the title was *First Part of the Index of the Music library Great and Powerful King D. João IV Our Lord*.
- [2] According to Filipe Mesquita de Oliveira (1996, p. 28) Manuel Cardoso also respects this sectioning.
- [3] CF. ZARLINO, G. (1573). *L'istitutvione harmoniche divise in quarttro parti*. Venezia: Francesco de i Franschis Senefe.
- [4] Illustration or musical symbolism that some authors also call word-painting. CF. CARTER, T. (2001). Word-painting. In S. Sadie (Ed.) *The New Grove Dictionary of Music and Musicians* (2^a Ed., Vol. 27, pp. 563–565). London: Macmillian Publishers Ltd.

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Teaching Music History in Italian Licei Musicali: An Analysis of the Current Situation and Some Pedagogical Principles



Paolo Sullo

Abstract The teaching of music history within the Italian school system reached a significant turning point in 2010, as the opportunity for its reevaluation arose.

1 The Indicazioni Nazionali

The teaching of music history within the Italian school system reached a significant turning point in 2010, as the opportunity for its reevaluation arose. The reform establishing the Licei Musicali, in fact, came into force in that year, allowing the legislator and the whole of Italian teaching staff to re-think content, objectives and methodology of music history teaching in light of a new audience of students. Moreover, the teaching of music history, precisely thanks to the establishment of the Liceo Musicale, becomes an element of a complex teaching framework that includes also other theoretical subjects, such as *Music Theory, Analysis and Composition* and *Music Technology*. A first regulatory consequence of the institution of the Liceo Musicale can be tracked down in the *Indicazioni Nazionali* published on the 7 October 2010¹, in which the acquisition of knowledge, skills and competencies to be achieved by the students is organised over the span of two sets of two-year periods and a final year, as in the case of other subjects. Before engaging in a detailed explanation of the programmes across the five years of study, the legislator puts forward a general premise immediately specifying that the subject matter consists of “the art music of Western tradition”. Moreover, immediate reference is made to the centrality of listening with a musical score as a starting point for the understanding of the repertoire and of different musical styles.

At the end of the course, the students will have gained familiarity with art music of Western tradition, and they will have become acquainted with a wide variety of seminal works of every period, genre and style through the listening of whole works

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¹Ministero dell’Istruzione, dell’Università e della Ricerca (2010).

or important extracts of them in conjunction with the analytical reading of the literary text, where present, and of the musical score.²

It is clear that analytical listening contributes to the achievement of one of the first general learning objectives outlined by the legislator, namely, encouraging the students' autonomous learning throughout their musical progress by fostering individual curiosity, not only as an initial stimulus, but also, clearly, as a reflection of the achievement of greater historical and musical competence.

Thus, the legislator foresees a student, who, at the end of the five-year course,

is aware of the intrinsic value of a careful listening to complex musical structures as responding to his or her independent intellectual and aesthetic curiosity, rather than as the mere fulfilling of a learning task; is familiar with the overall span of Western music of written tradition; is able to recognise the main artistic phenomena, the most important music genres and the main composers from Gregorian chant to the present day, and is able to place them in the relevant historical and social contexts and traditions; is able to distinguish and classify a variety of music sources (scores, poetic texts set to music, treatises, verbal, visual, audiovisual and aural documents and witness accounts); has a general understanding of the evolution of notation; can describe at least the primary structural and phonic features of the instruments of a symphony orchestra; reads, interprets and comments musical texts through structural and stylistic tools, while singling out the intrinsic aesthetic value of musical phenomena and the results of their planned interaction with a variety of expressive means (poetic, theatrical, filmic, architectural, etcetera).³

If, on one hand, the *Indicazioni* make it clear that the learner must come into contact with a wealth of musical sources, from scores to literary and visual documents, on the other hand they are perhaps wrong in citing "Gregorian chant" as the beginning of the musicological enquiry to be pursued in the lessons. It is certain that there are few written sources of ancient music before the repertoire of the so-called 'Gregorian chant', but there is a wealth of information on the role of music in antiquity (derived from literary, philosophical and other secondary sources) that has exerted considerable influence on the development of Western music. The arbitrary nature of such a starting point appears even more glaring since the legislator specifies repeatedly that the subject matter is not merely dependent on written sources, but is informed also by the understanding of the oral tradition and by the familiarity with an array of research methodologies that vary according to the repertoire.

The student grasps the features that outline the remit of music history in relation to two other fields of enquiry, which are nevertheless closely connected to it, namely, the study of music of oral tradition (with a specific regard to Italian popular music from the North to the South), and the systematic perspective in the description and analysis of musical phenomena (aesthetics, psychology and sociology of music, etcetera) (see footnote 2).

However, the reference to the contemporary relevance of the work of art and of its placement within a historical framework, is significant, as the two instances that are perfectly integrated in the practice of the 'capacity to inherit', which can be ascribed, according to Massimo Recalcati, to 'Telemachus as a son'.⁴

²Ministero dell'Istruzione, dell'Università e della Ricerca (2010), p. 52.

³Ministero dell'Istruzione, dell'Università e della Ricerca (2010), p. 53.

⁴See Recalcati (2013).

The student is able to describe orally and in writing the experience of listening to music of different periods through specific conceptual and terminological categories, and to focus on the historical dimension embedded in it, recognising not only the aesthetic relevance of a musical work of art at the time of its first fruition, but its meaning as testimony of a past age and tradition, irrespective of temporal distance (see footnote 3).

For the first two years of the course, the *Indicazioni* envisage a non-chronological organisation of the musical subject matter, which will take as a starting point musical objects that are closer, according to the legislator and by the teacher, to the listening experience of the students, and generally more meaningful to the collective imagination of the class, but always with a clear reference to their historical context.

In the first two years, it is appropriate that the introduction to the critical listening of art music, always accompanied by the support of the literary text, where present, and of the score, should follow a features-based approach, and that it should aim to acquaint the student with musical genres, principles and styles of different periods irrespective of a pre-ordered chronological sequence (see footnote 3).

As to the works considered significant to the collective imagination of the class, the *Indicazioni* contain a specific reference to a particular repertoire that requires listening, learning and comprehension, stretching from Bach's Passions, to Mozart's *Don Giovanni* and Stravinsky's *Sacre*. The relevance of the chosen musical work is considered not only in an absolute sense, but also in relation to the constitution of a 'Western identity'. Finally, the legislator suggests listening to a repertoire different from that of one's own instrument. This activity, certainly profitable, in my opinion may be complementary to listening to and understanding the repertoire of your instrument, which is very often unknown to children. In this way, it will form not only a collective or community identity, but also another more individual one.

Such preliminary acquaintance covers not only the genres of absolute music, but also the genres that rely on the interaction of different expressive media (vocal music, opera, dance, film music). It envisages, during the span of the first two years, the listening of at least two works of considerable weight that are important for the constitution of the modern Western identity and are rooted in the collective imagination (one of Bach's Passions, Mozart's *Don Giovanni* or *The magic flute*, Beethoven's Ninth symphony, Verdi's *Rigoletto*, *Otello*, or the *Requiem*, some excerpts from Wagner's operas, one of Tchaikovsky ballets, Stravinsky's *Sacre du printemps* di Stravinskij, etcetera). [...] During the first two years, the student will listen to a number of 'classics' belonging to repertoires other than the one of the student's own instrument (e.g. Vivaldi's concerti, Bach's suites, Haydn's quartets, Beethoven's sonatas, Schubert's songs, symphonies by Mendelsshon, Brahms, Mahler, etcetera). The teacher will introduce such works at the appropriate time and will test that they have been absorbed.⁵

As we have seen, the legislator envisaged, for the first two years, a teaching and learning process stemming from collective and individual imagination and sensibility, while the next two years herald a preference for a style of learning based on a the chronological examination of the repertoire, its sources and its contest, starting, yet again, with the tradition of Gregorian chant and the birth of polyphony. Teachers are provided, as before, with a list of 'great composers', left deliberately incomplete,

⁵Ministero dell'Istruzione, dell'Università e della Ricerca (2010), pp 53–54.

starting from Machaut and ending with Chopin. Beyond this list, the *Indicazioni* hint at a methodological approach recommending that the teacher avoids a monographic approach on a specific composer or repertoire.

The student learns the historical outline of European music of written tradition from Gregorian chant and the origins of polyphony to the nineteenth century, and becomes acquainted with a number of great composers, such as Machaut, Dufay, Josquin, Palestrina, Monteverdi, Vivaldi, Rameau, Bach, Händel, Haydn, Mozart, Beethoven, Rossini, Schubert, Berlioz, Schumann, Chopin, etcetera. [...] The attention of the student is focused on the listening to important musical works, reading them in score and understanding them, without aiming to acquire an encyclopedic knowledge of a single composer (for instance, the whole of Bach's or Beethoven's output) or, conversely, of a particular genre (for instance, the history of the concerto from the sixteenth to the nineteenth century). At the same time, the student will be able to continue listening to selected works belonging to repertoires of different periods. The critical understanding of composers, genres and individual works will be always placed within the relevant historical and cultural framework, the social and output context, and the continuity and inconsistency that characterise the tradition of musical knowledge.⁶

Although the *Indicazioni* make reference to composers such as Chopin and Schumann, they do also allow the teacher the freedom to decide the last nineteenth-century composer to be studied at the end of the second two-year period, in view of the fact that the last year will have to be devoted to the study of twentieth-century and contemporary music.

The teacher, taking into account in each case the learning pathway most suited to individual class, will decide what portion of the nineteenth century will be included in the programme of the second two-year period, namely, whether to stop at Beethoven and Rossini, or to continue beyond, with a view to ensuring that the final year will be devoted to twentieth-century and contemporary music (see footnote 7).

Finally, as the legislator points out that, in the second two-year period, it is necessary to begin to develop in the students the understanding of the research methodologies involved in the research of oral traditions, as well as to the types of source materials that inform different historical and analytical approaches. Various passages in the *Indicazioni*, in fact, highlight the requirement to steer the students not to one history of music, but to different 'histories of music', as we shall see below in detail.

In the second two-year period, the student begins to approach the study of the different types of sources and documents involved in music history, the history of notation, the history and technology of musical instruments and of singing, as well as basic elements of ethnomusicology (how musical knowledge is transmitted in cultures of oral tradition, as well as the issues of methodology within this field) (see footnote 7).

The exploration of the second half of the nineteenth century and of the twentieth century is the main teaching goal in the last year of the Liceo Musicale. In fact, not only the *Indicazioni* suggest the study of several composers whose works span the second half of the nineteenth century and extend into the second half of the twentieth century, but they also invite the teacher to tackle every aspect of musicological

⁶Ministero dell'Istruzione, dell'Università e della Ricerca (2010), p 54.

enquiry, and even ethnomusicology. The repertoires to be analysed and studied, therefore, are considerably larger, as they cover folk music and popular music. Again, the *Indicazioni* discourage a one-directional history of music, in favour of a multiplicity of ‘histories of music’.

The Student learns the historical profile of the period between the nineteenth century and the present day, and analyses works by composers such as Liszt, Verdi, Wagner, Brahms, Puccini, Debussy, Mahler, Stravinsky, Schönberg, Bartók, Webern, Shostakovich, Britten, Berio, Stockhausen, etcetera, alongside traditions such as jazz, popular music and folk music. At the same time, the students acquire the principles of musical historiography, its aims and methodology, and distinguishes them from the frameworks of systematic musicology and ethnomusicology. The student will widen his or her knowledge of folk music of Northern, Central and Southern Italy, including the islands, while approaching European and extra-European oral music traditions.⁷

2 The Process of Learning in Today’s Society: Knowledge, Skills and Character

Leaving aside any presumption of providing an exhaustive and organic overview of current pedagogical theories, we can nevertheless put forward a number of considerations flowing from the *Indicazioni*. A starting point could certainly be the establishment or strengthening of students’ curiosity, as suggested in the *Indicazioni*. What is curiosity, if not a desire for knowledge? As the psychoanalytical literature suggest, however, such desire is generated and fostered by the absence of the object of desire,⁸ while the current bulimic availability of content numbs the students and smothers the emergence of desire. I remember the time, in my experience as a student, when a score or a recording was an object of desire, and its mere possession made one feel richer and enhanced the moment of fruition. Nowadays, when everything is immediately available to our students, as they do not experience the absence of the object, they do not long for it. The task of the teacher, therefore, is to create that sense of absence despite the unlimited availability of content. But, how can this idea of absence be engendered in a context that presumes a continuous and widespread presence of musical objects? One way could be for the teacher to enable the student to perceive and experience the performance of a work in a different manner to what the student had been used to do before the lesson. Thus, the circumstances of the lesson, away from the technological tools already almost too familiar in the students’ daily lives, become a meaningful point of contact between the students and the object of desire. The absence perceived by the students, therefore, will be essentially interpretative, and felt as the desire to know something alien that, in order to be fulfilled, requires an exploration drawing together a variety of perspectives. In this way, the students will want to pursue a variety of historical enquiries, as suggested in the

⁷Ministero dell’Istruzione, dell’Università e della Ricerca (2010), pp 54–55.

⁸See Recalcati (2018).

Indicazioni, from the perspective of considering an individual composer and particular musical idioms, to the examination of the contexts in which music is produced. Such process of acknowledgement presumes the meeting of a contemporary and a historical sensitivity, as advised in the aforementioned *Indicazioni*, as part of a more general process, namely, ‘the capacity to inherit’ described by Massimo Recalcati in 2013 in his book *Il complesso di Telemaco*.⁹ The process of inheriting, personified by the Telemachus’ character, is considered by this psychoanalyst as an active behaviour, a real preparation to the meeting between father and son, which is also necessary for the expression of one’s identity and to understand one’s times.

Umberto Galimberti expressed a similar view when, in a recent study on nihilism among young people (2018), reminded us that

[...] it is impossible to teach if one has not devoted oneself first to the establishment of an identity, and one has not entered the meanders of desire. [...] As everybody knows, adolescence is fuelled by desire, which finds its greatest expression at that particular time of life. An adolescence devoid of desire preconizes an unfulfilled life [...].¹⁰

Galimberti’s words, which chime with Daniel Goleman’s¹¹ theories and with the ‘aesthetic curiosity’ championed in the *Indicazioni*, take us back onto the track of modern pedagogy, which sees the variety of disciplinary content as inherently related to the overall establishment of the individual. Music history, therefore, becomes an opportunity to learn to desire, to learn about beauty and to acquire an aesthetic education. The task of the school, according to Galimberti, is to create in the students an emotional map, which, as it is not innate, must necessarily be learned.

We recognise *anger* when the blood runs to our hands and makes it easier to grab a weapon or throw a fist. [...] We recognise *fear* when the blood rushes to the larger muscles of the skeleton, [...] thus making it easier for us to run away [...]. We recognise *love*, because, by awakening the parasympathetic nervous system, it produces the opposite reaction to the two previous ones connected with fighting and running away [...]. We recognise *sadness*, because, by slowing down our metabolism, it allows us to become used to a significant loss, heartache or the sorrow for the death of someone. [...] Modern developments in neuroscience can tell us almost everything about our emotions, but they cannot tell us yet what Aristotle mentions in his *Rhetoric*, where he writes: “Emotions are connected to the cognitive apparatus because they let themselves be modified by persuasion”.¹² This means that our emotions *can be trained*, and, if we desire a better society, *they must be trained*.¹³

Galimberti, therefore, maintains that certain violent or nihilistic behaviours that also, unfortunately, concern young people, are the direct consequence of a lack of emotional and sentimental education, which, in many cases, produces juvenile depressions unknown to previous generations.

Every day news bulletins list the furious attacks caused by impulses escaped from our control. [...] This is accompanied by an exponential increase in instances of depression. [...] What

⁹See Recalcati (2013).

¹⁰Galimberti (2007), p 33.

¹¹See Goleman (1996), pp 269–330.

¹²Aristotele, *Retorica*, Libro II, 1378 a. In: Galimberti (2007), pp 43–44.

¹³Galimberti (2007), pp 43–44.

has all this to do with emotional education? A lot, because who cannot recite the emotional alphabet and who has let the roots of their heart dry out moves in a world imbued with distrust and fear, and, therefore, with aggressive vigilance, often coupled with paranoid suggestions that make one perceive others as potential enemies to be feared or attacked.¹⁴

Who, therefore, is assigned, in our society, to the task of providing an emotional education? It is certain that it does not fall only onto psychologists and psychoanalysts, to whom young people are entrusted ever more frequently, but it can and must be part of the work of teachers, who, through the subject-specific content that they pass on to their class, are able to build a network of emotional knowledge in their students.

Nowadays, *emotional education* is underestimated, and all the studies and statistics concur in highlighting the tendency of the current generation to display a greater number of emotional issues compared with the previous ones. The cause of this is the fact that nowadays the youngest are more alone, more depressed, angrier and more rebellious, more nervous and impulsive, more aggressive and less prepared to face life, because they lack the emotive tools that are indispensable to foster behaviours such as self-awareness, self-control and empathy, without which they will be able to speak, but not to listen, to resolve conflict and to cooperate. I invite all the teachers who every day prepare themselves to judge the intellectual aptitude of their students to consider first of all how much emotional education they have transmitted, because they cannot hide, at least to themselves, that intelligence and learning cannot work if the heart is not nourished.¹⁵

3 Opera as ‘emotional Education’

To return to our initial theme, namely, the study of music history, we could say that the school has the task to lead the student, first of all through the practice of listening, to the understanding of an emotional alphabet. Conversely, an appropriate emotional education, enhanced by the benefit drawn from a particular repertoire, promotes the knowledge of musical literature and produces thus a virtuous cycle. What repertoire can a music history teacher employ in order to educate the students emotionally? Galimberti, referring to humanities teachers, suggests that literature and classical mythology are excellent means of providing emotional education, but, with regard to the teaching of music history, what repertoire could be most effective? Albeit the whole of music literature, once it has become an object of desire and of emotional projection, has undoubtedly a noticeable impact on emotional awareness, we indicate, in agreement with Lorenzo Bianconi, opera as the musical genre in which reference to emotions is made explicit. According to Bianconi, opera is first and foremost.

a powerful form of sentimental training, as it offered its audience the *formalised representation* of an emotional universe. It has done so in typically theatrical terms, namely, through an exemplar repertoire of stylised conflicts, of memorable dramatic subjects – the devastation

¹⁴Galimberti (2007), p 44.

¹⁵Galimberti (2007), p 48.

arising from Othello's jealousy, Figaro's manipulative wit, the Nibelung's the envious greed – coupled with the power of “actualisation” (*Vergegenwärtigung*) that is as specific to music as its ability to convey the most subtle emotive nuances.¹⁶

Bianconi's study successfully clarifies how, despite the standardisation of formal models in the operatic repertoire from the eighteenth to the beginning of the twentieth century, composers have proved successful in expressing a variety of emotions. Musical theatre, in fact, consists of a complex spectacle in which music is one of the arts involved, and in which the fascination occurs thanks to a number of concurring elements, from the subject of the plot to everything that meets the eye of the audience.

What did I want to show [...] with my reasoning? As an institution, opera has been – and for many of us who believe in it, it is still – a school of emotions. In an operatic performance, the intrinsic asemanticity of music is corrected, in a way, by the explicit declaration of the emotional content via three concomitant factors: the plot, the visual element, and the provisions of the text. Conversely, it is precisely the character of opera, so emotionally explicit, what allows us, from a didactic point of view, to hail the music lesson, quite apart from its many other goals, as a gymnasium, even from a linguistic point of view, where the student practices the skill of recognising a variety of emotions [...].¹⁷

So which repertoire can be used by teachers? A prominent place could certainly be occupied by nineteenth-century opera, where the feelings of the protagonists become heated and ‘realistic’. According to Bianconi, it is possible to imagine that the jealousy and doubt present in *Otello*, as well as in Bizet's *Carmen*, can ‘resonate’ in the soul of the students. In fact, nineteenth century music, similarly to the works of other arts, does not represent ‘what should be’, but allows students, and all of us, to live all the feelings, objectifying them. In this sense, the act of educating, in its Latin etymological root of ‘pulling out’, is closely connected to the idea of Aristotelian catharsis. The teacher of music history educates the students through the emotions communicated by the music and conveyed by its formal organization, by also analyzing the librettos. A fruitful activity could be to read these latter by dramatizing their contents, assigning a different character to each pupil. In this way, the students will be able to explore the dramatic aspect of the words, understanding the feelings of the protagonists by experiencing them firsthand and reconstructing the relationship between text and music as emerged from the whole composition.

4 Conclusions

Since the teaching of music history in the *Licei Musicali* contributes in equal measure to the development of the musician and of the individual, it becomes an occasion to share and explore a repertoire. The identity of new musicians is created through the analysis of the works in the variety of contexts of musical production and through the roles that music and musicians take on across the centuries, thus debunking the utterly

¹⁶Bianconi (2008), pp 85–86.

¹⁷Bianconi (2008), p. 107.

modern myth that man is self-made and disavows anything that constitutes the past. The teaching of music history allows students to comprehend a repertoire that can be accessed with great ease, as it allows those materials to 'exist now', not because they are available online, but because they are understood and welcomed as something unfamiliar. All the available materials are in danger of disappearing, despite their ubiquitous presence, without the interpretative stage and the awareness of the other. Listening to music becomes an important moment, but only if it participates in the creation of a desire, in the perception of an absence that only the hermeneutic moment can return to the students.

Conversely, the awareness of the other becomes a mirror for the knowledge of self and for the exploration of feelings and emotions. This is why music history, just as art history, should not only form part of the training of musicians, but ought to feature in education at all levels, and certainly in every Liceo.¹⁸ Its absence, paraphrasing Galimberti's words, produces unfulfilled lives and existences deprived of an experience that is essential to the development of the individual.

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¹⁸For some interesting considerations on the importance of spreading the history of music in all school orders, on the problems of teaching and on the importance of listening, see Baroni (2001).

Rudimental: A Musical Practice Tool



Nuno João Casteleira, Luísa Correia Castilho, Arminda Guerra Lopes,
and Luís Pereira

Abstract Following the experience of musical teaching, researchers found that often students don't know how to apply study strategies and be self-proficient. A group of researchers developed an online platform, which intends to optimize the students' time when playing musical instruments. The platform allows a teacher to monitor students' work, through the use of data logged during a set of classes and practice sessions. This paper presents the design process and the implications of the tool implementation. The results obtained before and after the use of this platform, by a group of students, are described. Findings show that this platform's use as a pedagogical practice tool, permitted students to improve their instrumental practice.

Keywords Music education · Musical study · Communication and information technologies

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1 Introduction

Before public auditions, musicians invest a great amount of time alone with their instrument, perfecting musicality and technique. The instrument practice is, perhaps, the most productive activity a music student can do. Music teachers help their students obtaining correct study habits (Oare 2011; Prichard 2012; Stambaugh 2011). To help teachers and students develop a study routine that considers their specific needs, the researchers proposed an online tool, allowing a simple methodology for the student and revealing a roadmap of the students' evolution. The study was conducted at a local Conservatory in Portugal. The actors were one teacher and their students who were learning Percussion instrument. This study is of utmost importance due to the fact that the diversity and multiplicity of instruments that percussion student has to learn, which demands the need to manage their own time, the best they can. On the other hand, the majority of the students do not afford to buy musical instruments because of its high cost, which force them to use the school's instruments.

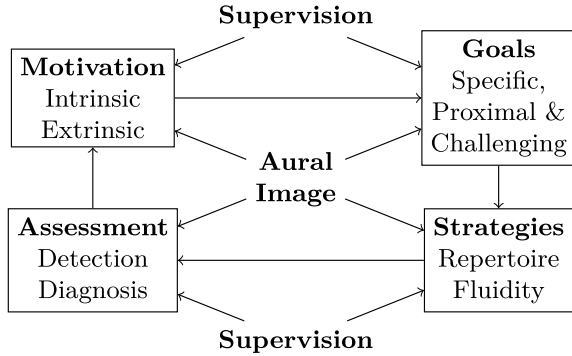
2 Background

Among several learning theories, authors focus on the Self-regulated learning (SRL) which includes the cognitive, meta cognitive, behavioral, motivational, and emotional/affective aspects of learning. The SRL models form an integrative and coherent framework on which students can be taught to be more strategic and successful. Among the several existing models on educational psychology, authors decided to approach the Oare model (Oare 2011). Other examples are Barry Zimmerman's approach (Zimmerman 1986, 2000). A brief introduction to virtual learning environments is also tackled since it is the context for the developed platform.

2.1 *The Self-regulated Practice Model*

Experts in music pedagogy refer the relevance of diary notes to keep track of the students' progress, as a way to show the results and providing them autonomy and self-efficacy (Davila 1997). The provision of ways to empower self-regulation and self-efficacy of the musical practice supports students to develop more competencies (Nielsen 1999; Oare 2011; Prichard 2012). The Self-Regulated Practice Model (Fig. 1) presented by Oare 2011, was the basis for the developed platform, which focus on both teachers and students. The model application permits students to be more able to achieve their personal goals and challenges presented by teachers. The method is the combination of challenging, meaningful task, focused on personal improvement.

Fig. 1 Self-regulated practice model (Oare 2011, p. 42)



The items targeted by the model are:

Supervision. Having a structured practice means that, through supervision, the student will define goals, develop study strategies and assess their own progress. Teachers have some kind of control on their students’ instrument practice by defining clear goals and criteria.

Motivation. Motivation is correlated to problem solving and the need to achieve goals, rather than pure study time counting. Improving the motivation means, frequently, that the goals that were set are being accomplished and satisfy both the students and teacher’s criteria.

Goals. Being a key component of musical practice, new students often find difficulties in setting them. Setting goals and being motivated are strictly connected. The teacher should define clear, proximal and challenging goals.

Strategies. Teachers observe that, although they teach ways to solve problems, students seldom use them. Regarding this, students should be oriented towards self-efficacy on problem solving.

Assessment. Assessment is important because it helps students to define new goals by the means of information gathering. Teachers should provide guided practice sessions, to show what the student should be aware of, in order to assess their efficacy. The scientific method can be used to, for example—identify the problem, to propose a solution and to evaluate that solution—associated with reflection or audio (visual) recordings, as shown in Table 1.

Table 1 Using a method to identify and solve problems through self-assessment (Oare 2011, p. 46)

| The scientific method for musicians | |
|-------------------------------------|--|
| | The Method Example |
| Identify the problem | My tempo is inconsistent. |
| Review notions | What can I minimize in my gesture? |
| Develop a theory | My movement is too high. |
| Test through experimentation | Reduce the height of my hand movement. |
| Data gathering | Play; record. |
| Data analysis | “It’s better but I can still improve” |
| Result interpretation | Reducing the height helps keeping the tempo but doesn’t solve the problem. |

2.2 Virtual Learning Environments

Being a Learning Tool, the developed online platform should be in conformity with some Virtual Learning Environment (VLE) features (Dillenbourg et al. 2002).

A VLE should provide:

1. Structured information;
2. Ways in which educational interactions occur;
3. Explicitly represented information;
4. Co-authoring for teachers and students;
5. Classroom activities enrichment;
6. Heterogeneous technologies and multiple pedagogical approaches and
7. An overlap with physical environments.

Besides these features, we believe that it is also important that the information created through VLE should be shared.

3 Methodology and Approach

This study took place during the first seven months of the academic year of 2018/19. The platform development started early, a year before. During that preparation time the platform idea generation and the settings were analyzed, as well as, the relevant information to include on it to have value for both teachers and students, either in classes, or in practices sessions. During the academic year of 2017/18 the teacher in charge of applying the study created an observation grid detailing what the student should play in any given class, what should they set as goals, and how and what should they practice.

This grid (Fig. 2) gave the roadmap for the online platform to be developed. The platform was developed in collaboration with a team of teachers and software

developers. The data for this case study was collected from September 2018 until February 2019. Students were from middle school and they had, in average, 12 years old.

The research methods used in this study were interviews, observation grid (Fig. 2) and a SWOT analysis (Table 2).

3.1 Interviews

In order to assess objective answers to our research questions, there were two moments of interviews—before starting using the platform and near the end of the research period. Seven students were interviewed before using the platform. The first interview was under the form of a questionnaire, divided in three parts: student characterization, musical instrument study and the use of an online musical aiding platform.

The second interview, under the form of an interview, was also divided in three parts: online musical aiding platform usage, student’s likes and online platform effects.

Fig. 2 Class observation grid

| | | | | | | | | |
|-------------------------------------|-------|--------------|-------|----------|---------|------|------|------------------|
| Student | | Date | | / | / | Week | from | to |
| Evaluation of the Repertoire | | | | | | | | |
| Content | | | | | | | | Evaluation (1-5) |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Detected problems | | | | | | | | |
| Rhythm | Notes | Phrasing | Tempo | Sticking | Gesture | | | |
| | | | | | | | | |
| Recommended Exercises | | | | | | | | |
| Technique | | Musical Text | | | Sound | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Rudiments | | | | | | | | |
| Cross out the days you've practiced | | | | | | | | |
| Rudiment | Mon | Tue | Wed | Thu | Fri | Sat | Sun | |
| | | | | | | | | |
| | | | | | | | | |

3.2 *Observation Grid*

The platform was used as a class observation grid, as the teacher would take notes of every class; the student would take notes of their practice sessions. The platform provided ways to relate the classes with the practice sessions. This will be better explained in Sect. 5.1.

3.3 *SWOT Analysis*

A SWOT Matrix is a structured diagnostic method. In order to understand what the limitations were, the team built a SWOT Matrix regarding this study.

4 The Platform

The platform architecture follows typical monolithic web application architecture (Microsoft 2019).

The main entities presented in the platform, and its relations, are presented in Fig. 3 and described in the topics below.

4.1 *Platform Functionalities*

During the platform's development we focused in the following key areas (Dillenbourg et al. 2002):

Structured Information. Multiple authors produce Information stored on VLE, in this case teachers, students and web masters.

A VLE should survive to the rapid transformation of technology, assuring that produced content is reusable after several years. All elements involved in education can and will benefit with sharing information. We should thrive to use standard formats to not reduce this opportunity.

Social Space. A book, though full of content, is hardly considered a learning environment. But reading a book with others, revising it with the students, writing its summary for a teacher, etc., can be applied on this learning environment. Comparing with the online space, a static website is hardly a learning environment, unless there is some sort of social interaction.

Table 2 *SWOT* analysis

| | | |
|--|---|---|
| | <p>Strengths</p> <ul style="list-style-type: none"> • Simple access on every mobile device with a web browser • Immediate view on Repertoire and its problems • Student progress overview | <p>Weaknesses</p> <ul style="list-style-type: none"> • Learning curve • Digital method can slow classes and practice sessions • Can only work with logged study sessions • The existence of a prior study and/or class methodology can disable the adoption of a new one |
| <p>Opportunities</p> <ul style="list-style-type: none"> • High frequency of students with smartphones • VLE in use in other study areas • Empathy towards new technologies from students | <p>SO Strategies</p> <ul style="list-style-type: none"> • Develop a young and easy to use environment • Log students' progress conscientiously, raising motivation | <p>WO Strategies</p> <ul style="list-style-type: none"> • Helping students with the use of the platform • Promote its use, logging continuous evaluation |
| <p>Threats</p> <ul style="list-style-type: none"> • Internet access limitations • Technological rejection • Need of digital equipment | <p>ST Strategies</p> <ul style="list-style-type: none"> • Raise parent awareness to its use and advantages • Enable web access with school resources | <p>WT Strategies</p> <ul style="list-style-type: none"> • New methodology with technological means can promote digital literacy |

About this topic we should discuss synchronous and asynchronous communication. When interaction is done at the same time, we call it synchronous (chats, videocalls); otherwise we are talking about asynchronous interactions (e-mail, online forums). This latter category also includes sharing objects online (Dillenbourg et al. 2002).

Explicit Representations. More relevant than flashy colors and 3D simulations of information is content interpretation. Simpler interpretations of complex data allow positive attitude towards learning environments. The graphical appearance should be simple enough to allow easy navigation through the VLE. It should be a museum, with well-conceived rooms, rather than a maze (Dillenbourg et al. 2002).

Students as Authors. Content creation activities are observed in all the education systems. The emphasis is made towards sharing it with the community, other than the normative student teacher binomial. We were motivating an interesting content creation phenomenon. This sharing activity was encouraged through the use of VLE, providing ways to share those contents and going forward with what was stated in Social space.

The interdisciplinary activities were also promoted; researching about a specific piece or composer forced the students to use what they know from History, Music,

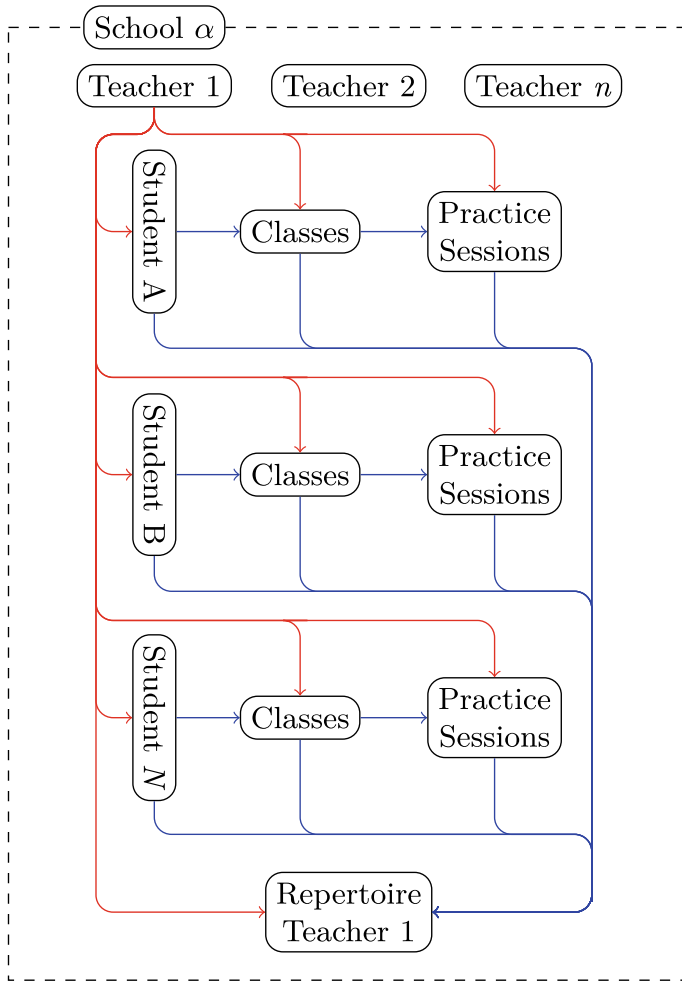


Fig. 3 Entities in the platform and its relations

and Languages. They improve their analysis capabilities and social skills, which had a positive impact on the student’s curricula.

Classroom Learning Support. Learning with VLE is frequently associated with distance education, but it is also used to help classroom activities. Actually, the differences between these two teaching types are thinning. Sometimes, the only restrictions students have are time-related; they are near their school, but those restrictions are overcome with asynchronous communication. So, schools have been offering a new teaching type—b-learning—combining classroom and distance learning. Every digital tool has its limitations that can rapidly be solved spending some time with a teacher face to face.

As a global unit, by grouping all objects, we created a School. This School can have as many Teachers and Students as we want. Each Teacher has their Students. Only their Teacher can create Classes and see what their Practice Sessions were.

Each Teacher has a Repertoire database, in which he establishes what musical elements their Students will practice (it can be a piece, a study, a scale, an exercise and so on). Attributing one element of this database to one student allows its use on Classes and on Practice Sessions. Figure 3 presents the main entities in the platform with the relations between them.

4.2 Platform Operation

Teachers and Students have different permissions and available tools. The Student's role has the most restrictive toolkit, in order to simplify its usage.

Teachers have the following permission tools: creation of School, designate a Student to their pool of students, set their students' class schedule, create repertoire items, set students' repertoire items, log classes, set homework, check their students' Practice Sessions.

Students can use the following tools: check Class logs, start a Practice Session, log their Practice Sessions.

5 Findings

The platform made possible logging several indicators, serving both teachers and students data analysis. Teachers and students logged this data; some data was teacher's responsibility, and some was students' one.

From Classes, evaluation on each repertoire item, repertoire item frequency, detected problems and problem frequency were logged.

From Practice Sessions, duration, frequency, repertoire item frequency, repertoire item difficulty (homework) and notes were logged. Practice Sessions are a direct consequence of Classes, so we should find some sort of causality between frequency and evaluation on Classes and frequency and difficulty on Practice Sessions.

5.1 Classroom Observation

Classroom observation is an important method of evaluation, which shows behaviors under the subjective judgment of teacher. We cannot translate music into numerical values because this is subjective but descriptive evaluation allows us to create an

observation grid, mandatory to this type of investigation. Logs were not always taken directly on the platform; favoring simplicity and effectiveness, some data was noted on paper and then inserted onto the platform.

5.2 Logged Data

Over the course of six months, the data taken into account considered one hundred and forty (140) Classes, twenty to each of the seven students, totaling four hundred sixty-three (463) repertoire items, two hundred and eighteen (218) of which had numerical evaluation and seventy-four (74) had textual description. Seventy-one (71) problems were logged. Two hundred and ten (210) items were assigned as homework.

Over students' responsibility, only ten (10) Practice Sessions were logged, totaling twenty-four (24) repertoire items and five (5) descriptive difficulties. The sum of Practice Session time was seven hours, twenty-eight minutes and eighteen seconds (07:28:18).

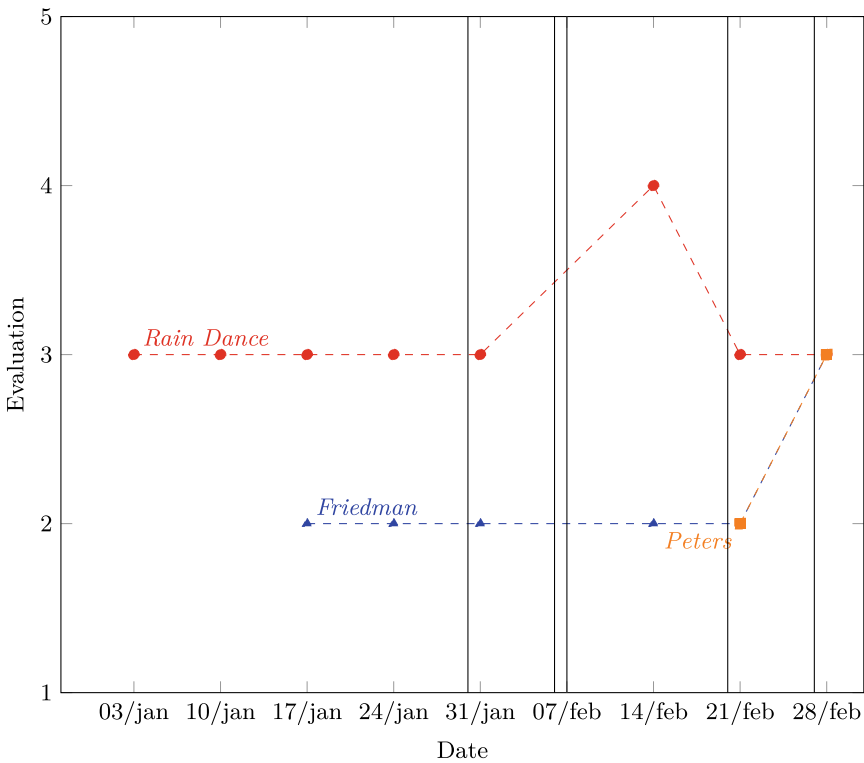


Fig. 4 Example plot of a student's evolution

5.3 Data Logged on the Online Platform

From all logged data, we found the relevant example shown below, represented in Table 3. In Table 3 one can observe the evolution that this student had between several classes, crossing information from his Classes and his Practice Sessions, chronologically. Mainly focused on a specific piece, Rain Dance by Alice Gómez (marimba), we are able to see his evaluation not to drop but to increase, as well as we were able to see the difficulty to reduce. This tendency was verified again at the two Classes of 21/Feb and 22/Feb, with the pieces Friedman #5 (study for vibraphone) and Peters #28 (study for timpani).

We can observe three lines in Fig. 4, each of one represents the evaluation progress, logged in the platform during classes. The vertical lines represent the days the student practiced his instrument and logged it on to the platform. The vertical scale is non continuous, as the evaluation is done through a qualitative scale from one to five, and in that sense the horizontal lines are dashed and not continuous. Through this representation, it becomes easier to assess the correlation between the Practice Sessions and the increase of the evaluation of said repertoire item.

Table 3 Example of a student’s evolution between several classes

| Kind | Date | Repertoire | | Homework |
|----------|-------|--------------------------------------|--------|--------------------------------------|
| | | Item | Grade | Item |
| Class | 03/01 | <i>Rain Dance</i> | 3 | <i>Rain Dance</i> <i>Friedman</i> |
| Class | 10/01 | <i>Rain Dance</i> | 3 | <i>Rain Dance</i> |
| Class | 17/01 | <i>Rain Dance</i> <i>Friedman</i> | 3 2 | <i>Rain Dance</i> |
| Class | 24/01 | <i>Rain Dance</i> | 3 | |
| Practice | 30/01 | <i>Rain Dance</i> | M | (60 mins) |
| Class | 31/01 | <i>Rain Dance</i> | 3 | |
| Practice | 06/02 | <i>Rain Dance</i> | D | (26 mins) |
| Practice | 07/02 | <i>Rain Dance</i> | M | (60 mins) |
| Class | 14/02 | <i>Rain Dance</i> | 4 | |
| Practice | 20/02 | <i>Rain Dance</i> | M | (60 mins) |
| Class | 21/02 | <i>Rain Dance</i> <i>Peters</i> | 3 2 | <i>Friedman</i> <i>Peters</i> |
| Practice | 27/02 | <i>Friedman</i> | D | (60 mins) |
| Class | 28/02 | <i>Friedman</i> <i>Peters</i> | 3 3 | |

The difficulty scale was: Easy (E), Medium (M) or Difficult (D).

6 Conclusion

After setting our investigation goals the aim was to, after all, understand if using the online platform was beneficial for the student. That meant understanding students' behaviors prior and after using the platform and analyze their answers to both the interviews and questionnaires; the teacher's evaluation regarding the student was also a big factor.

Based on the methodology previously presented we can reflect consciously about those aforementioned investigation goals.

With the answers given by those students that effectively used the platform, we can conclude that practice time was more effective by setting exactly what those session goals were and simplifying its understanding.

Concerning the teacher's point of view, the use of the platform to log information to keep track of their students' progress gave better insight on their evolution as a musician and, consequently, allowed a more concerned grade. Referring to students' interviews, their contribution also helped to identify the shortcomings of the developed platform, to help us, the research team, to build on them and to improve it.

Having a 'always-on' approach to teaching gave way to more motivation and ease of knowledge acquiring.

Our research was confined to only one school, one instrumental class and one teacher, making a great investigation opportunity to apply this study in other schools, instruments, teachers and students to improve upon what were our results.

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AM-I-BLUES: An Interactive Digital Music Instrument for Guiding Novice Pianist in the Improvisation of Jazz Melodies



Isabela Corintha , Luís Outeiro , Rui Dias, and Gilberto Bernardes 

Abstract In this paper, we discuss the design considerations and goals of an interactive digital musical instrument (DMI) for novice pianists. It aims to promote the practice of melodic improvisation by guiding pianists in the selection of notes. The DMI includes two major components: a generative jazz model (software) and an illuminating keyboard controller (hardware). Visual feedback in the form of illuminated keyboard controller keys guides notes selection. Illuminated keys correspond to scale degrees that comply with a harmonic structure generated on-the-fly. The generative nature of the engine allows high degrees of novelty while guaranteeing a structurally-coherent harmonic structure anchored in the blues/jazz idiom. Preliminary experimental results inform critical directions for future design iterations of the proposed system.

Keywords Interactivity · Digital music instrument · Jazz · Generative music · Music education

1 Introduction

Traditionally, human culture engages in activities recognized as musical, (Van der Schyff 2019). Improvised sound-making is representative of such activities across many communities (Schiavio and Van der Schyff 2018). Its expression occurs within melodic, rhythmic, sonic, harmonic, and social frameworks (Van der Schyff 2019)

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and can be situated as a core objective in music learning. In the context of music education, improvisation challenges students through active listening, prepares them for complex decision making during performance (Khoury 2017), develops a strong sense of creative potential, and impels the exploration of music theory concepts and instrument practice (Campbell 2009). Moreover, the focus on improvisational musicianship using innovative learning paradigms, such as interactive (computer-mediated) tools for education, respond to a broader demand for 21st-century apprenticeship (Khoury 2017). Nevertheless, music education has often been resistant to change as music tutors continue to focus on repertoire primarily (Khoury 2017).

Finding the right chords to adjust a melody or the right melody to adjust a chord progression is often in the improviser's task. While the notion of "right" is subjective, a musician typically needs to constraint the selection of notes, chords, or voicings to the aesthetic promoted by the overall structure or idiom (Biles 1994). The landscape of technology for music education includes essential contributions to stimulating these improvisational skills (Khoury 2017). Of note is the diversity of keyboards with lighted keys to drive novice pianist actions during improvisation. Our work expands on this research topic with new approaches to the design of digital musical instruments (DMIs) that guide novice pianists to improvise on an illuminating keyboard.

Towards enhanced levels of readiness and expressiveness, we propose AM-I-BLUES, a DMI with embedded potential for automatically generating jazz structures. Furthermore, the AM-I-BLUES includes a physical interface for guiding novice pianists in the creation of melodic patterns from multiple *optimal note* solutions which "fit" an on-the-fly generated jazz harmony. AM-I-BLUES integrates the following two technologies in a system designed to introduce melodic jazz improvisation in music education, namely in the training of novice pianists: AMIGO (Corintha et al. 2019) and MyJazzBand (Dias 2018). The hardware component AMIGO (Corintha et al. 2019) is a physical interface that aims to guide musical composition through an illuminated keyboard. The software component MyJazzBand (Dias 2018) is an installation that invites users to experience jazz improvisation without prior knowledge of musical theory and practice. In the proposed AM-I-BLUES DMI, the illuminating keyboard component makes *multiple* note suggestions for guiding the melody creation beyond the typical linear mapping between an existing score and illuminating keys instructions for its performance. The note suggestions are contextual to the harmony generated on-the-fly by the software component, which features different jazz structures. Inspired by an enactivist approach (Van der Schyff 2019), we conducted a preliminary experiment with trained pianists, to discuss future iterations of our DMI in supporting an intuitive understanding of jazz improvisation in education.

The remainder of this paper is structured as follows. Section 2 describes the state-of-the-art in generative jazz systems and pedagogical approaches to technology-mediated improvisation. Section 3 details the architecture of the AM-I-BLUES and the mappings between its two major generative (software) and physical (hardware) components. Sections 4 and 5 disclose the generative jazz model and the illuminating physical control keyboard hardware interface. Section 6 presents the design

and results of a preliminary experiment, discussed in the scope of the educational affordances of the AM-I-BLUES. Finally, Sect. 7 describes the conclusions and our future work.

2 Related Work

The present work is rooted in two fundamental areas of knowledge: (1) generative music systems, notably those related to the automatic generation of jazz structures, and (2) DMI design in the scope of improvisation and education. In the latter category, a particular focus is given to illuminating keyboards to assist novice pianists in experiencing music creation and performance with little to no musical training.

Generative music systems for the automatic creation of jazz structures were previously proposed in the literature. Here, we focus mainly on those systems that target education. *GenJam* (Biles 1994) adopts genetic algorithms for generating jazz structures in real-time based on interactive user feedback. *ChordEase* (Korda 2015) allows the dynamic transformation of pitch content from a given jazz melody in order to fit on a predetermined harmonic structure. *GimmeDaBlues* (Dias et al. 2012) is a generative jazz application that allows users without prior musical knowledge to play multiple instruments along with a predefined harmonic progression. *Impro-Visor* (2020) is a music notation program designed to help jazz musicians compose and hear solos. It aims to improve understanding of solo construction and chord changes.

On the scope of improvisation in pedagogy, the software application *Creative Music Learning with Technology* (Khoury 2017) is a real-time feedback system for improving primary elements of music structure such as rhythm, harmony, and melody. An adaptive musical instrument designed to enhance creativity through improvisation using a home row of keys from a standard computer keyboard is a representative example of a system created for a more embodied musical expression (Griffin & Jacob 2013). *Andantino* (Xiao et al. 2016) presents an innovative methodology by emphasizing communication and expressive understanding of body movements in the musical learning process, namely (micro)-time and rhythm; training of musical scales and the consequent recognition of tones for reflection and eventually future capacity for improvisation. In this category, many relevant examples use keyboards with illuminated keys for guiding novice pianists in creating musical structures, such as the *Illuminating Piano* (2020), *Yousician* (2020), and *The ONE Smart Piano* (2020). These applications are mostly focused on expressive performative nuances and rely on an existing repertoire piece to be learned without the need for understanding the complex system of music notation.

3 AM-I-BLUES: DMI Overview

This paper details AM-I-BLUES, a DMI that integrates two existing technologies: the illuminating controller interface of AMIGO (Corintha et al. 2019) with the generative jazz model developed for the MyJazzBand installation (Dias 2018). The resulting DMI aims to introduce novice pianists in the improvisation of blues and jazz melodies by guiding them via the visual feedback of an illuminating keyboard. Ultimately, it fosters a musical understanding and expressiveness of the mechanics and theory of melodic improvisation within the blues/jazz idiom without music theory knowledge. Nevertheless, the DMI was designed to consider some prior performative skills on the keyboard, as the target user is mostly restricted to novice pianists.

The major novelty of AM-I-BLUES, in comparison to existing illuminating keyboards, is the use of a generative system, which provides harmonic sequences on-the-fly, to which multiple optimal solutions for note selection are provided for melodic creation. Figure 1 presents the AM-I-BLUES architecture, which includes two main (hardware and software) components. The software component is responsible for the generation of musical structures anchored in the blues/jazz idiom.

The hardware component is an illuminating physical control keyboard, which provides visual feedback to novice pianists on note suggestions for the creation of melodic patterns.

The illuminating keyboard is used to provide visual feedback to the user. It collects from the generative jazz model a vector with a 12 element binary list exposing the active notes within the chromatic scale in an octave. The vector is then automatically mapped to the two upper octaves of the LED bar, as shown in Fig. 2.

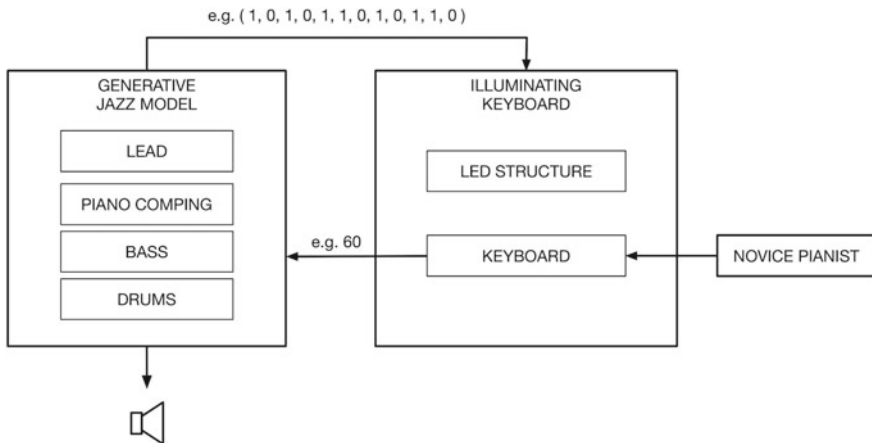


Fig. 1 AM-I-BLUES architecture, which features two major software (on the left) and hardware (on the right) components. Arrows indicate the information flux of the system



Fig. 2 The Illuminating physical control keyboard

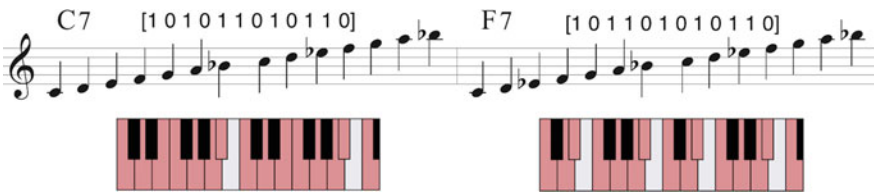


Fig. 3 Two example generated scales corresponding to the first two chords of the blues progression (C7 and F7)

The active notes, represented by a “1” in the vector and corresponding to the suggestions by the generative system for the Lead instrument, are illuminated in the LED bar in red. In contrast, the inactive notes are lit white (see Fig. 3).

4 Generative Jazz Model

The software component of the proposed DMI features an interactive generation of musical events based on standard melodic, harmonic, and rhythmic procedures from the traditional tonal and modal jazz music practice. It was developed for MyJazzBand (Biles 1994) and adapted for the illuminating keyboard system.

The platform emulates a traditional jazz band with a rhythm section—namely bass, drums, piano—and melodic instruments (Dias et al. 2014), for which a set of generative algorithms were developed that are specific for each type of instrument. All the instruments are globally controlled by a custom-made sequencer and music parser that sends all the necessary musical data—whether harmonic and rhythmic—to each instrument. The data is stored in custom song style-sheets that define the musical data for a given song, namely the chord progression and associated scales for each section, as well as global information like the song title, tempo and swing type. By default, the system uses the “Standard Blues” style-sheet, a common 12-bar blues form (see Fig. 4). Other song style-sheets were created, based on chord progressions from well-

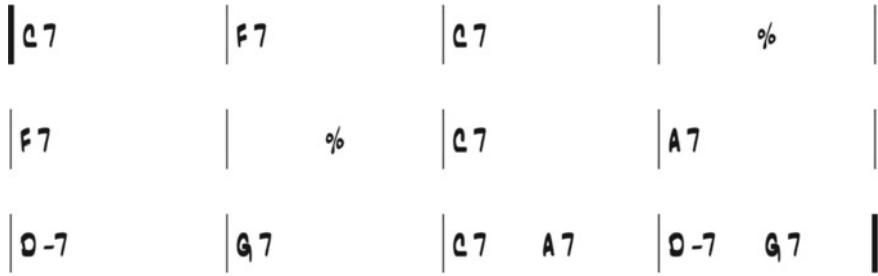


Fig. 4 “Standard Blues” harmonic progression in jazz chord notation format

known jazz standards like George Gershwin’s *I’ve got rhythm*, Miles Davis’ *Freddie the Freeloader*, and John Coltrane’s *Equinox* and *Giant Steps*, among others.

The approach taken for the bass and drums was that of a virtual player. These are not meant to be controlled directly. Instead, they were designed as a virtual drummer and a virtual bassist (Corintha et al. 2019) that are generated automatically in real-time but also influenced by the user’s activity using the other instruments. The melodic instruments and piano were designed to be played directly by the user, so the algorithms for these instruments implement a dynamic mapping system that adapts the song’s musical data in real-time and maps it to the user interface. The algorithms receive the current harmonic data from the sequencer and adapt the available notes on the keyboard using the LEDs, in order to optimize and determine the available notes that can be played by the user. The piano algorithm additionally implements a chord generation algorithm that uses a single input note from the user on the keyboard, and the harmonic data from the sequencer, to dynamically calculate an appropriate jazz chord voicing (Dias 2018).

Another global component—the Listener—provides an overall analysis and control over the activity level of the instruments, according to the user input (see Fig. 5).

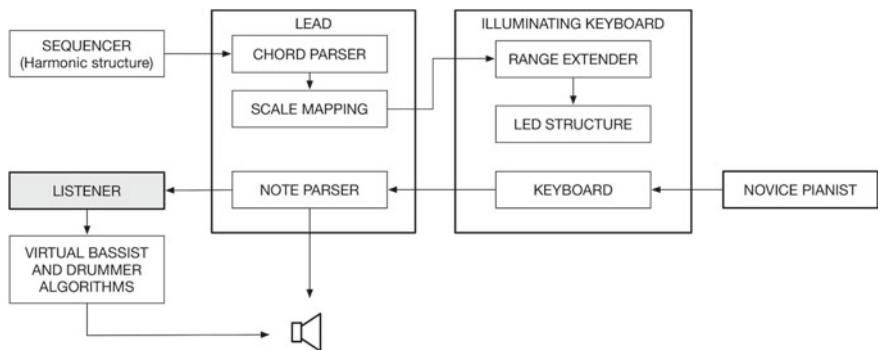


Fig. 5 The structure of the Lead scale mapping algorithm, including the Listener module

The virtual drums and bass follow the user input by matching the density, speed, and type of response, thus creating an overall sense of a real jazz band.

5 Illuminating Keyboard

Figure 6 shows the handcrafted plywood structure, which includes all hardware components of an illuminating bar to be placed on a MIDI keyboard controller. It aims to provide visual feedback to the novices pianists by illuminating a set of notes on a MIDI keyboard. The illuminating notes comply with an on-the-fly generated jazz harmony driven by the generative jazz model. The user can then use this information to select notes accordingly.

An ESP32 microcontroller board was adopted, due to its built-in Bluetooth support and low cost. The final project features 48 APA-106-F5 programmable RGB (red, green, and blue) LEDs (light-emitting diodes). The LEDs are daisy-chained, i.e., the output of LED n is connected to the input of LED $n + 1$. This makes the hardware assembly much easier compared to soldering them in a matrix configuration in a tight space, as it would require more connections between far apart LEDs. A lithium-ion battery is used for portability. There is an overdischarge and short circuit protection board that also handles the battery charging (see Fig. 7).



Fig. 6 The Illuminating Keyboard. The plywood structure holding the LED array docked to the MIDI keyboard controller

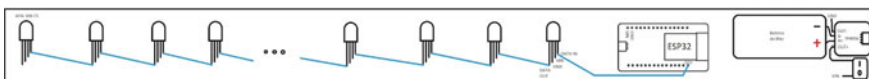


Fig. 7 Circuit diagram of the prototype with the LEDs on the left and control and power circuit on the right

The FastLED library handles the LEDs control. For each refresh of the display, Max software sends 144 bytes (3 bytes per LED) via a Bluetooth serial communication, turning on the corresponding LEDs. During idle (no Bluetooth communication established), a colored test pattern is shown. A low battery imposes a flashing red pattern.

6 Preliminary Experiment and Educational Affordances

We conducted a preliminary experiment to inform the design and future interactions of AM-I-BLUES. The experiment protocol was primarily based on heuristic evaluation (Nielsen and Molich 1990) to understand the performance of the DMI and the effectiveness of the interface in providing a pleasant musical learning environment for trained pianists without prior knowledge of the jazz idiom.

The experiment included two participants with ten or more years of classical piano training. Before the experiment, we presented to the participants how to use the main components of the system, namely the interpretation of the illuminating keyboard. We then asked them to test the system for as long as they wished for on the four different jazz harmonic structures available. During the tests, the participants asked many questions in different aspects according to their interests. The first participant made considerations pertinent to the use of the tool in music education. He concluded the experiment by expressing his interest in continuing to explore the DMI. The second participant mentioned that as he got acquainted with the dynamics of the system. In greater detail, in following the guidance of the LEDs, he felt free to improvise. However, he identified some difficulty in following the lights at the beginning of the experiment. He was interested in testing more often. “This system allows us to play freely. When we play, we are not imitating what is on the score. However, we have to know what we are doing.”

The evaluation with the two experienced pianists was of high relevance before the experiment with novice pianists. The results of the evaluation were taken into consideration to verify the effectiveness of the DMI for more advanced research in professional musical pedagogy. We concluded that experiments with novice pianists should hold a considerable time during the school year (e.g., across several months). The duration in months and the time in each class for the experiment will be agreed with the piano teacher in order to make the assessment as useful as possible.

Music students often endeavor instrument practice by themselves. It is a lonely and lengthy process. The intention of practicing in the AM-I-BLUES is to provide a more effortless way of bringing possibilities for novice pianists to learn by looking at form, rhythm, theory, and harmonic progressions. It should be noted that our proposal is inspired by musical education and improvisation that develops enactive and embodied perspectives on cognition. We aim to provide a system that emphasizes a more effective and enjoyable music learning environment through a tool that reminds novice pianists to listen more emotionally. We believe this change in perspective resonates closely with post-functionalism cognitive science as it places

more emphasis on the embodied, interactive, and adaptive aspects of musicality and human cognition (Schiavio and Van der Schyff 2018). The proposal is to offer music students the freedom to trace the natural course of the art of music.

7 Conclusions and Future Work

This paper presented a DMI created to encourage novice pianists to improvise melodic jazz patterns guided by an illuminating keyboard. We described the musical context behind our design, the architecture of our DMI, as well as documented some observations from a preliminary experiment with trained pianists. Above all, the proposed DMI points out to ask teachers and novice pianists to enact pedagogical environments where they may exercise their capacities as self-making musical beings, where exploratory, improvisational, creative, and collaborative activities can play out (Xiao 2016). As future work, we aim to conduct a formal evaluation with a larger pool of novice pianists for a broader pedagogical analysis. We hope that our system becomes an essential tool for the musical learning process through the enactive and embodied perspectives on cognition approach. For further information, please refer to the following online link: <https://sites.google.com/site/amigomusicalamigo/home/amigo>.

In order to evaluate the effectiveness of the DMI, a thorough evaluation following existing pedagogy theories on improvisation (Van der Schyff 2019) will be conducted. The research-creation methodological approach described as a complex intersection of artistic practice, and a theoretical concept that cannot be predicted or determined in advance (Springgay and Truman 2019; Truman 2016) will be adopted as the experiment protocol to examine the feasibility of the DMI to explore the potential of the system for musical education. Our preliminary trials include reports from professional music teachers and novice piano students to deduce the applicability of DMI in apprenticeship. The purpose of the study is to evaluate both the student and teacher experience using the DMI, in addition to more general information about the creative and autonomous learning of improvisational skills. Ultimately, we aim to contribute to the ongoing music pedagogy—from more traditional pedagogies where a unidirectional stream of knowledge is passed from a teacher to a student, to more relational approaches that highlight improvisation, creativity, collaboration, as well as the role of movement and the situated body for learning.

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