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ABSTRACT BOOK

CIDAG

6th

go green for 2030

international
conference
on design and
graphic arts



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CIDAG 2021

ABSTRACT BOOK

6th CIDAG

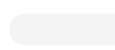
go green for 2030

**international
conference
on design and
graphic arts**



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**INTRODUCTION
NOTE**



go green for 2030

6th international conference on design and graphic arts

Welcome to the **CIDAG**, International Conference on Design and Graphic Arts, organized jointly by **ISEC Lisboa** | Higher Institute of Education and Science. and the **IPT** | Polytechnic Institute of Tomar.

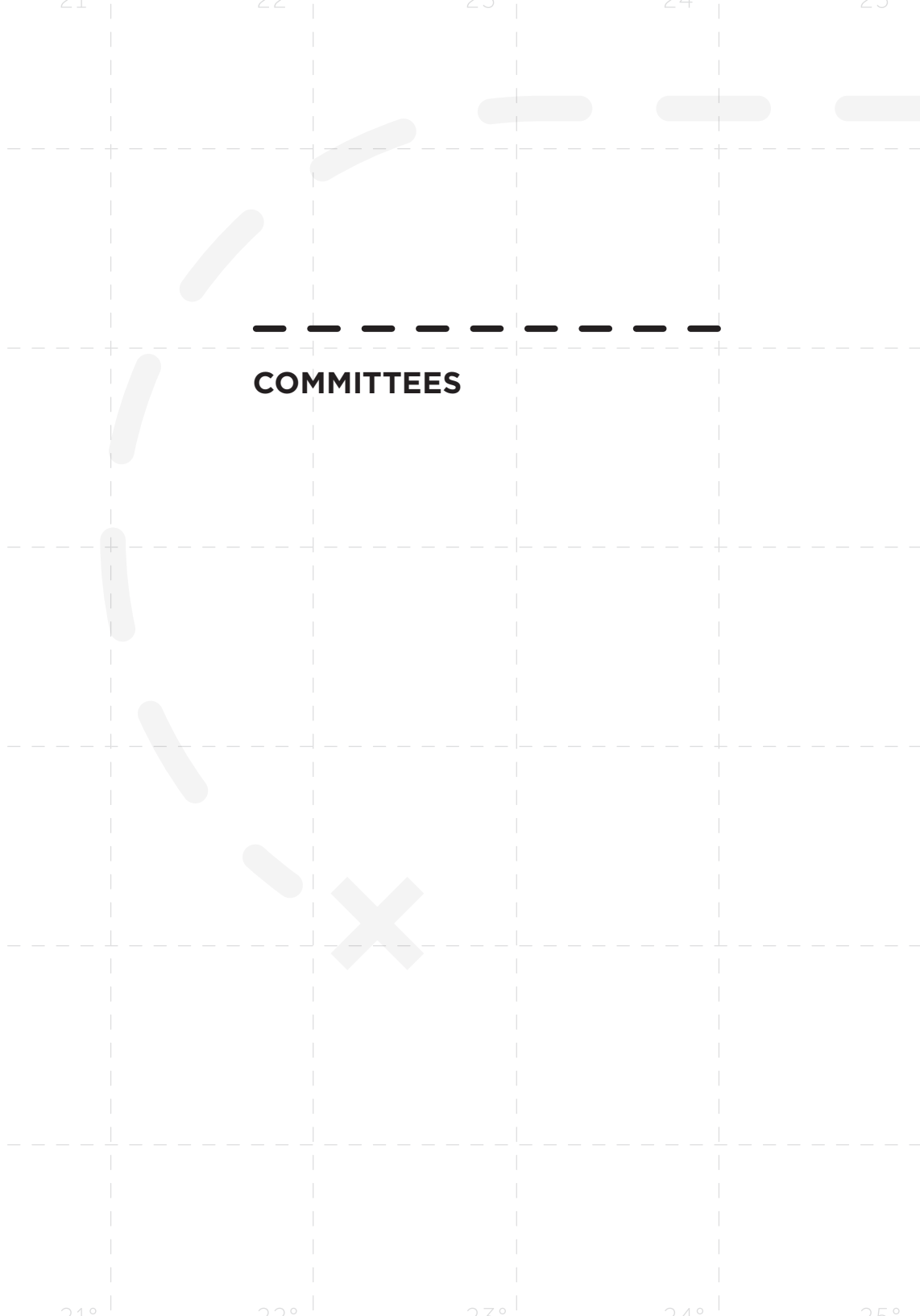
The **6th CIDAG** will be held on **20-22 October 2021**, and will feature the most reputable experts from companies and manufacturers, from Universities and Colleges, national and international R&D Institutes, which develop their activity in areas associated with the Graphic Production and Design, using and developing advanced technologies for the production of new materials, new equipment, software and IT tools and innovating in design methodologies and communication.

The conference involves Keynote Communications, Oral Communications and Posters.

The invited speakers are among the most worldwide prominent experts and will showcase the latest and innovative results concerning the development and state of the art in these areas.

It is with great pleasure that we receive you, wishing a great Conference.

The Organizing Committee



COMMITTEES



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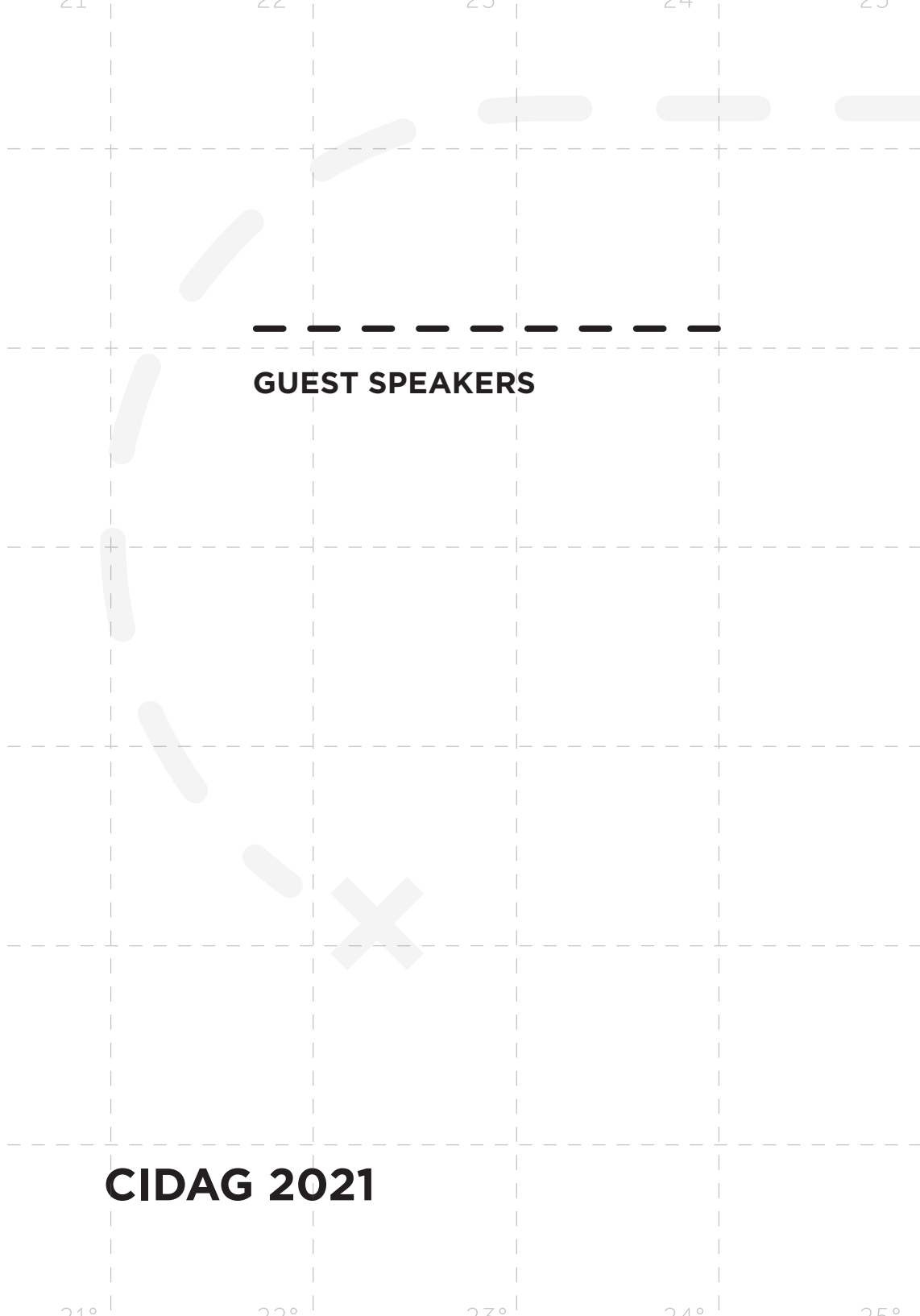
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Miguel Sanches | Instituto Politécnico Tomar



GUEST SPEAKERS

CIDAG 2021



ANNA MERONI

A different design perspective

Anna é professora de design na Escola de Design do Politécnico de Milão. Doutora em Design, sua pesquisa se concentra em serviços e design estratégico para a sustentabilidade para promover a inovação social, a participação e o desenvolvimento do local. Ela foi co-fundadora do Laboratório POLIMI-DESIS, o laboratório de pesquisa sediado em Milão da Rede DESIS-Design para Inovação Social e Sustentabilidade. Com conhecimentos específicos em métodos e ferramentas de co-design, deu origem ao conceito de design centrado na comunidade e trabalha de forma transversal no novo empreendedorismo, nos serviços públicos e na investigação e inovação responsáveis. Desde 2016, ela é chefe do Mestrado internacional em Design de Sistemas de Serviços de Produtos, na Escola de Design do Politécnico de Milão.

Anna is Professor of Design in the School of Design of the Politecnico di Milano, PhD in Design, her research focuses on service and strategic design for sustainability to foster social innovation, participation and place development. She has been co-founder of the POLIMI-DESIS Lab, the Milan based research laboratory of the DESIS-Design for Social Innovation and Sustainability Network. With specific expertise in co-design methods and tools, she originated the concept of community-centred design and works transversally on new entrepreneurship, public services and responsible research and innovation. Since 2016 she is the head of the international Master of Science in Product Service System Design, at the School of Design of Politecnico di Milano.



WARREN BEEBY

Creativity isn't Neutral

Warren passou os últimos 20 anos conectando pessoas a algumas das principais marcas do mundo e ganhando prêmios aqui e ali também. Agora, ele está a impulsionar a linguagem visual da sustentabilidade, tornando-a tão inspiradora e sedutora quanto merece ser, como Chief Creative Officer da Futerra. A Futerra é uma Agência Criativa que trabalha com pessoas que acreditam que podem transformar o imperativo da sustentabilidade na maior oportunidade empreendedora de uma geração. Junto com os seus clientes, estão a construir marcas que são símbolos de mudanças positivas. Eles estão a desencadear o progresso com um propósito.

Warren's spent the past 20 years connecting people to some of the world's leading brands, and winning the odd award here and there too. Now, he's pushing the visual language of sustainability, making it as inspirational and seductive as it deserves to be, as Chief Creative Officer for Futerra. Futerra is a Creative Agency that works with people who believe they can turn the sustainability imperative into the greatest entrepreneurial opportunity for a generation. Together with their clients, they are building brands that are symbols of positive change. They are unleashing progress that has purpose.

**LIA KRUCKEN****The power of the smallest acts and ways of reinventing relationships through design**

Lia Krucken é professora na área de Design e Artes Visuais e conduz oficinas e práticas de design colaborativo, com foco na valorização de recursos e culturas locais. Tem pós-doutorado em Design, pelo Politécnico de Milão, Itália (2011), e em Arte Contemporânea, pela Universidade de Coimbra, Portugal (2019). Colabora universidades e instituições de pesquisa nas áreas de arte e design no Brasil, em Portugal, na Itália e na Alemanha, desde 2003. Integra o Coletivo Insurgências, em Berlim, que propõe projetos engajados socialmente. É professora visitante do Programa de Pós-Graduação em Artes Visuais na Universidade Federal da Bahia em Salvador, Brasil com apoio do PNPd-CAPES.

Lia Krucken is a Design and Visual Arts professor and leads collaborative design workshops and practices, with a focus on valuing local resources and cultures. She has a postdoctoral degree in Design, at the Polytechnic of Milan, Italy (2011), and in Contemporary Art, at the University of Coimbra, Portugal (2019). She has collaborated with universities and research institutions in the fields of art and design in Brazil, Portugal, Italy and Germany since 2003. She is a member of Coletivo Insurgencias, in Berlin, which proposes socially engaged projects. She is a visiting professor in the Postgraduate Program in Visual Arts at the Federal University of Bahia in Salvador, Brazil, with support from the PNPd-CAPES.



RUI MARCELINO

Rui Marcelino é licenciado em Engenharia Mecânica pelo Instituto Superior Técnico de Lisboa (IST), mestre em Design de Transportes pela Scuola Politecnica di Design de Milão e doutorado em Design pela Faculdade de Arquitectura da Universidade Técnica de Lisboa (FAUTL). Marcelino leciona Projeto de Design no Mestrado em Design de Produto da Faculdade de Arquitectura da Universidade de Lisboa e é o Coordenador desse mesmo curso. Profissionalmente, depois de uma passagem pelo Centro Stile Alfa Romeo, fundou em 1997 a Almadesign, que se dedica aos Transportes, Produto e Design de Interiores. Com a Almadesign, Marcelino recebeu o Prémio Nacional de Design em 1999 e 2009, o Prémio Good Design em 2009, 2013 e 2015, uma menção honrosa nos DME Awards 2009, o Green Good Design Award 2010, o Crystal Cabin Award 2012, o Daciano da Prémio Costa 2015, entre outros.

Rui Marcelino holds a Bachelor's degree in Mechanical Engineering from Instituto Superior Técnico de Lisboa (IST), a Master's degree in Transport Design from Scuola Politecnica di Design in Milan, and a PhD in Design from the Faculty of Architecture of Technical University of Lisbon (FAUTL). Marcelino teaches Design Project in the Master's degree in Product Design at the Faculty of Architecture of the University of Lisbon and is the Coordinator of that same course. Professionally, after a stint at Centro Stile Alfa Romeo, he founded Almadesign in 1997, which is dedicated to Transport, Product and Interiors Design. With Almadesign, Marcelino received the National Design Award in 1999 and 2009, the Good Design Award in 2009, 2013 and 2015, an honourable mention in the DME Awards 2009, the Green Good Design Award 2010, the Crystal Cabin Award 2012, the Daciano da Costa Award 2015, and others.

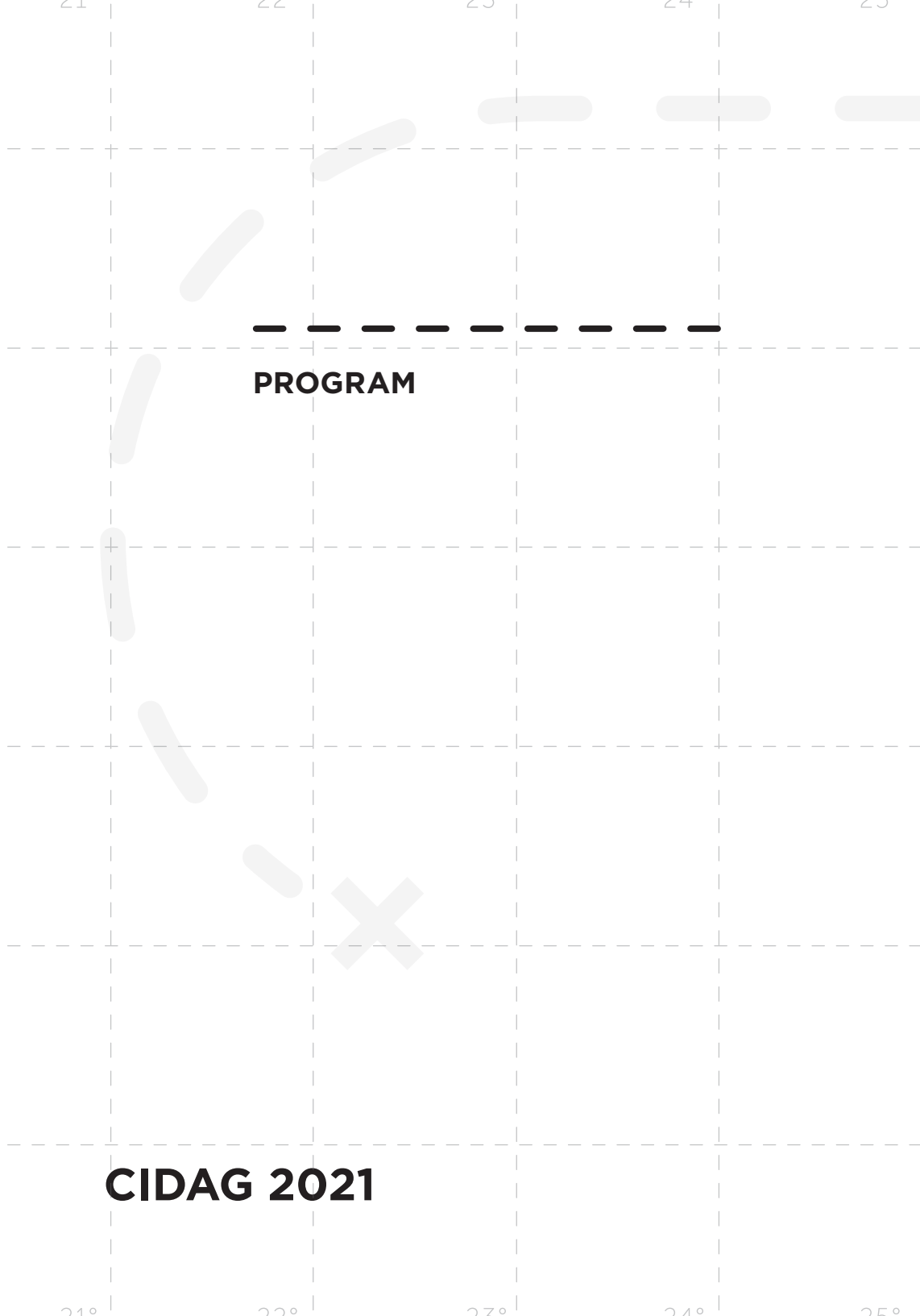


FERNANDO MOREIRA DA SILVA

CIAUD Round table

Professor Catedrático de Design da Faculdade de Arquitectura de Lisboa (FA_ULisboa); Doutorado e Mestre pela Universidade de Salford, em Ambiente Construído, e Doutorado pela Universidade Técnica de Lisboa, em Arquitetura, especialidade em Comunicação Visual; Pós-doutorado pela Salford University em Design de Comunicação Visual, Design Inclusivo e Cor; Agregação em Design. Presidente do CIAUD - Centro de Investigação em Arquitectura, Urbanismo e Design, desde 2009. Coordenador do Doutoramento em Design da FA_ULisboa desde 2006. Coordenador e membro do júri da FCT para atribuição de bolsas de doutoramento em Design, Arquitectura e Urbanismo, desde 2008; avaliador internacional do CnPq, Brasil, para projetos de pesquisa internacionais; participação regular em universidades nacionais e internacionais, área de Design e Pesquisa; membro de Comissões Científicas de revistas científicas internacionais; coordenação e participação em projetos de pesquisa; publicações regulares em revistas científicas com revisão por pares, vários capítulos de livros e três livros.

Full Professor in Design, Lisbon School of Architecture (FA_ULisboa); PhD and Master by the University of Salford, in Built Environment, and PhD by the Technical University of Lisbon, in Architecture, specialty in Visual Communication; Post-doctorate from Salford University in Visual Communication Design, Inclusive Design and Colour; Aggregation in Design. President of CIAUD - Research Centre for Architecture, Urbanism and Design, since 2009. Coordinator of the PhD degree in Design at FA_ULisboa since 2006. Coordinator and member of the FCT panel to award PhD grants in Design, Architecture and Urbanism, since 2008; international evaluator of CnPq, Brazil, for international research projects; regular participation in national and international universities, area of Design and Research; member of Scientific Commissions of international scientific journals; coordination and participation in research projects; regular publications in peer-reviewed scientific journals, several book chapters and three books.



PROGRAM

CIDAG 2021

DAY 1 WEDNESDAY 20 OCT



**+ Warren
Beeby**
UNITED KINGDOM

**9:45
OPENING SESSION**

**10:00
KEYNOTE SPEAKER**

Warren Beeby

**11:00
Presentations**

**SUSTAINABILITY IN DESIGN
PROJECTS
- A PROPOSAL TO APPLY
SUSTAINABILITY TO EDUCATION AND
PROFESSIONAL PRACTICE**

Josélia Pedro

Pedro Matos

Vanda Correia

**ORGANIC WASTE BIO-BASED
MATERIALS FOR 3D EXTRUSION:
EGGSHELLS, SHELLS SAND AND
COFFEE GRAINS WITH SODIUM
ALGINATE**

Carolina Vasco Costa Delgado

Rebecca Louise Breuer

Gabriela Santos Forman

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

Manuela Maia

DAY 2 THURSDAY 21 OCT



**+ Fernando
Moreira da Silva**
PORTUGAL

10:00
CIAUD ROUND TABLE
**Fernando Moreira
da Silva**

WITH
Rita Almendra
Maria Cadarso

11:00
Presentations

**FOSTERING A CREATIVITY
CULTURE - OR HOW CULTURE
CAN FOSTER CREATIVITY IN
DESIGN STUDENTS ACROSS
A SEMESTER**
Leonardo Springer

**LABORATORY PRACTICES
APPLIED
TO THE DEVELOPMENT OF
AN INDEPENDENT EDITORIAL
PROJECT**
Miguel Sanches

**THE ROLE OF ILLUSTRATION IN
PEDIATRIC HOSPITALISATION.
A COLLABORATIVE PROJECT
BETWEEN ESAD AND PEDRO
HISPANO'S HOSPITAL
OF MATOSINHOS**
Marta Varzim Miranda
José Manuel Saraiva
Helena Soares Cordeiro

**ON HOW TO MAKE PAPER
FROM OTHER PAPERS**
Fernando Miguel Marques

**DEVELOPMENT OF A FOOD
REDISTRIBUTION APPLICATION**
Paula Costa P. da Silva
Christian Lacerda
Franciane Falcão

12:30
LUNCH

DAY 2 THURSDAY 21 OCT



+ Lia
Krucken
BRAZIL

**14:00
KEYNOTE SPEAKER
Lia Krucken**

**15:00
PRESENTATIONS**

**EVALUATION OF THE RUB
RESISTANCE
OF OFFSET UV INK LAYERS
ON PAPERS
WITH WHEAT PULP**

Maja Rudolf
Ivana Plazonic
Irena Bates
Valentina Radic Seles
Katja Petric Maretic

**MATERIALS AND PRINTING
PROCESSES THAT IMPROVE
SUSTAINABILITY OF TINPLATE
FOOD CANS**

Stamatina Theohari
Maria-Georgia Nomikou
Konstantina Kolonia
Evangelia Pappa Athanasios
Karambotsos
Christos Kelemenis Giota
Tsitsirikou

INKJET PRINTING - GUIDELINES

Rui Proença

**IMPROVING PRINT QUALITY
AND SUSTAINABILITY
OF TINPLATE FOR FOOD
PACKAGING**

Spyridon Nomikos
Stamatina Theohari Maria
Georgia Nomikou
Christos Kelemenis Giota
Tsitsirikou

DAY 3 FRIDAY 22 OCT



**+ Rui
Marcelino**
PORTUGAL

**10:00
KEYNOTE SPEAKER
Rui Marcelino**

**11:00
PRESENTATIONS**

**DESIGNING 'ENGAGING
ENVIRONMENTS' ON THE
BORDERS OF REAL
AND VIRTUAL**

Nicòlo Ceccarelli

**HYBRIDIZATION OF METHODS
AIMING SURFACE DESIGN FOR
AESTHETICS AND COMFORT
IN PRODUCT DESIGN**

Florence Endres Chechi
Joyson Luiz Pacheco

**HAS GENDERELESS BECOME
A A FASHION DESIGN LABEL?**

Eduarda Loureiro

**THE CREATIVE INDUSTRY
AND DESIGN 5.0: THE
RELATIONSHIP...**

Leandro Werner Ribeiro
Júlio Monteiro Teixeira

**GRAPHIC DESIGN
IN PORTUGUESE:
SEBASTIÃO RODRIGUES**

Maria João Bom

**12:30
LUNCH**

DAY 3 **FRIDAY** 22 OCT

+ **Anna
Meroni**
ITALY

14:00
KEYNOTE SPEAKER
Anna Meroni

15:00
PRESENTATIONS

**PANDEMIC IMPACT ON DESIGN
AND COMMUNICATION
FOR THEATER CULTURAL
CONTENTS**

Mónica Lameiro

**A SHORT STORY:
AN ADAPTATION
TO DIFFERENT EBOOK
FORMATS**

Leonor Carpinteiro
Ana do Carmo

**ENVIRONMENTAL ASPECTS
OF WATER BASED
CONDUCTIVE INKS BASED
ON GRAPHENE FOR GRAVURE
AND FLEXOGRAPHY PRINTING**

Vassiliki Belessi

**COLOR MANAGEMENT
IN THE PORTUGUESE PRINTING
INDUSTRY:**

AN EXPLORATORY STUDY

Miguel Sanches
Ana do Carmo

16:00
CLOSING SESSION



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Oral Communications & Posters

D design



GRAPHIC DESIGN IN PORTUGUESE: SEBASTIÃO RODRIGUES

Bom, Maria João¹

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Abstract

This paper focuses on the work done by Sebastião Rodrigues for the Secretariado Nacional da Informação, the public body responsible for the propaganda of the Estado Novo regime. Sebastião Rodrigues created numerous works for this organisation inspired by Portuguese popular art. The inspiration on pop art was a requirement imposed on artists by António Ferro, in 1948, when he inaugurated the Popular Art Museum. From then on, this art became the focus of the plastic artists, architects and decorative artists who worked for the SNI. Sebastião Rodrigues, however, had a different approach to Portuguese popular art from his fellow designers, which meant that his works would soon become a step beyond those previously carried out.

The iconographic elements that served as inspiration to Sebastião Rodrigues would also constitute a precious dictionary of symbols which, despite being related to Portugal, had nothing to do with the stereotype such as, for example, the fisherwoman from Nazaré (nazarena), the cattle herder from Ribatejo (campino) or the typical Douro boat (rabelo). Let us say that the designer took a fresh look at Portuguese tradition helping to broaden the scope of the work of the "SNI brand". Sebastião Rodrigues' visual codes, namely in the work he developed for SNI, which earned him the "Best tourism flyer" award (1960), were some of the characteristic features of Sebastião Rodrigues' visual codes.

In times like those, when global parameters were changing so dramatically and cultural borders were becoming so fluid it would, however, be presumptuous to compile a definitive selection of the Portuguese graphic artists who were inspired by "sebastianesque" practices in the construction of their projects, since the possible references started to come from so many different sources, that it will be more realistic to see this paper as an attempt to understand which were the specific contributions made by Sebastião Rodrigues to Portuguese graphic design namely the work produced for the SNI (Bom, 2018).

The main focus of this paper is to show what characterises the work done by Sebastião Rodrigues for the SNI and why it constitutes an improvement in relation to that developed by his fellow designers in this organisation. With this objective, a research methodology was started, which comprises three separate parts, including: a review of the literature on graphic design produced in Portugal which shows that Sebastião Rodrigues occupies a prominent place in the Portuguese context and always ranks amongst the best, precisely because he uses a peculiar "graphic language"; a set of qualitative interviews made to his contemporary designers or those who crossed paths with him. Through these it was possible to understand that, apart from his qualities as a graphic designer, Sebastião Rodrigues also stood out as a person, due to his discretion and modesty. This method allowed us to have a more interpretative and constructive approach to the issues; the Case Study, which involved field work, observation of the works, photographic records, and obviously analysis and critical evaluation without however neglecting the context in which the designer's work was created and having in mind that the reality passed onto paper can only be interpreted and/or constructed. In light of these principles, a narrative was built around Sebastião Rodrigues' graphic work which includes, albeit briefly, his life until he emerged as a designer and, above all, the work he develops for the SNI, since this is the object of study of this research.

With a remarkable display of works close to a correct understanding of the evolution of the practice and strategy of international graphic design and a professional behaviour capable of giving rise to a theoretical production on the know-how of this discipline, Sebastião Rodrigues' work also constitutes, due to the extensive variety of alphabet forms it contained, an exceptional starting point for the qualification of the graphic media that the cultural expansion of the 1980s and 1990s would bring about. In addition to the very rich productions designed for the SNI, we should also highlight those for the Calouste Gulbenkian Foundation, the publishing houses, the National Museum of Ancient Art in which the motifs also arose from the passions he nurtured for the popular, but also for the erudite, the Portuguese and even the foreigner.

The quintessence of this paper is to bring to light a particular aspect of Sebastião Rodrigues' work which we believe has not yet been sufficiently studied. Having opted for the monograph genre, we try to (de)codify the way in which Sebastião Rodrigues' intervention strategies within the SNI context have been developed. We also seek to make history as opposed to discourses and to contribute to enriching the general knowledge about Portuguese designers and, at the same time, through the reading of the work under analysis, to contribute to a better understanding of the still incipient written history of Portuguese graphic design.

Keywords

Sebastião Rodrigues; Portuguese graphic design; Secretariado Nacional da Informação; Museu de Arte Popular

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ORGANIC WASTE BIO-BASED MATERIALS FOR 3D EXTRUSION: Eggshells, Shells Sand and Coffee grains with Sodium Alginate

Delgado, Carolina Vasco Costa¹; Breuer, Rebecca Louise²; Forman, Gabriela Santos¹.

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² Amsterdam University of Applied Sciences, Netherlands

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Abstract

This study explores semi-solid bioplastics' fabrication based on alginate polymers with added glycerine as plasticiser creating flexibility. Organic waste was used as a filler and avoid material shrinkage. Exploratory, observational and experimental methods and a literature review were used within a qualitative and quantitative methodology to reach the desired results. The researched material was documented through an open-source FabLab platform and shared with a community of researchers and future designers who want to design innovative and environmentally friendly materials, which can replace synthetic plastics. Fifteen different bio-based materials resulted from this experiment, which can have variable applications. Results show that different fillers added to sodium alginate and glycerine present ample opportunities for sustainable bio-ceramics, bio-composites and bio-plastics.

Keywords

Bio-based materials, alginate bio-composites, open-source, 3D handheld printing

Introduction

Once an excellent solution to the design of all kinds of products, plastic has become one of the most urgent problems to tackle currently. The material created to last is ironically also used mostly for single-use purposes. Thirty-three per cent of all plastic – water bottles, straws and, most recently, unnecessary plastic packaging from e-commerce giants such as Amazon – is used once and thrown away (Plastic Pollution Coalition, n.d.). Plastic, however, will not biodegrade but breaks down into microscopic particles, contaminating the waters, threatening wildlife, poisoning food chains, affecting human health, the environment and costing billions to halt (Ibid.). There is an urgent need for plastic alternatives within the design industry (Lockton et al., 2013).

Bio-based composites are combinations of two or more materials from a natural source: a reinforcing (e.g. fibres, particles) and a matrix (e.g. polymer, metal or ceramic). According to Saxena et al., soon, biodegradable polymers are expected to replace synthetics. Natural fibre composites are easily available, renewable, low-cost, lightweight and with specific strengths and stiffnesses. Bio-composites have received much commercial success in the semi-structural as well as structural applications (Saxena et al., 2011, p. 124). Organic-based bio-plastic uses natural polymers from renewal biomass sources through polymerisation (Kipngetich & Hillary, 2012). According to Dicker et al., green composites can be defined as bio-derived polymers reinforced with natural fibres; these might take on different properties and applications.

One attribute of green composites "is their tendency to absorb water and degrade; a complementary application attribute would be limited exposure to moisture" (Dicker et al., 2013). Nevertheless, this material research study focused on hydrophobic properties to provide material longevity, resilience, and applicability in 3D projects, such as pots, reusable packaging, tableware, and furniture (Sauerwein, 2020). Therefore, waterproof seaweed-based polymer (i.e. sodium alginate) was chosen as a base,

considering future studies with easy access to the raw material (both in Portugal and the Netherlands). Seaweed in European, North Atlantic and Mediterranean environments are used for varied purposes, from food to bio-fertilisers. Depending on the size, algae are named macroalgae or seaweed (i.e. benthic) or microalgae (i.e. planktonic), and divided into three taxonomic groups: Chlorophyta (green algae), Rhodophyta (red algae) and Phaeophyceae (brown algae)(Pereira, 2015, p. 187).

Algae neutralise greenhouse gas emissions from factories, remediate wastewater and Co2 emissions as a nutrient source (Ferreira, 2014), and have a high growth rate (Kipngetich & Hillary, 2012, p. 11). Marine algae constitute a great source of natural polysaccharide, providing four groups of phycolloids (e.g. seaweed gum): the Agars, the Carrageenans and the Gelans from red seaweed and the Algins derived from major brown seaweed (Rinaudo, 2014). Brown algae contain a large amount of alginate, providing for varied applications, for instance, biomedical materials, packaging, food, the paper industry, textiles and wound dressing.

Sodium alginate is the most common salt of alginate and, when crosslinked with calcium chloride, generates strong gels. These gels can be used and applied with different methods, such as solvent casting, extrusion and spraying. Their mechanical properties depend on the plasticisers that improve flexibility, reduce brittleness and improve impact resistance (Senturk Parreidt et al., 2018).

Objectives

Exploring and documenting properties of specific bio-based materials for usage in a handheld extruder. This extruder was assembled based on an existing open-source extruder model and adapted for utilisation with the preferred and suitable semi-solid bio-plastics.

Methodology

This project was developed during one week for the 2020 Fabricademy assignment 'Open-source hardware: from fibres to textile', Textile Lab Amsterdam. Open-source hardware was used to create a handheld 3D printer, and the aim was to extrude semi-solid bio-based materials that can replace synthetic plastics (Jongenburger, 2013).

A mixed-method approach was used, and the initial recipes were retrieved through an open-source literature review. From there, exploratory research was executed, attempting to create semi-solid bio-plastics that were fluid enough to be extruded with a handheld extruder. By experimenting with increasing amounts of solidifiers, such as shell sand, eggshells and ground coffee, a total of fifteen different bio-plastics were created and tested for potential extrusion. In addition, observational research methods were used to decide which materials would be suited for which purpose. As such, multidisciplinary research methods proved relevant to reach the desired results.

Results and Discussion

The experimental recipes started from provided literature references (Kochhar, 2018)(Ferlatte, 2019) (Bolumburu, 2018). These were adjusted for appropriate syringe usage with an electric handheld extruder for 3D printing to create semi-solid bio-plastics suitable for replacing synthetic plastics.

The research was developed for educational purposes within the design field. Bio-based composites were analysed by direct observation through: a) the suitability for handheld extrusion; b) the appropriate solidity or liquidity; c) the adaptation to the nozzle in use; d) their properties. Materials were photographed in two distinct phases: wet and cured and after the material dried, to observe shrinking and final characteristics (table 1.). The results lead to a variety of bio-plastics that can be used for different purposes.



Conclusion

High calcium carbonate value on Eggshells waste gives particular resilience and physical attributes, of worth, for bio-ceramic composites. In seashore countries (e.g. Portugal, Netherlands), shell sand reveal opportunities for treasuring waste as sustainable materials.

Coffee grains bio-composite revealed plasticity and rubber appearance, relevant for vegan leathers or packaging. These have potential interest for future studies: collecting waste on cities coffee shops to easily scale-up bio-based products.

In conclusion, using natural waste for bio-composites allows for easy reproduction, testing and improving results. Using open-source recipes and literature promotes worldwide collaborative learning and research towards a sustainable approach (e.g. social and economic). Future experiments are needed to collect more data about material resistance, shrinking, waterproof properties and weight.

Acknowledges

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PANDEMIC IMPACT ON DESIGN AND COMMUNICATION FOR THEATER CULTURAL CONTENTS

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Abstract

Design allows us to respond to a constantly changing world. The pandemic had a profound impact on arts and cultural sectors, affecting global well-being and economy of institutions and countries. The cultural sector was forced to close doors and with that resolution several new priorities in artistic production have emerged.

While some areas of the creative industries were already using technologies to promote their art, theater was until then dependent on the classic models: the physical audience. With the pandemic, theaters were forced to become more flexible and to implement a set of new solutions to promote and keep their productions alive in the minds of their audiences.

In record time, design and designers followed this crisis in culture and played an active role in adapting the ways and means of disseminating theater. The designer played a fundamental role in this action, not only in the establishment of a cohesive digital communication program, but also to differentiate theaters and productions.

The theater failed to accomplish its purpose of physical connection between actors and public, becoming part of visual paths in social network feeds. But it is not only from the stage that theater stories are made, as there is a wide range of content associated with the productions that are worth to be shared.

The present study reflects on the impact of the pandemic on cultural design and disclosure of theater shows, suggestion to look at the production of digital contents in an open perspective of access to culture, represented in a digital platform (prototype) dedicated to conversation, thinking and sharing of theater stories and the people who make it.

Keywords

design, cultural, theater, pandemic, digital platform

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HAS GENDERLESS BECOME A FASHION DESIGN LABEL?

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Abstract

The word 'genderless' carries a cultural and social burden that hasn't bestowed upon the general audience, nor some of the most spoken about brands in the world. There have been top tier designers that have dipped their toes and tried to show a world without binary gender boundaries, but the message is still not accurate. If fashion design seeks its roots in the lifestyle of the beholder, than what lifestyle are some brands representing by showcasing their genderless ideas as neutral, basic and shapeless designs? La Ferla (2015) calls it a movement. Hilario (2019) calls it a new concept. Fashion is the art through which people can express themselves, but there always seems to be a limit. The younger generation is questioning those limits and establishing that we can wear what we want, as long as it's representative of the gender we feel most, or not at all (Risman, 2018). There has been a surge of the word 'genderless'. Several well-established brands are using it to promote, of what can only be pointed out as their marketing agendas and a cross-off list of the cultural and social issues riding around. It's important to understand that most of these brands haven't done their homework. They haven't talked to the people who actually go through the experience of a non-binary reality every day. The problematic isn't necessarily the use of the word 'genderless', it's the use of the experience of people who aren't even part of the conversation. So the question remains, has genderless become just a label and marketing move for brands and designers, or is it here to stay and establish a third gender in fashion design? The present paper will address these issues, using contextual inquiries, trying to sort if genderless is just a trend in fashion design, or something else entirely.

Keywords

Fashion, gender, genderless, fashion design, communities.

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A PERSPECTIVE ON 21TH DESIGN CHALLENGES FACING THE URGENCY OF SOLUTIONS FOR SUSTAINABILITY GLOBAL PROBLEMS: The emerging of an education and design profession alignment about core principles

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Abstract

The reality increasing complexity and the impact of the rapid change puts pressure on skills development capable of facing the challenges placed by major global problems. 21st century societies are increasingly dominated by intense information and knowledge processes. Intangibles intensify their dominance over demand, often exceeding the importance and value of physical goods. This reality coexists with an increasing demand and consume of sustainable products. The pressure made by this environment is defined by gradual market behavior reconfiguration, making communication processes more complex, subject, and volatile. Responding to all stakeholders at different levels must align with solutions requirements capable of climate change and environmental degradation global challenges approaches. This critical problems about our common future introduces a new look at ethical issues.

The challenges about the future of education have to do with large scale, with processes requiring the ability to deal with complex conceptual frameworks with context dimensions involving economic, ecological, social, cultural, and political issues of societies in permanent change. The accelerated transformation of reality questions the future role of the human in the technological context, placing the need of thinking about the importance of intrinsically human competences. Creativity, curiosity, empathy, sensory capacity, dimensions of an intuitive knowledge base, and an ecological consciousness are recognized as a fundamental part of a set of competencies of a “cognitive device” for complexity approach. Educational systems must face students’ needs when integrate multidisciplinary teams where the boundaries between artifacts, systems and processes are increasingly ambiguous.

Competencies transition is becoming an imperative for designers, requiring technological and management skills, and leadership capacity on complex processes. Preparing designers for their needs about collaboration and cooperation skills in HCD is in tension with a reality where the integral potential of design to deal with complexity remains unaware. the challenge for future education is huge because design is a complex field of a practice and an academic discipline.

The design community recognizes the strategic value of designer’s multidisciplinary skills and recognize the ability to lead processes involving large socio-technical systems. However, today the designer’s role faces the challenge of multidisciplinary working teams where skills go far beyond their traditional responsibilities. In the thinking and practice of design there’s a set of core values and virtues of the designers that allows a strategic positioning of this professionals in the complex solving problem context. Design as a discipline deals with how knowledge and ideas are transformed into material artifacts. As a cognitive activity design is about solutions development with information processing with a methodological oriented approach supported by a particular way of thinking about problems, responding to new and future needs (Cross, 2007). Modern design knowledge must address problems in a collaboration mode, supported by an effective network of educators and professionals. New methods, new research practices, team diversity, with specializations and cultural aware, envision new dimensions for design that demand an accurate debate.

Before this recognized pressure for design expanded competences and new mindsets, we look for understand from major European design organizations, such as Design Council and BEDA, and the North American AIGA, the perspective of professionals facing these tensions. To understand the design community's vision for the future, based on the vision shared by this organizations, we also placed a particular focus on the needs identified for 21st century design education and the proposals for broader new skills development. Simultaneously, we carried out an analysis of relevant contributions on the ongoing reflection and debate within the design research community about design education. Based on a revision of design thinker's recent literature we pursuit our investigation from a formulated hypothesis: there is an alignment between professional and academic design communities view about the future of design practice.

The research verified there's reflection and debate within the design community with important contributions to the importance of a central core of principles for 21st century design education and practice. This set of principles must be transversal to all design disciplines and their specificities and should contemplate a response to systemic change, contexts, and global challenges, in addition to traditional questions closely related to designer's performance about artifacts creation. From the contributions analyzed we verified that principles central core must be based on three pillars: ethics, justice, and environmental protection. The recognition of a profound transformations underway, determined above all by the gradual global cultural change, increased the perception that the designer's product and communication development must be aligned with United Nations sustainable development global objectives. The proposal of a set of updated critical dimensions for design activity changes design processes to more chaotic and ambiguous, where finding unique connections that result in valid solutions implies synthesizing stimuli and information with large volumes of data in constant interaction. Designers will have an increasingly complicated role in creating products, services and experiences which mean a profession under pressure to evolve towards a more complex multidisciplinary activity and, as such, more demanding in general and specialized skills.

Technology is increasingly integrated into our lives, in spaces, communication, and products, and it is not only a strategic resource of innovation but also a fundamental resource for planet sustainability. The future of design involves learning about technology, for real and virtual life, for all senses solutions. Design will have to integrate new thinking, logic, and rationality which implies projects with visualization and communication techniques proposed by new technologies. Technology is already reconfiguring the environment and the educational programs in design with the exploration of new methodologies, with permanent real context simulation, with users, consumers, and companies. Design research points out to design curricular programs where technology, culture and ethics form a training central axis of future education. There's an emerging agreement that design education must prepare students to work in multidisciplinary teams in new projects that respond to real needs in a world where creativity must serve the major global problems.

Keywords

Design Education, Design Cognition, Design Practice, SDG, Complex solving problems.

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ON HOW TO MAKE PAPER FROM OTHER PAPERS: An experience with students

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Abstract

Handmade paper has fallen into disuse due to the offer of industrial paper which is much more accessible and achieves feels and textures like never before, but industrial paper has never managed to have the material's expressiveness that handmade paper has.

This is the starting point for a research applied to the design of graphic production integrated into the subject of Materials Laboratory at ISEC Lisboa.

This applied and collaborative research with students started in the 2016-17 academic year, with students from the old curriculum of the Design and Graphical Production degree, at the time, adapting to the new degree's curriculum in the 2017-18 academic year, continuing with the students of the previous years until obtaining tangible results worthy of being presented as scientific research. In the academic year 2018-2019, the institution opened a technical and professional course in Graphic and Digital Production and this course has the same Curricular Unit, so the results obtained by the students were also integrated into this study.

This study intends to understand the extent to which the additives added to the recycled paper pulp are important in the results of the material's behaviour, either when cutting or folding, so the exercises requested from students were a paper-cut and a pop-up.

Keywords

Recycled paper; paper additives; paper-cut; paper folding

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THE CREATIVE INDUSTRY AND DESIGN 5.0

The relationship of the creative industry with proposed new execution models based on Design 5.0

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Abstract

Design today assumes a decisive role in making business decisions and has increasingly relied on data to search for its answers. Designers who used to be based on past experiences or non-tangible and measurable aspects, today turn to scenarios closer to reality. Much of this change is due to the advancement of the creative industry, which has propelled the design area to new scenarios and paths. When observing the evolution of the industry and marketing until today, there are notable changes in behaviour and performance in the area of design. The creative industry is one of those that best reflects this panorama and the exchange of information between a new future for the design area and the union with the industry. In this article we seek to explore more about the area already lived by the industries and how they interacted with the design area, our main objective is to conceptualize new co-relational aspects between the area of the creative industry, sustainable business and Design 5.0.

The Industrial Revolution opened new paths in the conversion of energy, in the production of goods and also in consumption. It can be said that it gradually began to “free” people from the ecosystem around them. Aspects of this evolution are currently presented in four industrial cycles: Industry 1.0, 2.0, 3.0 and 4.0 (SCHWAB, 2019). The main objective of this study is to point out new advances in the area of design and what are the main attributions of design in each of the moments mentioned above, as well as in the performance of sustainability in new businesses with the creative industry.

Design is, by vocation, one of the areas most qualified to make this alliance between sustainable businesses, technologies and people (MOZOTA, 2011), until Industry 3.0 its performance basically consisted of idealizing, embellishing, optimizing and materializing solutions, often unheard of for people. In addition to benefiting the product, the industry also demanded that the solutions be reproducible in series. To meet these requirements, the designer started to improve methods and techniques that sought more intimate connections between products and people (VERGANTI, 2012). In addition, its *modus operandi* has been increased with techniques that are useful today, such as prototyping, experimentation and validation. In today's industry, reproduction and scale come much more from network connection than from shop floor reproduction. This condition greatly facilitates the launch of digital products and services. On the other hand, it imposes greater agility and requires greater competitiveness.

The first great evolution made by human beings was called the Industrial Revolution, which began in the mid-18th century and had as its main engine the invention of steam engines and the mechanization of production. This was the first major Industrial Revolution that would emerge, before this period the entire process of manufacturing materials was done by hand, not being able to be manufactured on a large scale.

In this period, also named Industry 1.0, the artisan also began to focus his efforts on humanizing the aesthetics of machines for products that would be produced on a scale (JOHNSON, 2011), in this sense it was possible to observe that the artisan starts to think and act as a designer. With the arrival of electricity, the Second Industrial Revolution, or Industry 2.0, begins. In this scenario, the massification of products on a large scale was already possible (SCHWAB, 2019). The highlight

of this new cycle was precisely the new model of thought, now centered much more on the mass commercialization of products than on its aesthetic form (VERGANTI, 2012).

Still in Industry 2.0, there are models of business administration and management, such as the entrepreneurs of the time Henry Ford, Taylor, Fayol and Drucker. These models had several characteristics and metrics to be followed, but all favored the same concept, speeding up the manufacturing process. The Ford T model revolutionized transport and industry at the time, in addition to their contributions to manufacturing processes.

Design takes on a new role that, in addition to seeking to improve the aesthetic aspect of machines, also tried to reduce the impersonality of industrial products. Even if the industry was still acting against this thought, such as the Arts and Crafts movement that had a principle of refusal to industry, design started to gain space on the scene, but it was still operational and focused on optimization (VERGANTI, 2012).

With the arrival of the techno-scientific revolution, Industria 3.0, design started to assume a more tactile role in the entire chain, now combining its experience with the segment's marketing and focused on the process.

Industry 3.0 promoted the advancement of electronic technologies, industrial robotics and the miniaturization and popularization of circuit boards, which enabled the insertion of logic controllers in the industry. With these new technologies, now operationalized, design has its work bias focused precisely on joining efforts with marketing and no longer thinking only about the aestheticization or sale of the product, but about the process chain (KOTLER 2021).

With the arrival of industrial 4.0, where connectivity and the internet are the main agents of this change, the "fourth industrial revolution is systemic, broad and considers as many technological and economic aspects as social" (PADILHA 2020, p.23). Design starts to focus its efforts in another area, now it has its role in the human being and its relations with products, companies and services.

The relationship that was previously conducted by the internet and its overvaluation starts to focus on the human being and his personal relationships. It is noted that the explosion of social networks begins to lose the trust of society, which in turn also aims for more sincere and real relationships, for Schwab (2019, p.32) "what happened in the last 18 months with the media platforms in terms of the erosion of consumer confidence was surprising, even if it was late".

Design 5.0, which is entirely connected with the new industry that is emerging, will be closely linked to the human potential that is already seen in people, creativity and other areas will be increasingly explored and enhanced, the interaction between man and machine will be because of human benefit. Design 5.0 is a metaphor used in this research to represent a new design cycle. This cycle, in turn, goes hand in hand with the concepts of Industry 5.0 coined by Schwab (2020) and Marketing 5.0 coined by Kotler (2021).

There is a clear definition presented by Kotler (2021, p.32) to better clarify marketing 5.0, the author presents that marketing 5.0 "by definition, is the application of technologies that imitate the human being to create, communicate, deliver and increase the value throughout the customer journey". When analysing the new types of industries emerging, the advancement of new technologies, the notorious administrative and marketing change in the corporate segment, it can be said that Design 5.0 is moving in an increasingly strategic and sustainable direction, as it has been presenting itself before, but now more participatory, inclusive, creative, data-based and human.

To better contextualize Design 5.0 and its interaction with the Creative Industry, it was decided to conduct an exploratory research based on books and materials already published and available for wide access (GIL, 2008). In this sense, research on issues is also of a qualitative nature, using the observational method as a data collection instrument. This method "can be a valuable way of collecting data because, what you see with your eyes and perceive with your senses, is not filtered



by what others may have reported to you, or what the author of some document may have seen” (YIN 2016, p.127). This method of data collection is based on the knowledge and ease with which researchers have with the area, both academically and in the market.

In the creative industry, design 5.0 also takes on the role of bringing together the responsible actors and the use of measurable and co-creative methods for building the business. The function of design 5.0 is to guide the actors throughout the creative process to reach innovation, according to the vision of Govindarajan and Trimble (2012), innovation would be the sum of creativity and leaders.

If we look at the concept of creative industry presented by Florida (2011), design 5.0, has the function of being the connector between agents and increasingly humanizing processes. In this way, design 5.0 can act as an agent for transforming creativity into innovation, connecting the actors responsible for the business, using methodologies that promote interaction between all, it becomes a profession that can categorize the creative industry.

The main finds of this research are related to conceptualizing new co-relational aspects between the area of the creative industry, sustainable business and Design 5.0. Due to the pandemic of the new Corona Virus, this process has been accelerated and is gaining more traction over time. The relationship between Industry 5.0, Design 5.0 and Marketing 5.0 exists to value businesses and make them more and more sustainable. The creative economy, described by Florida (2011); Howkins (2007), in turn, has the potential to be the most affected by this transformation, while it could also be the guiding principle of this process. Finally, when observing the formula proposed by Govindarajma and Trimble (2012), where innovation would be the result between the sum of creativity and leaders, it can be concluded that creativity would be the co-creative processes used in Design 5.0 and leaders would be the designers themselves who are able to bring about this change.

Keywords

Creative Industry, Design 5.0, Design Management, Creativity

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DEVELOPMENT OF A FOOD REDISTRIBUTION APPLICATION

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Abstract

It is estimated that one-third of all food produced in the world is wasted. Wasting food is equivalent to wasting water, land, energy, labor and financial resources. In addition, the decomposition of these foods releases large amounts of methane and carbon dioxide, thus contributing to global warming.

In Manaus/Amazonas the situation is also worrying. The Municipal Cleaning Department (Semulsp) reported collecting 95.4 tons of food daily from the dumps of 39 fairs and markets, but the dimension of the waste in the city is even greater. At the same time, according to the 2010 IBGE Census, the universe of poor people in Manaus corresponds to 18.6% of the total of 3.84 million inhabitants.

One of the great difficulties encountered to avoid waste is the lack of a connection between those who have leftover food (market stalls, markets, restaurants) and groups that need these foods (day-care centers, charitable organizations, among others). Besides, there is also the concern of those who donate to comply with Law 2,848 / 1940 of the Penal Code, which provides for the liability of a food donor for damage caused to the beneficiary by the consumption of the donated goods.

The main objective of this research is to create a fast, safe and easily accessible bridge between those who have a desire to donate food and those who need it. This connection would be made through a smartphone application in which this exchange can be formalized in a short time and within the reach of users' hands.

To carry out the project, we used the methodology of Project E, developed by Meurer and Szabluk. This methodology has 6 steps that work the user experience layers individually, generating a result focused on the users' needs. The steps are Strategy, Scope, Structure, Skeleton, Aesthetics, and Execution.

We started with the Strategy stage, developing the infographic of the chosen theme, design issues, applying a questionnaire to the target audience, selecting terms relevant to the project and studying similars and reference applications.

In the initial stages of the project, we contacted several charities in Manaus to list which ones could volunteer to participate in our research. We obtained three positive responses from institutions that could help. As for the markets, we contacted four different ones and none of them responded to us until the end of the project.

We managed to get only one of the charities previously contacted to answer the proposed questionnaire. Due to the difficulty of returning from some market, it was decided to contact a professional who has already worked in the area for the application of tests and initial research.

To build the profile of our target audience, two different questionnaires were carried out: one with charities and one with the market representative interested in participating. Both were built using the Google Forms platform and aimed to map the needs of each audience.

The questionnaire with the charities had questions about the meals offered, how often they are offered, how they are prepared, how the food is received, among others. The questionnaire with the markets asked about how the food is discarded, how the discarded food is chosen and, in the case of non-perishables, how many days before validity, the frequency of this discard, among other information.

Finally, we developed an infographic with the answers to facilitate your viewing and understanding:

The information presented by the Associação de Apoio Lar de Vitória's will be used in the preparation of storytellings and the definition of the app's functionalities.

In carrying out the study of similars and references, we decided to develop an infographic to demonstrate the results of the analyses. This infographic aims to facilitate the visualization of all information at the same time.

For the development of the infographic, we used the methodology idealized in the article "Infographics: concept and practice" by Juliana Carvalho and Isabella Aragão. This methodology is divided into three major groups of stages, namely Design, Execution, and Finishing.

In the Scope stage, we developed a checklist with the requirements, needs, and parameters of the project, based on the result of previous analyses.

We started the Structure stage with the development of storyboards of how the app would work, in addition to the definition of tools, its functionalities, and content.

From there, in the Skeleton stage, we developed the low complexity wireframes of the final application.

In the Aesthetics stage, we carry out naming, visual signature development and definition of typographic fonts and chromatic matrix. Finally, we present the final screens of the application.

With the production of the screens, it was possible to generate a prototype of the application interface to carry out tests in the Execution phase. Due to time and lack of answers, we managed to apply it only with the employee Jackeline Machado, from Associação de Apoio Lar de Vitória's. She is vice president of the institution and has worked there for 5 years. After asking the initial questions, the employee was asked to perform some tasks.

During the application of the test, the user found it difficult to identify the functions of the menus and what each icon symbolized, without being able to move naturally from one screen to the other and constantly asking how this path was done.

Despite this, the user was able to understand the screens individually. We believe that the lack of contact with applications of this type and factors such as age and familiarity with technologies influenced the difficulty of adaptation.

From these results, we have added a brief explanation of the application's functions that should appear only at the first access/use of the same. The screens with these final changes are shown below:

We concluded that Project E's contribution to the analysis of each layer of usability necessary for the application was remarkable. In addition, this methodology provides a practical way of thinking about web usability, as it allows the developer to think about each area to be designed separately.

Finally, we were able to conclude that despite the great interest on the part of the charities, from which we obtained a greater number of responses and participation, the contacted markets did not present the same disposition. Although similar applications exist in Brazil, it is notable that the local market does not appear to be ready for these transactions, either due to lack of interest, knowledge or preparation. It would be necessary to foster a culture of donation and solidarity before the application is made available in Manaus.

Keywords

Food redistribution, mobile application, user experience, user interface, Project E



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ENVIRONMENTAL ASPECTS OF WATER BASED CONDUCTIVE INKS BASED ON GRAPHENE FOR GRAVURE AND FLEXOGRAPHY PRINTING

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Abstract

Sustainable printing is a necessity today. Traditional inks were formulated to reproduce an optical theme or to transfer a message. Current developments in printing technology place value on functional inks, which need to perform targeted functionalities (thermal or electrical conductivity, semiconductor etc). At the same time functional inks are called to minimize their environmental burden.

One of the rapidly growing type of conductive inks is graphene inks, where the pigment is either (a) pristine graphene which is produced mainly by the liquid phase exfoliation process or (b) chemically reduced graphene oxide (rGO), that is produced by reducing graphene oxide (GO). The production of pristine graphene nanosheets via liquid exfoliation of graphite is achieved in selected organic solvents or surfactant aqueous solutions. However, despite the high quality of pristine graphene nanosheets and their remarkable properties, their low yield at high costs and up-scaling difficulties are restrictive parameters for their large scale production.

Graphene oxide is a non-conductive hydrophilic material that is produced by oxidizing graphite under highly acidic conditions which causes definitely environmental burden due to the waste generated. The reduction of GO to rGO is necessary in order to obtain conductive properties and is achieved by simple heat treatment or by various reducing agents or electrochemical and / or photochemical. However, the reduction process should lead to soluble derivatives when used for inks development. Under appropriate conditions, the simultaneous reduction and chemical modification of GO by a sulfonated aromatic diamine is possible, thereby producing highly conductive hydrophilic rGO, suitable for the synthesis of conductive water-based inks without the use of dispersing aids.

Although rGO is inferior in electrical conductivity than pristine graphene, it is produced with much greater efficiency, an advantage that has led to its commercial production.

As a carbon-based material, graphene is generally safe. However, the manufacturing processes for graphenic materials can use hazardous chemicals such as acids, oxidizing and reducing agents, solvents. On a small scale, these chemicals are easily handled. However, on commercial production scale the dealing with large quantities of hazardous materials is significant. Concerning graphene, an important challenge is its sustainable production using renewable sources and the manufacturing process modification so as to have the minimum possible environmental impact.

Resins are the binder of the ink pigmented particles and help to pigment dispersing, carry and hold the pigment to the substrate, facilitate solvent release and deliver end use properties, such as flexibility, adhesion, gloss, dry and wet abrasion. The resins commonly used in printing inks



formulations are condensation or addition polymers. However, the resins are non-conductive material and therefore their percentage, on the dry film of the ink, must be kept to the minimum possible, so that to contribute as much as possible to the conductivity and simultaneously not to burden the environment.

Depending on the type of solvent, inks may be solvent or water-based. Water based inks are considered by their nature environmentally friendly but they still contain petrochemical-based raw materials that are poorly biodegradable. Water-based inks compared to solvent-based inks have a low evaporation rate, thus maintaining a constant viscosity during printing. In water-based inks the resins must be water soluble, but after printing must be insoluble to provide the necessary strength. This can be achieved by adding alkali to a suitable resin, which is converted from insoluble to soluble form. Acrylic resins are mainly used for this purpose. In their acidic form they are insoluble in water, but once neutralized, and need to be neutralized in order to keep them in the solution.

Then as the amine evaporates, the dried ink film develops the water resistance necessary for most end uses. Water-based inks formulated with biodegradable resins are a challenge.

In order to enhance or modify the final ink properties, additives may be added to the ink formulation. Such additives are waxes, defoamers, surfactants etc. Inks may benefit from

addition of certain additives, but in functional inks the presence of additives is not always desirable, as it can adversely affect functional properties, such as electrical conductivity, while contributing negatively to the environment as well.

In the present work we focus on the primary environmental impact assessment of gravure and flexographic conductive graphenic inks using two different methods of preparation process. The first involves the GO reduction using a sulfonated aromatic diamine and the second is based on the exfoliation of graphite in suitable solvents. Then is following the recording of chemical reagents, energy and time required for production of 1 g graphenic material and the corresponding amount in grammars of graphene ink taking into account that the percentage of the solids in the final suspension was 55% w/w in graphenic material.

For ink's formulation various commercial resins (Druckfarben SA) were used. We tried to correlate the chemical composition of each resin with the printing quality (printability) of the ink and the environmental profile of the resin. The printing tests were done using the printability testers IGT G1-5 with raster patterned printing cylinders or IGT F1. Various types of paper where used as printing substrates. Concerning graphene preparation, the chemical reduction process (rGO) was found to be less environmental impacting method compared to the exfoliation of graphite in suitable solvents.

The as prepared graphenic materials do not require any annealing process due to their high conductivity and this is another environmental advantage. Also, the excellent dispersibility of these highly conductive pigments does not require any energy consumption to produce stable water based inks. Concerning to conductive ink printability, the ink formulation involving a mixture of carboxylated acrylic and methacrylate polymers exhibited the best printing results.

Keywords

sustainability, conductive inks, graphene, reduced graphene oxide

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IMPROVING PRINT QUALITY AND SUSTAINABILITY OF TINPLATE FOR FOOD PACKAGING

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Abstract

Consumers relation with labelling is a unique interaction, the first impression of a product is the easiest way to evaluate the printed quality and as a result the product itself (Debra Riley et. al., 2015). Metal substrates have management limitations, compared to paper-cardboard printing. Some of these limitations are, the difficult sheet control in the export of the tin sheet printing machine, due to the weight and the difficulty of transport and control in the printed table. At this stage, a special feature is the prevention of the printing problem. In order to predict a printed problem, the easiest way is the naked eye. Through this first quality control the profit is a few wasted sheets. But an electronic file management, as well as electronic print tint monitoring, is an easiest way to control the continuous quality printing, and be sure that every batch has the expected result. This can be achieved through electronic color management (ICC Profile) (Pre-Press), (Nomikos S. 2019) but also through the optical control systems of four-color printing and shades. The art of printing has been transformed from the old skills of visual control, to electronic digital control through (electronic eyes) type video camera & software, for quality control of the metal substrate (Drupa, 2020), (Pérez Juárez Carlos Alberto et al. 2021). Throughout the production process, the constant quality of the printed substrate, declares and supports over time, the branding in the market (Ampuero, Vila Natalia, 2006). One of the basic tools for consistent quality is the ISO (International Organization for Standardization) standards & HAASP (Hazard Analysis and Critical Control Point System) certificate, which a lot of food and beverage production factory follows in order to be ensure of the quality (European Union, online available).

Research objectives: The management system in the printing industry and the evaluation of printing in quality production are some of the research objectives. The control and adaptation of new quality control systems at old printing systems, help to evaluate the results and the viability of the production. The use of new electronic quality control systems in print production, can identify and control energy consumption and footprint reduction.

Research methodology: The research proposal is mainly based on field research and case study, in areas (pre-printing, printing and termination) with additional bibliographic support. The systems of quality control that were used in the company Lefkosidirourgia Kavalas S.A. in Greece are "Coat Star" and "Deco Star". The results have shown reduce of print waste in metal packaging, and increase of production by 100% providing defect-free coated sheets for the following print run. The fast and easy job setup led this company to reduce the waste of raw materials to a minimum. It was possible to find any deviation in decoration processing in the earliest possible stage and 100% inline inspection for every single sheet at the highest coating machine speed. The quality control systems provided intuitive setup procedure for new projects or the use of existing project files, as well as constant monitoring of coating quality, sheet margins, and welding areas at a glance. The detection of defective sheets at the earliest possible stage of your metal decoration process was possible. Coating inspection assured best conditions for the later print run and inline check of coating area uniformity.



The applications of the specific quality control system “Coat Star” is in:

- Highlights, coating for every metal decorated packaging product.
- Specialty packaging with complex finishing. Beverage seal components, lids and caps.
- Aerosol cans and tins. Canisters for paints or oil. Defect sheet marker signal: for mechanical marking of defect coated sheets.
- Automatic masking function. Adjustable region sensitivity: Individual sensitivity settings.

The quality control system “Deco Star” consists of a recording video and software program for the inside metal substrate. It has improved the procedure of optical quality control and the features are the following:

1. 100 % Print Inspection for Metal Decoration and printing excellence.
2. Right the first time, every time. Improved Efficiency in Metal Sheet Decoration:
3. Reduce Metal Sheet Print Waste, 100% assurance in delivery of defect-free sheets. Fast and easy job setup to speed up make ready time
4. Reduce print waste to a minimum 100% inline inspection for every single sheet at the highest production speed
5. Intuitive setup procedure for new jobs or use of repeating job files
6. Constant feedback on print run, notification of serial defects, adjustable quality parameters
7. It can be used for tin plate or aluminum, 2, 4 or 6 colors, high-gloss or matte motives
8. The applications are as follows:
 - a) Consumer products such as milk powder, sweets or tobacco
 - b) Specialty packaging in any possible blank shape
 - c) Beverage seal components, lids and caps aerosol cans and tins
 - d) Most advanced hardware at low maintenance level
 - e) Detection of color deviations in the earliest possible stage
 - f) Edge monitoring assures best quality for the finishing process
 - g) Easy setup and handling of software reduce make ready time and enhance process survey
 - h) Flexible use of defect criteria for sheet management.

Results: Whilst initially the quality control was carried out manually, the print quality was improved after the installation and operation of a new system (ISRA). Thereafter, the specimens are inspected and studied using data from an inline system in order color deviations and material defects to be identified. Thus, using such automated systems, time, energy and wastage are reduced, the print quality is improved, the satisfaction of clients and new possibilities show to arise. The inline inspection system for the coatings improves also the decoration and provides defect-free coated sheets for the following print run. In conclusion, by improving the quality of coating and printing also improves the sustainability of tinline food packaging, increases the print quality, reduces sources and saves energy.



Keywords

Tinplate, food cans, print quality, inspection systems, printing management, four-color printing.

Funding

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EVALUATION OF THE RUB RESISTANCE OF OFFSET UV INK LAYERS ON PAPERS WITH WHEAT PULP

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Abstract

Paper composition, from the aspect of the printing substrate, and especially its surface characteristics, are of immense importance for its printability and the achieved quality of the final graphic product. When we talk about print quality, the stability of printed papers under various influences such as time, chemical agents, transport, pressure, and others are also needed to consider them as quality prints. The ink rub resistance, as one of the most important properties of printed material during the shipping or handling processes, refers to the degree of removal of an ink layer under the action of rubbing. The quality of the printed product is determined not only by the printing substrate and the selected ink (which is defined by the printing technique) but also by their interaction. Therefore, it is particularly important to choose an adequate printing substrate to achieve a quality printing. Increased concern for the environment has led to the idea that wood fibres in the pulp and paper industry must be replaced, as much as possible, with non-wood fibres. Nowadays, more and more studies indicate that fibres of various non-wood raw material can be a good substitute for wood virgin fibres in the paper industry.

Wheat straw is a by-product of crop production and it has been selected as an alternative source of fibre because it is available from the annually renewable crops and is produced abundantly in numerous regions all over the world. In laboratory paper production, the collected and purified wheat straw was first cut manually and processed by the soda pulping method. The obtained unbleached semi-chemical wheat pulp was added into the pulp of recycled wood fibres in a ratio of 30% to wood fibres, and laboratory papers of approximately 42.5 g/m² were formed by Rapid-Köthen sheet former (FRANK-PTI) according to standard EN ISO 5269-2:2004. Laboratory paper made only from pulp of recycled wood fibres was used as a reference sample. For a better insight into the utilisation of wheat pulp in pulp and paper industry, a control sample of commercially produced newsprint paper made from the pulp of recycled wood fibres was used for comparison with laboratory-made samples. In this research, the emphasis was placed on laboratory papers made with the addition of wheat pulp and on stability of the prints after they were printed with cyan, magenta, yellow and black inks by offset printing technique. Offset is an indirect lithographic printing technology and is the main printing technique in various publications. The offset printing process depends on many chemical and physical characteristics of materials and components which are involved in the process. The full tone areas with cyan, magenta, yellow and black inks have been achieved with SunCure Starluxe UV curable ink (manufacturer Sun Chemical) by Prüfbau multipurpose printability testing machine which simulates offset printing. After printing and drying, the samples were subjected to a mechanical resistance test (i.e., rub resistance test) on a Hanatek T4 Rub and Abrasion Tester according to the standard BS 3110 with 20, 40 and 60 circular motions at a constant speed of one rotation per second. Evaluation of the rub resistance of the UV ink layer on papers with and without wheat pulp is based on the CIE L^{*}a^{*}b^{*} colorimetric values. Colorimetric values were measured before and after performed rub resistance test. The Euclidean colour difference (ΔE_{00}) was calculated to define the tolerance between changes in print coloration, i.e., fading of the colour.

As mentioned, the ink rub resistance strongly depends on the surface characteristics of printing substrate. It is important to emphasize that laboratory-made papers have not gone through the final stages of surface treatment as commercially produced papers. One of the most important



surface characteristics that directly affects the rub stability is roughness of the paper. Laboratory papers have a far higher surface roughness than commercially produced ones due to the lack of surface treatment. Roughness profiles of the samples' surfaces was measured with a Mahr MarSurf PS 10 profilometer to study the correlation between surface characteristics of papers with wheat pulp and rub resistance after printing them with offset UV inks. As expected, commercial paper showed better rub resistance of all printed cyan, magenta, yellow and black offset inks compared to laboratory papers. Of all analysed offset inks on commercial paper, the black ink layer showed the lowest rub resistance ($\Delta E_{00} < 1.5$), while the yellow ink layer showed the highest rub resistance ($\Delta E_{00} < 0.6$). Compared to commercial paper, laboratory-made reference samples after printing with cyan, magenta and yellow ink showed lower rub resistance i.e., greater ΔE_{00} value, while black ink layer showed approximately the same rub resistance on both types of paper. Adding 30% wheat pulp into the pulp of recycled wood fibres, resulted with laboratory papers that provide lower rub resistance after printing. Observing all process inks, the cyan ink layer on papers with wheat pulp had the lowest rub stability. However, the calculated ΔE_{00} values of ink layers of all prints were within the tolerated range, according to the tolerance definition where $\Delta E_{00} \leq 2$ is classified as a very small noticeable difference for the standard observer. In this study, it is observed that the highest colour degradation occurs after only 20 rotations of the rubbing test, while further rubbing up to 60 rotations has a negligible impact on the colour degradation of the offset UV ink layers.

This research contributes to the necessary knowledge about the possibility of using non-wood sources of cellulose fibres in the paper and graphic industry, given that wood sources are increasingly limited.

Keywords

offset printing, paper, roughness, rub resistance, UV ink, wheat pulp

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COLOR MANAGEMENT IN THE PORTUGUESE PRINTING INDUSTRY: AN EXPLORATORY STUDY

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Abstract

The exploratory study presented here has as its object of investigation the current color management practices in the Portuguese printing industry. Color management processes, when applied to the printing industry, provide tools aimed at ensuring the ability to reproduce a color in a consistent and predictable way (Sanches, 2016, p. 135). Technological tools exist and are available; however, knowing how they are implemented and used has been the great challenge of recent years (Gray, 2006, p. 19). Color management works as a standard procedure for the industry and is planned to provide a correct translation of a color value between the different color spaces of the devices involved in the creation and production process. Homann (2009, p. 59) states that color management exists "... in order to ensure the correct reproduction of color throughout the workflow, from the first draft to the final product." Accordingly, it is important to know which color management tools are used by the national printing industry and how they are used by the different actors in the workflow, namely designers and producers.

With this study it is intended, first, to establish the current panorama with regard to the use of color management tools when applied in the context of the Portuguese printing industry, and to seek to identify its best practices. With the data collected, it will also be possible to analyze, compare, and eventually improve the current contents and methodologies applied in the context of teaching color management in the curricula of higher education institutions where researchers are teachers, thus adjusting the skills profile of the students as they are entering the labor market.

An initial search for international studies that address the problems related to the use of these tools is being carried out, in order to allow us to confirm that it is not completely known how the printing industry adopts color management processes. Some sector technical reports are published from time to time, such as those that InfoTrends regularly carries out for the North American market, which, in the results released at the end of 2014 (US Production Software Investment Outlook 2014), show that color management tools are one of the main concerns for about 34% of respondents, when in 2013 this number was only 9%. The same source also reveals that, when asked about the intentions of investing in software, color management tools come first, followed by cross-media marketing tools and creative/layout software. The main reasons given for this high interest in purchasing color management solutions are related to the possibility of achieving a more consistent, repeatable and accurate color reproduction, as well as the perception of the growing demand for the production of highly demanding color reproduction works.

Thus, it is possible to guarantee a reduction in the repetition of work due to failure to meet the customer's expectations regarding color, as well as the possibility of repeating work in a more consistent manner. It will also be important to analyze some of the Rochester Institute of Technology's monographs, namely the studies carried out by the Printing Industry Center, which may also contribute to a more global view of the way in which the communication of technical color data is carried out between designers and producers. Whether through the research "Design to Production: The Critical Interface" (Cost, 2002) or "Variation in Premedia Color and the Potential Automation of



Imaging Tasks” (Riordan, 2005), it is possible to perceive the degree of use of color management tools by designers and producers, and to analyze some of the solutions aimed at solving the main problems identified.

In parallel, the main studies and investigations that address the issue of teaching matters related to color management are also being collected. Here too, information does not exist in large numbers, which leads us to question what content is usually taught to higher education students and which teaching methodologies are employed, and, above all, to understand whether these contents and methodologies are contributing to a real knowledge and application of these tools in the practice of this industry. Examples of this are the research “An investigation into color accuracy and color management issues in digitally printed textiles for higher education” (Kelly, 2014) and the master’s thesis “Color Fields: What Designers Need to Know About Color” (Witcher, 2016), where the most relevant questions about the teaching of color management are raised in detail. Here, too, it will be possible to see whether the conclusions may or may not point the way to the creation of stable solutions in teaching and practice.

In addition to the literature review, we intend to conduct interviews with specialists in the field of color management in order to comment on the relevance of the topic under study and its practical suitability. With the collection of experts’ contributions, efforts will be made to improve the quality and interest of the quantitative research to be carried out through questionnaire surveys among companies in the national sector of the printing industry.

With this exploratory study we intend to analyze the degree of use of color management tools by the national printing industry, and use this knowledge to analyze, in a more profound and systematic way, the contents taught in the two institutions represented here. We believe that this is a fundamental step in trying to ensure that any changes in the curricula of courses with a strong component of graphic production, specifically with regard to the contents related to color management, can meet the expectations and needs of the labor market. These subjects are taught in several curricular units (such as pre-press, digital artwork and digital printing) and it is vital to understand whether the skills acquired by students are fundamental for their integration in the printing industry and whether, at the same time, they can contribute to the clarification of the processes and the improvement of the procedures that use color management tools as a guarantee of quality and predictability in graphic production.

KEYWORDS

color management; printing industry; print production; teaching; methodologies

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MATERIALS AND PRINTING PROCESSES THAT IMPROVE SUSTAINABILITY OF TINPLATE FOOD CANS: Following good practices for a green future

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Abstract

The role of metal food packaging has been proved crucial during the Covid-19 pandemic and the necessary lockdown worldwide. People had to procure packaged food and other products for quite a long time, so the metal containers proved to be extremely useful, since they offer a healthy way of storage and transport, ensure long life, as well as a high quality in the preservation of consumer's food. In addition, metal packaging industry represents an ideal example of a circular economy, since metals can be constantly recycled more than once in a loop. One of the most commonly used metals for packaging is tinplate, contributing to "sustainable development, which meets the needs of the present, without compromising the ability of future generations to meet their own needs".

Tinplate products are sustainable and environment-friendly since they can be recycled and reused infinitely without loss of any of its properties. After the manufacturing process, tinplate is usually coated internally and externally with suitable organic coatings (lacquers and varnishes): the internal coatings are in contact with the food, protect the metal against corrosion and possible metal contamination of food. On the other hand, the external coatings contribute to the protection of the metal from environmental and mechanical shocks, ensuring the aesthetic upgrade of the surface and the print quality of the surface.

So, it is very important to use suitable coatings and printing materials and practises that meet European and international standards (Directives and Regulation) in order to achieve better print quality and simultaneously to minimise the carbon footprint. Saving resources and energy, reducing wastages, etc. tinplate food packaging can offer further green advantages and promise a greener world for tomorrow.

A. BPA*-free coatings for metal food packaging: The aim of the first part of the present study was the assessment of physicochemical and mechanical properties of a BPA-free and a biological BPA-free lacquer in comparison with a conventional one, which are applied on the internal surface of tinplate food packaging containers. The used coatings must have suitable physicochemical characteristics and must be applied by the appropriate technique, meeting the requirements and high standards described by legislation about materials in contact with food. For this scope, the selected coated tinplate specimens were examined and characterized by various experimental methods, such as dry and wet adhesion tests after hydrothermal treatment in various solutions - simulators of food packaging and by microhardness measurements. Then they were observed using an optical microscope / stereoscope, and their microphotographs were analyzed with the image Pro program for quantitative expression of the results. The analysis of the surface of the specimens was carried out by the use of Scanning Electron Microscopy (SEM)** / Energy dispersive X-ray spectroscopy (EDS)** and Elemental Mapping. The results showed that the biological and the BPA-free lacquers response well to all tests and proved to be excellent alternative coatings to conventional ones in order to replace them due to the BPA content. In addition, the experimental tests for the quality control of the coating materials must be carefully designed since the phenomenon of corrosion of



metal packaging containers is dynamic and involves many different factors (condition of the metal surface, food composition and environment which the metal surface comes in contact with, contact time, temperature, etc.).

* Acronym BPA: Bisphenol A (BPA) is an organic synthetic compound which is used as a precursor to important plastics. BPA-based materials are clear, tough, and flame resistant. BPA's ability to mimic the effects of natural oestrogen acts as an endocrine disruptor. Thus, in 2012, the United States' Food and Drug Administration (FDA) banned the use of BPA in baby bottles and in 2017 the European Chemicals Agency concluded that BPA should be listed as a substance of very high concern. Finally, in 2019, the European Union upheld a decision by the European Chemicals Agency to list BPA as a substance of very high concern, the first step in the procedure for restrictions of its use due to BPA's toxicity for human reproduction.

** Acronyms SEM/ EDS: Scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDS) combined with Elemental Mapping allow for a fast, effective and precise analysis to determine the elemental composition of any material that can be imaged in an electron microscope. These advanced techniques are mainly used for the characterization of materials, such as metallic samples, polymers, etc. in a non-destructive manner.

B. Reducing materials - time - wastage and saving energy: The second part of the study includes the good practices of a Greek company, concerning (i) the use of a new type of a commercial printing plate, and (ii) the use of a suitable software in order to reduce materials, energy consumption and save costs, while high quality and sustainability is ensured. The above-mentioned printing plate offers all of the benefits of existing chem-free alternatives but "brings also robustness to a whole new level". It is with less cost, the most durable chem-free plate available on the market and it boosts efficiency, both in plate throughput as well as in run length, with optimal press performance, zero water and up to 75% less waste compared to other similar products (such as other commercial plates). This type of printing plate also supports up to 240lpi and incorporates a suitable technology, contributing to the product's chemical and mechanical robustness. It can facilitate run lengths as long as 350,000 copies, or up to 30,000 when using UV inks. In the examined case, Lefkosisdirourgia Kavalas S.A. in Greece has decided to launch this new type of printing plates for the reasons mentioned above. In addition, these plates represent a step further in photopolymer technology. With this technology one can go further in terms of robustness and it does not require any pre-heat, while previously if a company wanted to improve resistance and robustness in the case of commercial thermal plates, it would need to bake them. This is an example of good practices derived from companies, which support sustainability and promise a greener world for tomorrow. On the other hand, the company uses a software, which produces Print Production Format (PPF) files in order to integrate the Pre-press, Press, and Post-Press and enables transferring data through a simple production process (Workflow). The examined metal packaging company decided to use this type of format in order to manage information related to administrative data, inks (such as separations and ink coverage), register marks, comments, and preview images, contributing to sustainability, since it enables reducing make-ready times and wastage.

Keywords

Tinplate food cans, sustainability, BPA-free coatings, reducing materials, saving energy.

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A SHORT STORY: an adaptation to different ebook format

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Abstract

This project was developed within the Ebooks' course of the Master in Editorial Design from Polytechnic Institute of Tomar. The main objective was to develop a proposal for adaptation of a short story to an ebook. Considering two different file formats – fixed layout EPUB and reflowable layout EPUB –, and taking into account their different limitations and characteristics, the same content was adapted to these two formats, maintaining the same conceptual choices in terms of editorial design. Like in a printed book, all situations of typographic hierarchy, text/image relationship and cover/pages articulation were considered, taking advantage of the possibility of integrating interactive elements that enrich the reading experience and add meaningful content to the main narrative.

The development of this project started from the design of the fixed layout EPUB, considering that in this format the basic principles of the interactivity and visual identity of the book would be established. Those should later be adapted to the reflowable layout EPUB, keeping in mind the differences between both formats.

The short story was «Edilson vai negro de tanto caminhar» («Edilson goes black from so much walking», authors translation), by João Costa Rosa. It tells the story of Edilson, who walks along Estrada Nacional 2, in São Tomé, while longing for a car to pass by and give him a ride. Throughout the text, this main narrative is constantly interrupted to start others that relate to previous moments in Edilson's life and his relationship with the author. This results in a sequence of relatively autonomous, although interconnected, «stories inside the story». Throughout the textual analysis process, three text segments with those strong characteristics were identified. Those could actually be understood as independent stories and it was considered that it would be interesting if the ebook could make that even more clear – providing the chance for one to read the full story or, on the other hand, only parts of it, to which the reader could have direct access. This principle, justified by the nature of the short story itself and its characteristics, came to guide the process of development of the ebook. The design of a storyboard to define this proposal structure proved to be fundamental for the visual realization of the result of the textual analysis. Thus, the traditional front page was transformed into a visual table of contents, from which the reader is invited, first of all, to «choose a path», that is, to choose to read the full story or one of the briefer ones instead. These were differentiated from the rest of the narrative through chromatic differences (different background color) and by the integration of different multimedia resources (background audio), marking the beginning of a content that is intended to be differentiated from the rest of the ebook. It should be noted that the digital illustrations were specially developed for this story, having in mind their potential to be animated or interactive in any way, adding value and knowledge to the editorial project. The illustrations were also adapted to its presentation in both fixed and reflowable layout formats.

Throughout the fixed layout EPUB file, several levels of interactivity were integrated, using tools as buttons, internal hyperlinks and animations (of color, dimension, movement, appearance / disappearance), which add interest to the illustrations and / or offer extra information about specific elements that are referred throughout the text. A chromatic logic was also developed to identify, on the screen, the interactivity areas: the color yellow was used to highlight words or other content where the reader is invited to click in order to trigger some kind of action.

In adapting this design concept to the reflowable layout EPUB, which due to its characteristics does not support the integration of some of the interactivity features used in the fixed layout (such as buttons and animations), these were adapted in a minimalistic, although effective way. To differentiate the three text segments in relation to the main narrative, forced page breaks were added. Also, those three brief stories were the subject of a different typographic settings (in terms of typeface and its color), which associates them with each other and differentiates them from the rest of the narrative. The reader can easily choose to read the full story or one of the briefer ones by choosing it in the table of contents. In this way, it is considered that in the reflowable layout EPUB, the same objective has been fulfilled, although through different techniques that took into account the characteristics of the format.

This project resulted in the design proposal for an ebook, in two different formats, where the same short story was adapted. During its practical development it was possible to explore the potential of adapting a text to digital format, considering the different possibilities and limitations of the two EPUB formats, and how in each of them different tools can be used to achieve the same conceptual objective.

Keywords

ebook, fixed layout EPUB, reflowable layout EPUB, short story

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SUSTAINABILITY IN DESIGN PROJECTS: A proposal to apply sustainability to education and professional practice

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Abstract

Higher education institutions have a responsibility to contribute to a more sustainable development. However, this contribution hasn't been always consequential, especially when the focus is more on the construction of mere tools for sustainability, than on the process of internal transformation. That is, on the development of a true training for sustainability, consequently for a curriculum more oriented towards sustainability and with valid contributions for sustainable development, namely in the regions where they are based. On the other hand, ecodesign analysis tools, namely checklists, have been used successfully in companies, but also in education, and have made an important contribution to sustainability, fundamentally in the environmental and economic dimensions. Consolidated experiences in these areas have shown that employing these tools implies a contextualization of their use, in the case of their application in a teaching context, among students, or in a business environment, among professionals. It depends on the social, economic, and business context of the region or country, but, in the specific case of an application in education, it also depends on the type of subjects and the teaching and learning methods.

In addition, the usefulness of the checklists is observed in various contexts of everyday life, but also in the professional environment and in teaching, as it is a tool that can help teachers and students to guide projects towards the final objectives, also valuing the process of getting there.

The present study emerged from an investigation carried out within the scope of sustainability in communication design projects, involving several curricular units of a communication design course. Its final objective is to formulate a proposal for the application of sustainability to education and professional practice in this field of design. The main intention is to encourage design practices that consider aspects of environmental, social and economic sustainability, consolidating the training of students for a more sustainable development.

At the methodological level, the study was grouped into four phases of action. In the first phase, the state of the art was analysed, the most appropriate method was chosen – an Ecodesign Checklist – and developed to evaluate communication design projects and to introduce improvements in products sustainability and design projects.

Three curricular units from the third year of the Communication Design bachelor degree were selected, which allowed to carry out the communication design project (Communication Design IV subject), create ecodesign strategies (Sustainable Design subject) and plan their graphic production (Graphic Production I subject). Within this context a packaging and labelling design problem was defined as the project to be carried out evolving the subjects, having in mind the importance that this area of design has in the region where the school is located. To this end, an Ecodesign Checklist for Packaging and Labelling was developed, which allowed the design aspects for sustainability to be articulated between the three curricular units.

In a second methodological phase, the Packaging and Labelling Ecodesign Checklist, was implemented and a first assessment study was carried out, regarding the potential contributions to the main aspects of sustainable development and to the training and curriculum of students involved.



In addition to put in practice the Packaging and Labelling Ecodesign Checklist, surveys were also carried out with the involved students, in order to assess the impact of using the method on their curricular training and on their design practices.

It is expected that in a third phase, this study can be applied to other subjects of the Communication Design degree and in a fourth phase to be extended to professional practice.

This article presents the first analyses and reflections obtained in the first two methodological phases of this investigation, evaluating the importance of conducting the inquiry into a more holistic perspective, which includes a curriculum and training for sustainability as a whole, transposing the limits of the design project or of the designed products. It is also presented here the study contributions evaluation, specifically the Ecodesign Checklist for Packaging and Labelling, for the “Sustainable Development Goals - 2030” in Portugal and in the region where the higher education institution is located, highlighting the aspects considered as fundamental, and within the reach of design and communication designers.

The first presented results are exploratory, as the intention is to develop the study by comparing results on a continuous basis. The evaluation of the Packaging and Labelling Ecodesign Checklist was carried out considering the academic universe in which it was implemented and intends to establish improvement parameters for its use. These parameters include the ease of use of the Checklist; the achievement of ecodesign objectives and also of social and economic sustainability; and the contribution to students training in the scope of sustainability. Some of the criteria initially defined for this study, specifically criteria related to collaborative practices applied to the field of design, were conditioned by the constraints of social confinement. However, it is expected to apply and test these criteria in the next round of the Ecodesign Checklist implementation.

Keywords

Sustainability, Ecodesign; Checklist; Communication Design; Education

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LABORATORY PRACTICES APPLIED TO THE DEVELOPMENT OF AN INDEPENDENT EDITORIAL PROJECT

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Abstract

Technological advances and overwhelming presence of digital tools in our day-to-day lives, necessarily have an impact on the practice of design, where we can increasingly find preference for the instantaneous and ephemeral communication channels, in detriment of manual or conventional reproduction techniques. Concerning teaching practices, and particularly in the areas of design, there is an increasing hunger for training based on digital tools, where the student is faced with the need to present an answer to a certain problem, using almost exclusively known graphic software's. This article aims to demonstrate, through a practical example, how students can be encouraged to look for graphic solutions through laboratory practices, using analog tools, where the results presented were often shaped by this practice and not just a standard solution proposed by a software.

The example presented in this paper is based on the extracurricular editorial project, i.E. Magazine, that students of the Degree in Design and Graphic Arts Technology (DGAT) of the Polytechnic Institute of Tomar (PIT) have developed in recent years, with the objective of contributing to learning outside the classroom, encouraging the use of equipment and materials provided by the printing labs of this institution. This magazine is owned by DGAT students and has served as a platform for exploring the PIT printing laboratories, but also as a way for students to express themselves, without the commitment to respond to an exercise, program or problem placed in the classroom. The students that embrace this project are responsible for the choice of all the written content, for the external request for articles, for the collection or production of images and illustrations, for the design and layout, for the choice of materials and means of production, for the printing and finishing and for the distribution.

In the first part of this paper, we pretend to address mainly issues related to independent publication – the term is used here, not as a closed and definitive characterization, but only in order to distinguish an area of editing, apart from the traditional means of creation, production, dissemination and distribution – in order to understand its context and recognize how this kind of lighthearted edition, without resources and, almost always, without a commercial objective can influence the choice of tools, materials and resources, as a mean to produce a graphic object.

In a second part we will try to explore how the experimentation and exploration of traditional production techniques in a workshop context can lead the student to unexpected results, often imposed by technical, laboratory or time-based limitations related to the use of almost artisanal production techniques.

For a third part of this paper, we will present the approaches taken in the production of the sixth edition of the i.E. Magazine that usually starts with a set of limitations presented by the editor and that the students plan to solve as they explore the different solutions that laboratory practices allow. For each of the issues of this magazine it is essential to use the laboratory spaces offered by PIT, making the student conscious of a much wider reality that those they can find on the computer, on digital tools, or even within a traditional classroom.

With this article we hope to accomplish that having access to other, more experimental learning methods, allows amplifying the student's creative vision and makes it possible to improve the learning



processes. The collaborative methodologies used in the context of a workshop are relevant in the practices of graphic and editorial design, placing the designer also as an author, collaborator and producer, capable of dictating high-value content and practical solutions. The review of creative processes and tools used, transforms the designer as an author, into a more informed and conscious professional, allowing the approach to traditional technologies and contributing to their recognition and applicability in a professional context.

Keywords:

independent publication, laboratory practices, workshop production, pedagogical project

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FOSTERING A CREATIVITY CULTURE: Or how culture can foster creativity in design students across a semester

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Abstract

Design has evolved into a comprehensive discipline, its core areas (communication, product, spaces, web, service) are a fraction of its wide-ranging outcome which has expanded into specialized fields of knowledge. The creative process greatly depends on previously acquired cognitive knowledge (socio-cultural and moral values). This usually originates within a cultural context, that provides visual, audio, and kinaesthetic manifestations, requiring interpretations and understanding of both the designer and the end-user.

Design education had to adapt and evolve accordingly, applying methodologies and encompassing a transdisciplinary approach involving research, art, materials, technology, processes, and human interactions in the development of design solutions, emphasizing understanding over output.

Global culture and cultural expressions have created a need in design schools to foster understanding, encouraging students to ask questions and develop awareness of wide-ranging design manifestations, thus addressing a variety of subjects without prejudice of individual beliefs. This learning and sharing of experiences can produce meaningful results, considering that civilization is influenced by cultural interactions, regarding users and products/services. These are assessed as good/bad and beautiful/ugly, depending on specific cultural background and distinct interpretations.

Cultural unawareness impairs individuals to develop creative thinking and accordingly innovative solutions. The issue presents itself, how to encourage creativity among design students, many unaware of their cultural background, thus overcoming the fear of failure, developing curiosity, applying research methodologies, and engaging in discussions that foster a mindfulness about design.

Keywords:

creativity, cultural awareness, design thinking, innovation, education

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THE ROLE OF ILLUSTRATION IN PEDIATRIC HOSPITALISATION

A collaborative project between ESAD and Pedro Hispano's Hospital of Matosinhos

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Abstract

Health services and especially the areas related to hospitals Pediatrics are increasingly committed to human well-being, either through the search for more effective treatments, either through the promotion of an emotional balance of their patients, caregivers and professionals.

The search for greater humanization of services and hospital environments is evident in several projects and studies disseminated around the world (Beirão G., Costa H. (2018); Franqueira T., Gomes, G., & Gonçalves, S. (2012); Lee, S. (2011); Instituto Desiderata (2015); Park, JG (2009); Sherman-Bien, SA (2011); Ullán, AM, & Manzanera, P. (2009).

Despite these projects, reality still shows us that most people continue to have little positive feelings when they think of a hospital. For an institution whose main objective is the conservation and restoration of health, a negative image or a feeling of discomfort, can be seen as factors of stress that do not contribute to the rapid recovery of patients. Although the value of stress reduction is difficult to quantify, empirical evidence shows that there are intangible factors that are important for the recovery and well-being of the patient (Lankston, e.o., 2010).

In 2016, Esad, College of Arts and Design of Matosinhos was contacted by the Pediatric Service of Pedro Hispano's Hospital of Matosinhos in order to conceive new visual contents for the main corridor of the service and for one of the playing rooms, where children and young people, caregivers and educators, sometimes spend long hours of their days, during the breaks of the treatments, consultations or surgeries. The goal stated for this collaborative project was clear: to try to create a more welcoming and friendly environment, with points of interest for both users: patients (newborns to 18 years old), and caregivers, in order to help them forget, even if briefly, the less pleasant reasons for them being there. To help to create a positive memory of space and service has become one of the main challenges of this project.

The process started with a series of visits to the Hospital's Pediatrics Service and meetings with the various professionals and users. A record was made of the main needs and technical constraints were taken into account, namely, materials and products not authorized for hospital use. This was followed by a literature review on illustration and the influence of hospital decoration on the recovery of patients. Among a constant dialogue between the ESAD working group and Pediatric professionals, multiple solutions were also analyzed. Of the various possibilities pointed out, the fact that the hospital had already implemented several actions that orbit medical practice has been highlighted, and in which, for example, stories are told to help to demystify the fears of children with illness through play.

With the knowledge of this and other practices, it was decided to create a set of illustrations that, in some way, supported the already existing practice of storytelling, and provided moments of distraction and positive emotional experience for all the elements that inhabit the pediatric service. The richness of the chosen illustrations is exemplified by the fact that we can find in them different categories of combinations between text and illustration, using in this example the combinations proposed by Scott McCloud (McCloud, 1993, p. 153/155), like a redundant occurrence between text

and image, additive combination, combination based on a self-sufficient text or interdependence of text and drawing. In this way, we can see the exciting dynamics that the reader can find in understanding these illustrations.

According to Mendonça, M. (2015), children's mental representation in relation to hospitals can be transformed into positive experiences, memories and feelings. The success of hospitalization and the therapeutic work of hospitalized children can be enhanced by the existence of multidisciplinary works teams - doctors, nurses, technicians and early childhood educators - by the presence of the family but also by the design of welcoming environments.

Like nutrition, health, housing and education, playing is a basic need for children. Aware of the importance of communicating emotions and minimizing the impact of stress factors associated with the experience of the disease and hospitalization in the pediatric wards of hospitals, several recreational activities should be promoted.

An example of this effort to redesign the spaces and social rooms of sick children was the action promoted by Hospital Pedro Hispano and ESAD in a collaborative project that, through the exhibition of a set of illustrations, sought to create, in the pediatric ward, a playful and pedagogical moment for your patients.

The illustrations displayed in the corridor of the pediatric ward seek to be a significant resource in the recovery of these patients, working as an incentive to the dream, to the imagination, providing other forms of perception of the world. The illustrations allow children to enrich their imagination, develop their cognitive level, know their emotions and deal with their fears and anxieties (Bettelheim, 1975 in Martins, 2016).

Participating in this project, ESAD sought to ensure the selection of a set of illustrations capable of promoting communication and dialogue between hospitalized children and adults.

As a result, it was possible to verify that illustration is able to promote communication between children and adults and, as it stimulates fantasy and creativity, it becomes a powerful vehicle for distraction, able to fight fear and anxiety associated with the hospitalisation experience. The selection of images took into account Mergulhão's statement (in Ferreira, 2013) about how illustrations should be constituted as "an imaginary and pictorial universe that will be all the richer and more meaningful for the child the more it deviates from the stereotype and the conventionality laws." The selected illustrations installed in the pediatric ward thus seek to offer something new, creative, surprising and not only reproduce stereotypes associated with fear, contributing to the development of their interpretive, communicative competence and to the emotional experiences and positive memories of the hospital space and service.

Keywords

Illustration, Hospital Pediatrics, Humanization, Well-being.

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Oral Communications & Posters





DESIGNING 'ENGAGING ENVIRONMENTS' ON THE BORDERS OF REAL AND VIRTUAL

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Abstract

A mixed media research project for a temporary outdoor exhibit for Alghero's city prison has allowed us to confront with a domain that lays at the frontiers between the physical dimensions of space and the narrative component of audiovisual communication, and to explore its potential in presenting meaningful information to a vast public.

The result of this effort is the 'Sidewalk Museum' an experimental project aimed at extending the boundaries of exhibit design within a hybrid territory in which the narrative power of space and the idea of revisiting a collective dimension of audiovisual communication team up in a part in shaping exciting informative participatory experiences.

The project takes place yearly for one weekend, during a special event in which unique monuments and cultural sites usually not accessible are occasionally opened to the general public. Within this frame, our temporary exhibit was triggered by a very special set of circumstances: unique in its genre, the historical Museum of Alghero's prison is in fact hosted in a fully functioning detention structure. This inevitably poses serious security measures, resulting in long queues on the road facing the prison's entrance, as prior to accessing the building visitor must ID and hand over various personal items.

Our response is a series of modular displays that are lined up over the sidewalk to inform and raise awareness about the general topic of life in prison and incarceration, while entertaining the public waiting in line.

On the tracks of the classic design's knowledge-in-action model, and in the tradition of wonder cabinets, our project for a Sidewalk Museum draws by design on the activation of short-circuits between extremes, aimed at sparking the curiosity of an otherwise distracted audience.

In this framework the project is shaped by contrasts between pairs: a series of apparently identical display-boxes transform, once open, into the most possible diverse informative contrivances; sophisticated and absolutely no-tech solutions confront throughout the whole exhibit; old-school theatrical artifices and subtle cinematic narrative hints oppose palpably in almost any of the displays; contrasting presentation formats change from display to display shifting from allowing visitors full interactive freedom to forcing them to bend over to access information through a peephole.

A research grant from the Regional Government of Sardinia allowed us last year to extend the original project, started as a pro-bono endeavour in collaboration with the Direction of Alghero's city prison, to more ambitious goals.

The core of this research development was to further implement the audiovisual dimension of the project, in direction of its nature of a multimedia installation.

In line with the project's concept this development followed two parallel but rather different paths.

The first, conceived for a display devoted to present tattoos as a 'living' language, widely world-wide used by convicts to communicate a complex, and often vital, set of information, offered an opportunity to investigate the intimate relationship between the audiovisual text and its possible presentation, or 'screening', surfaces.

The second involved the re-design of one of the early displays illustrating the relationships between the changes the idea of punishment in society and the evolutions of the architectural shapes for detainment. This particular display, that worked very well in its original form based on simple scale models of typical prisons to be illustrated by a live presenter, was re-thought to offer an interactive exploration through Artificial Reality, an informative environment that beyond its original areas of application in the industry, assisted training and maintenance, has been recently widely used in the area of heritage valorization but still fails to fulfil its promises in improving our ability to access information and interact with the outside world.

The present paper aims at presenting some early findings generated by the project in the direction of provoking a public such as today's, intoxicated by the questionable social experiences of networked social media.

In this perspective, the two experiments we have introduced above can be seen as engaging environments, aimed at reconnecting, through the combination of elements deriving from the narrative power of audiovisual communication and of the capacity of space to create meaning, with a sense of collective participation. The very kind of shared, even 'subversive' character, that according to Noel Burch is typical of genuinely popular spectacle forms such as the popular theatre, the cabaret, the fairground. Forms in which a variable degree of audience participation is a key component of a show/performance setting that preceded the kind of solitary and individual forms of spectatorship associated first with the advent of cinema, then of home television, and ultimately of on-demand digital streaming entertainment.

Keywords

Engaging environments, exhibit design, augmented reality

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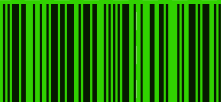
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