



Chair:
Prof. Paola Bertola

DOCTORAL PROGRAM IN DESIGN

Field of study

The Politecnico di Milano established a PhD programme in the field of design already in 1990. Based on this tradition, the current PhD programme in Design was established in 2008, resulting from a substantial review of how design was researched at a doctoral level.

The PhD programme in Design aims to develop skills to carry out high quality research in terms of design as an established academic field. Its main objectives are: to reflect on the overall nature of design, with its aesthetic, performance and meaning values as well as its capability of being an agent of social change; to develop and share design knowledge, in terms of theories, methodologies and sets of tools as well as designed artefacts. The PhD programme in Design deals with various **research strands**, each of them carried out by a given research team within the Department of Design. All the teams cluster around three Sections:

- Design and Cultures
- Products, Strategies and Services
- Design for Environments, Landscape and Mobility

The programme aims at educating researchers who will contribute original knowledge to the field of design by tackling the problems and identifying the potential of contemporary society.

Their contribution may be brought to bear in:

- creating designs, visions, and proposals (research through design);
- developing tools and methods for putting these into practice (research for design);
- developing critical analysis of design and its application domain (research on design).

The Programme develops project and analytical abilities, proposes different methodologies of research, promotes the attitude to collaborate, and offers working opportunities in universities and research centres, design enterprises and public corporate bodies.

Mission and goals

The programme develops design skills and analytical abilities, proposes various research methodologies and promotes a collaborative disposition.

The main academic field is Design. Other academic fields partially covered are: Philosophy; Language Theory; Sociology of Cultural Processes; History of Art; Science and Technology of Materials; Industrial Engineering.

The achievement of the PhD qualification in Design requires a study and research activity equivalent to at least three years of full time study. During this period, both educational and research activities are provided. At the beginning of the programme, candidates become effective members of a **research team**, within which they develop an original research topic: this activity is the core of the learning process. Parallel to this, candidates are involved in *training* and *specialist* activities.

Moreover, the activities of the PhD in Design include participation in conferences (as listeners or speakers) and writing of research papers and/or journal articles. The programme offers doctoral candidates the following **opportunities**:

- to develop an original theme of research, becoming an effective member of a research team;
- to attend courses and seminars on design research and on research in general, developing skills concerning the discipline of design and the profession of the researcher;
- to attend courses and seminars referred to a specific field of research, developing high-level specialist skills and acquiring knowledge and tools for the development of their own research;
- to develop the ability to clearly and effectively present the contents of their own work;
- to spend a period abroad as visiting researcher in a research centre to verify the assumptions, the methodologies and the results of their doctoral work.

Qualifications

The PhD program in Design intends to educate a flexible figure: a designer who knows how to carry out research and a researcher who uses design tools. At the same time, she is also an expert in knowledge management, in constructive interaction among different actors and in the sharing of ideas and proposals.

The combination of these skills is useful in a variety of work environments. Specifically: in institutions expressly dedicated to the development of design research, such as universities and research centres; in design agencies and in design-oriented companies; in public corporate bodies and in organizations for territorial development which, increasingly, are faced with complex design problems, which the Designer-Researcher can effectively address, analyse and contribute to resolve.

DOCTORAL PROGRAM BOARD

Paola Bertola

Maresa Bertolo

Monica Bordegoni

Giampiero Bosoni

Valeria Bucchetti

Alba Cappellieri

Elena Caratti

Manuela Celi

Barbara Del Curto

Davide Fassi

Fulvio Irace

Eleonora Lupo

Stefano Maffei

Pietro Marani

Anna Meroni

Antonella Penati

Silvia Pizzocaro

Lucia Rampino

Agnese Rebaglio

Valentina Rognoli

Maurizio Rossi

Daniela Sangiorgi

Francesco Scullica

Paolo Volonté

Francesco Zurlo

THE MATERIALS GENERATION

THE EMERGING EXPERIENCE OF DIY-MATERIALS

Camilo Ayala Garcia - Supervisor: Valentina Rognoli

Co Supervisor: Elvin Karana

The DIY movement is expanding beyond products to include the materials from which the products are made; namely, DIY-Materials. Designers around the globe are engaging in different experimental journeys encircling the materials development field before developing their projects. The design process includes the phase in which the material is developed, and this phase influences the whole creative pathway. Self-made material sources are providing designers with a unique tool to develop new languages and new products with original and fresh materials experiences. As more designers take this path of materials development, which can be defined as design driven, a proper study around the phenomenon needs to be carried out. This dissertation presents a series of studies conducted to understand the DIY-Materials phenomenon as one of the emerging materials experiences in the field of design. The research was called "Materials Generation" on purpose as it takes advantage of the double meaning of the expression. It refers to the new generation of designers who are aware of the possibilities that emerge when a project starts with the generation of material.

This research aims to describe and define the phenomenon of self-production of materials. It is grounded in the development of a series of codes and categories inside a system of rules to organize information around this particular class of materials. The proposed theory is composed of a language that allows seeing everything that surrounds from an alternative perspective. Living in a world of matter, everything we can touch, smell, see, hear and taste build up our lives. After the industrial revolution, societies were shaped in the way the technological advancements evolved. However, there is an alternative point of view. There is another way to see the world. The DIY-Materials theory is an attempt to produce a system of rules and conventions to categorize the different sources available on the planet and the technologies to transform them. Different from traditional sciences and economic approaches, where extraction of natural resources, mass production and trade of goods around the globe are the driving force, the self-production of materials offers a series of alternative principles and methodologies able to guide a more autonomous and independent way to produce

things. It helps to relief from the weight and responsibility to depend on the current dominant world economy. Promotes an alternative idea of smart use of resources, considering resource even elements that before weren't even considered. This research proposes a sustainable and circular perspective which can promote new social innovations starting from the materials. Within, it is possible to view and understand the opportunities DIY-Materials offer when considered as a possible practice in the design domain.

In order to distribute the different subjects coherently, the presented research has been structured by formulating the research questions and hypotheses, the qualitative methods and strategies to conduct different tests, and how the different elements are attempting to define this phenomenon together clearly.

The goal of this research is to provide more insights into the phenomenon of DIY-Materials, by creating a theoretical framework for reference with a series of steps to develop a material form an experimental design approach.

The dissertation consists of four main parts.
Part one: The first two chapters are the introductory part. They provide an introduction and overview of the entire research, focusing the attention on the organization and development of the research.

Part two is the theoretical background: inside chapter three there is a summary of the different theoretical elements considered during the research. Made with a brief historical review of the materials for the design domain, moves to the theoretical foundations of the DIY and the DIY practices. The chapter ends with a focus on sustainability-related theories. The three topics construct the three macro areas of research.

Part three presents the different studies conducted during the Ph.D. research: The initial three chapters of this part present the exploratory studies conducted to understand the DIY-Materials phenomenon better. This part is composed of three exploratory studies: cases collection and

categorization, evaluation and aesthetical evaluation of DIY-Materials. The latter two chapters present the test studies conducted to validate hypotheses and gather insights for the DIY-Materials theory building: DIY-Materials development level I and DIY-Materials development level II.

Part four is composed of the different outcomes of the research as well as the discussion and general conclusions of the research as an original contribution to the field of study. These chapters present the different outputs of the different investigations, proposes a roadmap for the efficient development of a DIY-Material with a test study and presents two strategies for the dissemination of the DIY-Materials theory. Finally, the last chapter poses a discussion on the conducted research highlighting possible opportunities for the future of this phenomenon together with a report of activities, dissemination work and credits to all designers who participated in the research.

Anticipating some of the personal reflections emerged at the end of this Ph.D., is possible to say that designers have not only the possibilities to generate materials, but also have the tools to produce them creating meaningful experiences. The different studies produced during this dissertation in addition to the material samples and physical results become essential elements enriching the DIY-Materials Theory. The results of this research will spark curiosity and hopefully also interest and passion around the materials development, highlighting the possibilities design have to offer to the materials science and engineering domain.



Fig. 1 - DIY-Materials collected as case studies.

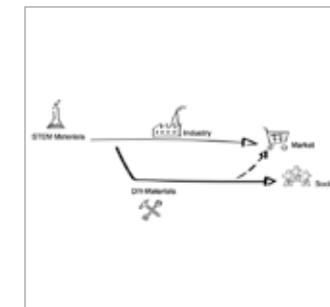


Fig. 2 - DIY-Materials as an alternative to traditional materials developed by science.



Fig. 3 - DIY-Materials Five Kingdoms: Vegetabile, Animale, Lapideum, Recuperavit, Mutantis.

HANDLING DESIGN SUPPORT PROGRAMMES COMPLEXITY

AN INTERPRETATIVE FRAMEWORK FOR BARRIERS AND DRIVERS TO INTRODUCING DESIGN INNOVATION INTO BRAZILIAN MSMEs

Mariana Fonseca Braga - Supervisor: Francesco Zurlo

Keywords: design support, design innovation, Brazilian MSMEs, barriers, drivers.

This dissertation looks at largely applied design support programmes which aim at introducing design innovation into Micro, Small and Medium-sized Enterprises (MSMEs) with little or no design experience in Brazilian traditional industries. The need to better understand how factors at diverse levels support the conditions and lever the decision to use design (as well as its intensity of use) or not to use design, making empirical barriers and drivers to design innovation evident, motivated this study. It can be of benefit to policy-makers, designers and consultants, MSMEs, and design scholars who deal with or are interested in design innovation, design policies and their related initiatives focused on MSMEs.

The research approach is inductive, exploratory and qualitative. In the first empirical cases' analysis, a map that indicates the businesses' engagement intensity and its impact on Acklin's design capabilities indicators was proposed. The preconditions to better absorb design in those cases were also identified. Businesses' attitudes and

conditions throughout projects' implementation are generally overlooked in design management and design policy research, particularly regarding MSMEs with little or no design experience in less advanced economies. The second sample of cases enlarges the landscape of introducing design innovation into MSMEs through design support initiatives by analysing two polar types cases in which barriers and drivers to design innovation emerged and were explored at three levels: (1) actors, (2) organisational, and (3) ecosystem level. This second cases' analysis aims at providing a holistic perspective on barriers and drivers to design innovation in the context of MSMEs, especially in Brazil, considering the main actors' (policy-makers, consultants and beneficiaries who took part in design support initiatives) point of view.

This study showed that barriers and drivers at the actors' level were more often and easily recognised by a range of key stakeholders, likely because they had enough face-to-face contact throughout projects that helped them identify one another's drawbacks and strengths. The lack of background in design management of policy-makers (which is already stated in

prior research), the absence of companies' prior design audit led by people with a design background, and the introduction of designers usually from the implementation of programme's project phase, underpinned the fact that many barriers that are already discussed in prior research focused in the context of MSMEs might exist but were not addressed at the organisational level.

Promoting ecosystem changes requires a network of key collaborators that agree and corroborate each other's needs should be set out and take action, sharing a purpose and strategy. Most barriers and drivers at the ecosystem level were not identified by interviewees despite the fact that they are clearly quoted in prior research addressing the Brazilian context. They were only recognised when directly affecting the established programme process or programme implementation, relating to day-to-day constraints and short-term outputs. Though they are crucial to moving towards a promising scenario, people seemed to get used to them. Hence, one might not be aware of a problem because one cannot recognise it in a certain lasting situation that takes place at the national level. Thus, the

proposed framework helps bring the awareness of their existence, spurring the importance in setting out collaboration with diverse stakeholders (e.g. government, institutions, universities, industry, firms, designers associations, industry unions) to achieve consistent changes through a more systematic and long-term development strategy. Few barriers and drivers were new and distinguished from others in prior research only regarding

the rationale used to address them by the interviewee or the lack of empirical evidence within design studies or regarding design support programmes. Barriers and drivers differ according to: (1) the context in which each project is embedded, including the economic and political priorities and orientation, as well as cultural aspects; (2) the way programmes and their projects were crafted, managed, implemented and evaluated; (3)

the background and mindset of key stakeholders who take part in these projects.

The main contributions to the design policy field are: (1) an interpretative framework at three levels to identify barriers and drivers to design innovation, contributing to underpinning strategies to harness drivers and to overcome barriers; and (2) a design support metamodel which aims at an experimental and participatory approach to tackling design support programmes' craft, upgrade, and change.

The design support programme metamodel was proposed addressing the design support programmes' drawbacks. This metamodel, as well as the framework at three levels, should be seen as dynamic metamodels that can change according to the specific project's contexts characteristics, the industry typology, the level of intervention (local, regional, national), and innovation needed, background of people who use them, and timing (barriers and drivers can emerge or change and can vary in a certain context, being more important or insignificant).



Fig. 1 - Barriers found at three levels.



Fig. 2 - Drivers found at three levels.

DISCLOSE TO TELL. A DATA DESIGN FRAMEWORK FOR ALTERNATIVE NARRATIVES

María de los Ángeles Briones R. - Supervisor: Paolo Ciuccarelli

The thesis, developed in the scope of a broader investigation within Design Semiotics and Design Management, aims at building a method of analysis of the pragmatistic dimension of artifacts. This dimension relates to emerging senses and plausible design consequences that emerge from the stakeholders' or design-agents' rationale. The objective is to provide theoretical and technical support to the analytical stages of product and service development by introducing such a dimension into design practices. The focus lies on gaining insight into *mediation processes* and their outcomes from the perspective of Peirce's notion of *sense* and Eco's understanding of *functions*. Mediation processes are subjective and embedded in the relationship established among customers, industrial goods and services providers. As such, according to Peirce, "our idea of anything is our idea of its *sensible effects*", i.e., the senses/functions of any industrial good or service are associated with *all possible interpretative answers* and *practical consequences* derived from the social and individual responses they produce or could produce. Consequently, as stated by Eco, "seeing functions from the semiotic point of view might permit one to understand and define them better [...]"

and thereby to discover other types of functionality, which [...] a straight functionalist interpretation keeps one from perceiving". Hence, they should be investigated in contexts of use, in *non-controlled* environments (e.g. focus groups), and under behavioral circumstances through the employment of specific research techniques. But how to precisely access, identify and analyze pragmatistic features—interpretative answers and practical consequences—that emerge when artifacts and services are launched worldwide? And then how to bring such features into design practices? Even though design practices inherently attempt to cope with symbolic and cultural features, the *applied* use of semiotics within design practices has remained incipient. However, the use of design semiotics as a foundation to enhance design practices that aim at developing reasonable solutions to social and customer issues seems to be neglected or misused, especially when one considers that design semiotics copes with our world of *signs*, which are strongly associated with the ways users make and negotiate meanings [senses] of objects [artifacts]. Hence, collaborative intersections among design semioticians, design

practitioners and researchers, industries and service providers may yield superior responses to design issues as well as to social and individual demands. As such, the development of a Full Methodological Research Framework aiming both at empirical and experimental studies in Design Semiotics and at introducing the pragmatistic approach into design practices, especially into ones which take into consideration the engagement of users [design-agents] (e.g., co-design and bottom-up practices), may contribute to developing specialized design skills and culture as well as Design Semiotics and Design Management. However, due to the complexity of such a framework, which may be regarded as a paradigm shift within Design Semiotics, its investigation and development process was divided into three correlated stages: Theoretical (2006-2008, Master's Degree in Management), Empirical (2010-2012, Master's Degree in Design), and Theoretical-Empirical (2013-2017, PhD in Design). The *Theoretical Stage* consisted primarily of pinpointing gaps in design semiotics. A theoretical approach was taken to tap into how individuals, design, culture, semiotics, and artifacts interplay with a view to understanding

how such interplay may affect meaning [sense] contingency in projecting, adapting and localizing global products. The study showed that design is deemed as a relevant tool in managing artifacts overseas, but empirical contributions are incipient as only recently have scholars attempted to establish design as a scientific domain. In response to such absence of *systematic* contributions to design semiotics, two theoretical models were developed—*The Target Model* and *The Hanger Model*—before moving on to second stage. The *Empirical Stage* drew on an exploratory investigation funded by Whirlpool Latin America (Brazil) in partnership with the Minas Gerais State Agency for Research and Development (FAPEMIG/Brazil). Supported mainly by ethnographic techniques, the theoretical assumptions developed in the previous stage were empirically tested. The research process, which consisted of tapping into *habits* and *cultural codes*, *critically* improved the research methodology. The *Theoretical-Empirical Stage* aimed at concluding the FMRF. As outcomes, the previous investigations and results led to theoretical advancements such as *The Propeller Model* and *The Trefoil Model* as well as to the

development of such concepts as *design-agents* and *plausible consequences*. In conclusion, the entire investigation attempts to introduce *systematicity* into research processes within design semiotics in the long run. Its contributions are expected to assist processes of attribution of intangible features in both (co-) design practices and early stages of design of industrial goods and services.

THE DESIGN OF COMPOSITE IMAGES. DISPLAYING DIGITAL VISUAL CONTENT FOR SOCIAL RESEARCH.

Gabriele Colombo - Supervisor: Paolo Ciuccarelli

Co Supervisor: Donato Ricci

Researchers working with digital methods look at the web as a source of data for the study of society. By collecting and analysing digital traces left by human interactions online, researchers are able to observe and describe controversial issues in the making, with unprecedented scope and detail. The growing number and pervasiveness of images online prompt (digital) social and cultural researchers to integrate visual contents in their analysis. At the same time, the specificity of digital images, in terms of their production, fruition and circulation, requires a novel approach to their study, one that shifts the focus from the individual image to the group of images. After research questions are formulated, content is selected and collected from the web, researchers find themselves with a set of images, saved in a local or shared folder. At this point, the need to look into the collection of images arises. How to observe, systematically, the content of a collection of images? Which strategies are available for the description and observation of groups of images collected online? To observe, describe and interpret a collection of digital images, researchers usually turn to available tools, with limited display options and functionalities. With

direct observation being often the chosen means for the analysis of a collection of images, the ways in which images are presented, should not be limited by the few display modes offered by available tools. In this dissertation, I explore the combination of a collection of images into a single artifact, which I call composite image, as a strategy to support interpretative work in the context of digital social research. While the role of communication design (and more specifically of information and data visualization) in the analysis of social issues with data from the web is object of an ongoing research, few reflections have been made around the contribution that the same discipline can give in respect to the specificity of working with digital images as data. The current dominant approach to the visualization of images, Cultural Analytics' direct visualization, is mainly used to analyze massive collections of visual materials. In this dissertation I argue both for the need to apply direct visualization techniques to smaller groups of images, in order to move the practice beyond the mere observation of formal properties, as well as for the need to describe with more detail the various transformations that images are subjected to

during the process. The design of composite images is then tested as a strategy for the analysis of various collections of images, in the context of an online mapping of the debate related to the (re) introduction of green spaces in the city of Paris. The aim of the project - NATURPRADI - was to provide the municipality of Paris with an account of the entanglement of objects, places, practices and technologies composing the urban nature debate, so to inform future revegetation policies. The project represented a perfect environment for experimenting with different techniques for the visualization of images collected online. The designed composite images have been then collectively interpreted, annotated and discussed in the context of a collaborative workshop with various actors involved in the debate around Parisian nature. This dissertation explores and illustrates the design of composite images, which is the result of the transformation and combination of multiple images, as a valuable tool for the analysis, interpretation and discussion of a collection of visual contents in the context of digital social research. In the conclusions I discuss composite images twofold function. On one side, I consider their function of visual interface to a collection of

images, thus evaluating their value as research tools. On the other side, I suggest a further use for the designed composite, beyond their intended use of offering a tailored interface to a collection of images. Drawing from the experience of a workshop organized in Paris, where experts were confronted with the designed composites and asked to interpret them, I discuss composites' role as conversation prompts and speculative devices.

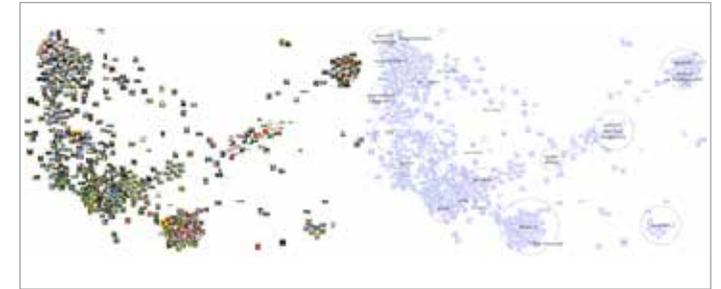


Fig. 1 - Composite of images included in tweets that mention the words [nature] and [Paris], from July to September 2017.



Fig. 2 - Composite of images included in tweets that mention the words [agriculture] and [Paris], from October to December 2017.



Fig. 3 - Images from the workshop organized in Paris, where experts were asked to interpret and discuss the composite images (left). Diagram produced by workshop participants, on top of a composite image (right).

S+S: DIALOGUES ON THE RELATIONSHIP BETWEEN SPATIAL AND SERVICE DESIGN

DISCLOSING THE FUNDAMENTALS FOR A TRANSDISCIPLINARY APPROACH

Annalinda De Rosa - Supervisor: Davide Fassi

The central topic of this research is to identify dialogues on the relationship between Spatial Design and Service Design, exploring their disciplinary implications in a theoretical analysis of specific areas of the landscape of the research in design. The aim is to start a first step towards an approach defined as *Service+Spatial (S+S) design: the doctoral thesis is a foundational act in this direction.*

The topic has been studied from a design perspective and from a design culture background in order to provide a contribution to a first attempt towards transdisciplinarity to expand and to contribute to an unexplored gateway into Service Design, that of Spatial Design.

Service innovations are reshaping spatial experiences.

Spaces are part of the service system to be designed.

These two initial assumptions represent the core of the research done and address the important gap in how spaces and services are correlated from a design point of view. The research originates, in fact, from the perception that services actively contribute in the definition and identification of spaces: Spatial Design encounters Service Design in

urban planning, and in the design of workplaces, retail settings, private interior spaces, public services and infrastructures. In this range of settings, spaces *host* relational entities and vice-versa, services *take place* in physical environments and *determine* tangible outcomes. Yet, despite the strategic importance of the theme, demonstrated by S+S experimentations in design university courses and in the design professional practice, the absence of a coordinated design culture and the lack in a theoretical development in the research in design is not negligible.

The aim is thus to identify a common ground of the two disciplines in order to explore areas of differentiation and of balance: these areas are the *Dialogues* identified. They

represent the scope of creating *supportive structures* between Spatial Design and Service Design, meaning disclosing the fundamentals of an S+S design to reconsider the tangibility and intangibility of Service Design through a spatial perspective. Hence, I attempted to propose a *taxonomy* of this relationship, defined as a *Qualitative Comparison* for an S+S transdisciplinary approach. It tries to break the silos between Service Design and Spatial Design and to focus on an approach going beyond the boundaries of the two disciplines. This taxonomy represents the first attempt to synthesize the gaps identified between the two disciplines and it served to shape and to experiment methods and tools in several direct experiences in research projects and in educational

activities here presented. These experimentations on a S+S design process are meant to be case studies to let emerge criticalities and critiques for future development after this doctoral path.

With an S+S approach, the Service design side can influence the material reality of services and the Spatial design side can embed the consolidated methodological discourse around human-centred design in its theoretical development, avoiding the Spatial Design development being merely a frame for Service Design. The ambition of the resulting *Qualitative Comparison* is to outline principles for the foundation of an S+S approach and this comparison is meant to propose an abstract and wider interpretative model to start considering the contribution of Spatial Design to Service Design.

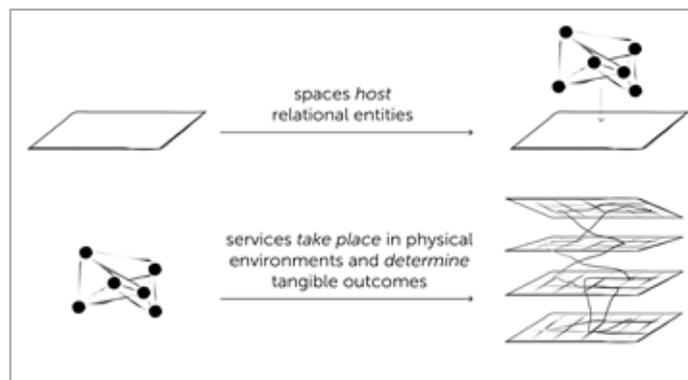


Fig. 1 - Diagram by the author

DESIGNING THE EMPATHIC EXPERIENCE. SUGGESTIONS FROM ART PRACTICES

Alice Devecchi - Supervisor: Luca Guerrini

In the light of the emerging collaborative approaches to design, this thesis aims at rethinking the traditional consideration of empathy as a designer's skill addressed at understanding the need and wishes of users. In managing collaborative processes, the designer's ability to step into the other's shoes is no longer enough. Empathy should be extended to participants who are asked to cooperate towards a common goal. On the basis of these premises, the thesis claims that a shift from considering empathy as a psychological ability of an individual to accounting for it as an experience that enhances dialogic and cooperative relations, could contribute to improving collaborative processes. In order to achieve this change of perspective, the thesis refers to a theoretical framework built on a phenomenological account of empathy. The phenomenological reading of empathy – developed in particular by Edith Stein and recently rediscovered and reviewed by Laura Boella, amongst others – focuses on its nature as an interpersonal experience that introduces the other into one's own personal horizon making his/her irreducible otherness emerge. The capacity of acknowledging otherness is as a key for establishing dialogic

exchanges and cultivating a cooperative attitude. Empathy may unfold spontaneously within relational contexts, still requiring facilitation and support in addition to contextual circumstances which do not prevent it from occurring. Hence, this study aims to provide guidelines that assist in the design of particular conditions that enable the unfolding of empathic experiences. The guidelines serve a practical tool to help set up the context of collaborative processes in order to make them more effective. The guidelines for designing the empathic experience have been drawn from the study of participatory and collaborative art practices. In the thesis, art is accounted for its potential of creating particular relational contexts in which empathic experiences are triggered. Six case studies of art practices – immersive, collaborative and/or participatory – are analysed to the aim of understanding how they can suggest strategies and provide models for design processes based on collaboration. The case studies are interpreted referring to the theoretical framework of empathy as an experience, in the attempt of circumscribing the elements which enable an empathic experience therein. Nine recurring elements called enablers came out of the research on the case studies, laying

the groundwork for developing the guidelines. The thesis is structured in seven chapters. The first one overviews the emergent approaches in design, particularly in service design, that deal with relational issues. The focus progressively narrows onto collaborative processes, in view of the fact that cooperation and dialogic skills could benefit the most from defined replicable strategies to facilitate the emergence of such skills. The second chapter describes and clarifies the meaning given in this context to the expression 'empathic experience' and to what extent it differs from the well-known – and often misunderstood – concept of empathy. As mentioned above, a phenomenological frame leads the theoretical part of the dissertation, drawing the attention on the role of empathy in experiencing the other. The third chapter reviews the literature pertaining to empathy in design. Out of the review, evidence emerged to support that empathy in design is mainly considered as the skill of reading and interpreting another's feelings, wishes, tacit needs and states of mind. It is considered as an ability the designer should possess and train in order to achieve knowledge of the hidden sides of users. At the same time, the literature review highlights that the designer's

empathic attitude alone is no more suitable for dealing with complex systems of stakeholders and/or with groups of participants who bear different social, cultural and economic identities. An alternative model of empathy that brings out its multiple facets of an experiential act connected to intersubjectivity and to interpersonal understanding within face-to-face encounters would answer to the need for strategies aimed at designing 'situations' for empathy to occur. The fourth chapter focuses on six cases of immersive, participatory and collaborative interventions, studied and analysed with the aim of circumscribing the elements which enable an empathic experience therein. *On Space Time Foam* (Tomás Saraceno, 2012), *Dialogue in the dark, Portals* (Shared Studios), *Eye Contact*

Experiment, Rede de elásticos (Lygia Clark, 1973), *Green Light* (Olafur Eliasson, 2016-ongoing) have provided examples of 'empathy in practice', though in different ways and with varying results. In chapter five, all the *enablers* are featured and their action outlined in each case. To further assess and foster the observations and hypothesis resulting from the preliminary study, primary sources were probed. By developing and disseminating (online and offline) a questionnaire addressed to the participants of the selected practices, insights about their experience and the opinions about its connections with empathy were collected. The research took advantage of such a survey as a further step towards the refinement of the *enablers*. Chapter six presents the survey's

results together with the report of another crucial test of the research's consistency, i.e. a workshop held at the University of Aveiro during a study abroad period. Five PhD students in Design, selected according to their research interests in the areas of service design, social innovation and user experience, participated in the workshop *Design for Empathy*, which addressed assessing the *enablers* and discussing their possible impact on design practice. The last chapter discusses the guidelines for designing the empathic experience, developed by weaving together evidence from the case studies, survey feedback and propositions from the workshop. The guidelines took the shape of cards, with each one explaining what the suggestion deals with, how to put it into practice and towards what aim. The guidelines for designing the empathic experience are intended as meta-design tools for collaborative processes, addressed to the setting up of spatial and relational contexts that enable 'dialogic cooperation'. The cards may be used to prepare and support design processes that rely on collaboration and people participation. The dissertation is a cross-disciplinary work that waves philosophy and art into the current design discourse, and is intended as an attempt to translate theoretical reflections about empathy and our modes of experiencing the other into practical suggestions for facilitating collaborative processes and managing the relational dynamics at stake therein.



Fig. 1 - Guidelines for designing the empathic experience

TOWARDS AN ECOLOGY OF KNOWLEDGES. CRITICAL PEDAGOGY AND EPISTEMIC DISOBEDIENCE IN CONTEMPORARY VISUAL ART AND DESIGN PRACTICES

Silvia Franceschini - Supervisor: Luca Guerrini

This thesis aims to problematize how critical pedagogical theories have been reassessed in radical learning experiments carried out by contemporary artists and designers involved in the production and mediation of critical social knowledge. The thesis departs from Boaventura de Sousa Santos's idea of "ecology of knowledges," an attempt to decolonize learning structures through a wider epistemological diversity. The premise of the research is that problems of unsustainability and the broader crises of globalization affecting the present are linked not only to the world of material production but also and especially to the sphere of cultural, social, and knowledge production. Issues of knowledge production in a global scenario trigger epistemological questions regarding knowledge production's own politics, the community of knowing subjects, and the institutions responsible for structuring and regulating such knowledge systems. Hegemony of one knowledge system over another has been the subject of debate in many disciplines. Our current global predicament marked by climate change, the constitution of increasingly less democratic and equal societies and an overly controlled media sphere is forcing us to rethink the

relation between knowing and the world. The aim of the thesis is to reconsider this relation from an art and design theory perspective by addressing these questions: How to create a dialogue between plural ways of knowing? What is the role of subaltern knowledge in developing socially sustainable and decolonizing alternatives? To do so, the research draws upon critical pedagogical philosophy and decolonial theory and analyzes how these have been translated in the practices of artists and designers through radical pedagogical experiments. The first part of the thesis approaches theories of critical pedagogy in an historical perspective, locating the emergence of these ideas in relation to transformative social action according to democratic principles of society. It then moves its focus to Paulo Freire and Ivan Illich, both working in Central and Latin America in the 1960s and 1970s. Illich's works on learning, education, and community practices are contextualized from an eco-ontological perspective, while Freire's "pedagogy of the oppressed" and notion of "conscientization" are analyzed for their influences on theories of knowledge. Subsequently, this part of the thesis describes ideas of

transversality, singularization, and social sustainability introduced by Félix Guattari, which nowadays are of particular relevance for artistic and design practices positioned at the intersection of research, knowledge production and processual creativity. This theoretical section is complemented by theories of decolonial pedagogy, a school of thought focused on the importance of subaltern and indigenous knowledges as well as of "body-politics" to foster processes of "knowing otherwise", an emancipation from the normalization of differences and simultaneous creation of new borders imposed by globalization. The following chapters broaden the investigation to art and design research, and look at how spaces for communal learning and cognitive communities are constituted and how knowledge can be grounded in action, performance, subjective auto-ethnographic accounts, and intersubjective exchanges that empower participants. Central to the thesis is a focus on interdisciplinary pedagogical experiments taking place at the intersection between art, design, and architecture in a selection of different geographical and historical frameworks, which have been chosen as case studies

for their profound investment in negotiating the complexities of modernity and its conflicting relation to the production of knowledge. The case studies considered share a will to relaunch contemporary and earlier theories questioning traditional forms of knowledge production such as those described above. For instance, in the experience of

Global Tools (1973–75), Illich's idea of "deschooling society" is perpetuated by groups and figures drawn from Italian Radical Architecture, Arte Povera, and conceptual art in a tentative attempt to found an alternative and dispersed educational program in the wake of the first global ecological crisis. Forty years later, the initiative of Campus in

Camps (2012–14), an alternative university in a refugee camp in the West Bank of Palestine, positioned at the junction of spatial and cognitive justice, critical pedagogy and critical theory, is paradigmatic for a broader theoretical investigation on the notion of "unlearning," a tool for creating counter-epistemologies with meaningful cultural impact on local communities. Furthermore, an overview of different southern and non-European artistic practices positioned at the intersection of knowledge production, emancipatory pedagogy and transversal institution making (such as the projects *The Silent University* by the Turkish artist Ahmet Ogüt, *La Ivan Illich* by the Puerto Rican collective Beta Local, and the filmic and performative practice of the Italian Libyan artist Adelita Husni-Bey, among others) sheds light on the question of how to deal with "other knowledges" without "subjectivating the 'other.'" The thesis reads the above-mentioned counter-design and art proposals as having critically challenged the hegemony of dominant disciplinary systems through a process of "epistemic disobedience", a strategy of civil disobedience within processes of construction of knowledge in order to envision social life, knowledge, and institutions differently.



Fig. 1 - Learning process in the frame of the cycle "Agri-Culture and Resistance", Campus in Camps, The Tree School, 2012. Courtesy Campus in Camps.



Fig. 2 - Groups Activity, Global Tools, First Bulletin, June 1974.

DESIGNING KNIT DESIGNERS. TEACHING TOOLS AND METHODS TO TRAIN PROFESSIONALS FOR THE KNITWEAR INDUSTRY

Martina Motta - Supervisor: Giovanni Maria Conti

Traditionally associated with craftsmanship, manual work, and a very practical knowledge belonging to the artistic approach that is often taken on fashion, knitwear could seem a quite unusual subject of investigation for scientific research.

To demonstrate its validity as an area of inquiry and to give it structure from an academic point of view, this study investigates knitwear as part of the industrial design culture, addressing it both as an industrial excellence placed halfway between tradition and technological innovation, and as a design discipline taught in design universities.

From an industrial standpoint, knitwear is a very interesting field to be addressed, as it is a fertile ground of new industrial and technological experimentation while being at the same time one of the most traditional sectors of Made in Italy. The complexity of a long and fragmented production chain made up of many different stakeholders, that with their expertise represent the strength of the sector, leads, however, to significant waste in terms of time, resources and materials leaving a low budget for the training of new designers and for knowledge transfer inside companies.

On the academic side, the growing correspondence of the disciplines

of fashion design with their respective specialized production areas creates an opportunity for knitwear to be addressed in this study from a designer-researcher perspective, and thus to be recognized not just as a simple variation on the more general theme of fashion, but as a discipline that deserves specific teaching tools and methods and a focused scientific research. In light of these premises, in an industrial scenario that is continuously renewing itself, it comes as increasingly urgent the need for higher education to understand how to train knit designers as new professionals, able to innovate on industrial products and processes, but also to keep the eye on the traditional work from where this industry originated, to act therefore in between tradition and innovation with cultural, creative, and technical skills along with competencies that are specific for the knitwear field.

To reach such a connection, the research aims to create a synergic system between the academic-didactic realities and the industrial territory, through the definition of a framework—set of tools, methods and practices—to teach knitwear design, combined with a set of guidelines for the direct involvement of companies into

teaching.

The study started from a theoretical background that addresses knitwear from four different perspectives. The first places knitwear design within the relatively new academic discourse ongoing in fashion design; the second frames it as an industrial sector among the excellences of the made in Italy brand, to understand how it integrates into the Italian fashion system and what are the specific traits of the sector. The third perspective analyses the educational system of industrial design in which this study is inserted, starting with the pillars that uphold industrial design disciplines, to then understand how these have been transferred from design to a fashion design education based on the industrial design culture rather than to the still common artistic perspective taken on the fashion world. The fourth gives an overview on what is known and established about the knit process, its stakeholders and the role of designers inside it: knit design emerges as a poorly explored research field but also as a complex creative and productive process with its own specific issues. The four areas defined the background of the entire study and set it inside the boundaries of the Italian industrial design culture, framing the Italian

territory as a privileged context for the experimental phases of the research.

Here, indeed, it has been possible to use educational activities as an experimental tool to build and define the exchange of knowledge between universities and companies, to address the specific needs of the knitwear industry and fill the existing gap of practical knowledge inside universities, with benefits on the one side for students, researchers, and professors, and the other for professionals, managers, and the business environment as a whole. A first set of eight experimental teaching activities, conducted at Politecnico di Milano between 2016 and 2017, enabled the building and the application of a *Knitwear Design Teaching Framework*. The methodological framework, based on the simplified design model given by Hertzum (2014), is made of three parallel thematic tracks, each of which contains the skills and knowledge that should be provided to KD students through lectures, practical lessons, tutorials and experiential learning.

Track 1 - Theoretical knowledge.

Composed by lectures on knitwear history and contemporary scenarios, materials, material engineering, management and supply chain, technical language, it makes the students understand the current situation.

Track 2 - Practical activities. It gives an overview on the technical and technological possibilities at students' disposal by learning hand-knitting, machine-knitting, shaping, finishings, programming of industrial machines.

Track 3 - Design process. It guides

students through all the phases of knitwear design, as launch of the brief, market research, brand positioning, target profiling, mood and concept, sketches and collection architecture, research on yarns, textures and colours, stitches and structures development, prototyping, final presentation. The experimental application of this framework showed how the three tracks impact on each other and the opportunity to model the teaching activity on times, contexts and participant's target. Moreover, the presence or absence of one or more stakeholders engaged in teaching highlighted the positive impact of this involvement on several areas of knowledge. With these premises, a second set of four experimental activities, conducted between 2017 and 2018, aimed to validate the framework and to improve good practices of collaborative teaching,

taking advantage of the variety of stakeholders throughout the knitwear chain. The intent was to codify new guidelines for collaborative teaching that go beyond the most common practices of sponsorships, traineeships, contests, and brief workshops.

The framework and the guidelines are designed as modular and combinable, to be used together in an integrated and mouldable teaching strategy. This strategy, depending on the request made by stakeholder/s, will enable professors and researchers to undertake activities of entrepreneurial nature, using teaching as a tool for assessment and choosing the most suitable methods and their application towards the desired result, while remaining in line with the students' backgrounds and the available time and facilities.

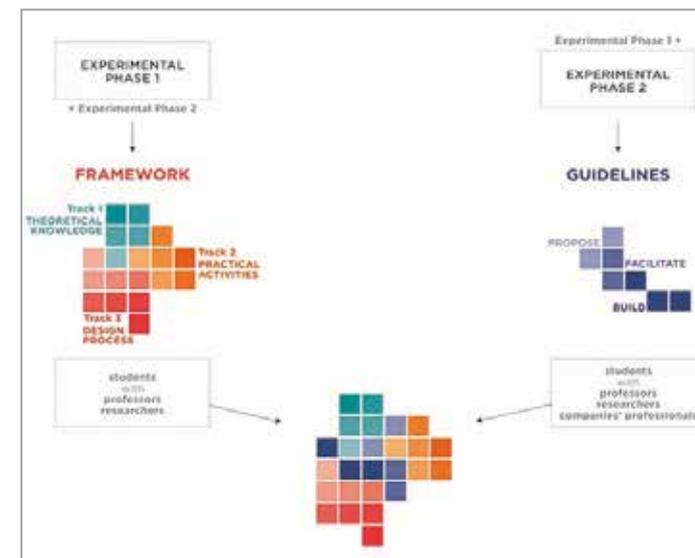


Fig. 1 - Visualization of the integration of the framework and the guidelines in a flexible strategy.

THE CONTRIBUTIONS OF SERVICE DESIGN FOR CAREER COUNSELLING SERVICE IMPROVEMENTS IN HIGHER EDUCATION INSTITUTIONS

Zichao Nie – Supervisor: Francesco Zurlo

The period of School-to-Work (STW) transition is a vital turning point in the career development and future life quality for the youths. This period has displayed that the significance of work values transforms across the STW transition time, and this period is a vital life event from standpoints of career development and developmental psychology.

However, this period is not “calm and peaceful” at all the times since students face the issues in campus life from the new surroundings and little known about the world of work. Therefore, the percentage of graduates think themselves ‘mismatched’ is continuously high and the demands to be a better understanding of why many graduates become mismatched, where they can be attained fittingly, and which work can prevent this. Under this context, Career interventions play a helpful role for confused students to act well in the STW transition, tackling the problems in the process of career development. However, the quality of CCS needs to be noticed. In the United States, university students have reported that one of their biggest demands is a good career service in university. It is increasingly clear that the existing problems are the lack of understanding student needs, being unaware of this service, the

absence of holistic personalized services, the need of integrating theory, practice and research and the limited resources in CCS raised.

According to the preliminary studies, this PhD research's aims generally are placed as building guidelines on the Career Counselling Service (CCS) improvements within higher education institution background based on service design perspective and providing the results of service improvements to universities where can reference it in order to better students' career path and future life (especially for the entering freshman class). Therefore, this is a literally research through design, which demonstrates to discover the design value in psychology field and to see how design research can benefit well-being services in university context. To be more specific, it is a research to explore the best solution (perspectives, approaches, or tools) within service design knowledge for campus CCS improvements, after negotiating the career construction and service design principles theoretically and investigating or verifying the assumptions based on perceptions and expectations from student perspective. Furthermore, this research is to disclose an implicit

link between design research and psychology research, building on a collaborative research with the vocational psychologist together to apply research methods in each field and triangulating the results from service design research through the results from vocational psychology research. After the research objectives recognized, a systematic review on the literatures of studying CCS in higher educations has been conducted. The results indicated that 21 academic papers can fit the aim of this literature review which studies career counselling programs from service research perspective of improving the quality of these services. The past studies showed that there is a gap of improving CCS in the university context through service design perspective, which means the research on CCS, so far, is lack of a holistic approach from design field. Besides, the evidences from existing literatures display the potential possibilities from service ecosystem design approach for exploring CCS improvements and creating a better solution for it. Thus, the primary motive of this research is to discover what are the contributions of service design for CCS, in order to reach a well-being or flourishing society. Furthermore, this research specifically is to study three

topics regarding how to improve practices for CCS through Service Ecosystem Design perspective, how to understand the relations between service design and psychology research, and how could build a guideline for CCS improvements in a different cultural context.

In order to understand how service ecosystem design can benefit the university CCS, there is a need of conducting an empirical research which aims to a collaborative research (design and psychology) in a cross-cultural context. The primary motivations of initiating this empirical research were to find out the contributions of service design for CCS in university. To be specific, the objectives of planning the research activities in this context were: 1) to investigate the service improvements from service design perspective; 2) to understand psychological correlations of career with students; 3) to discover the connections between service design research and vocational psychology; 4) to explore the similarities and differences of CCS in a cross-cultural context through service design logic. Up until this point, the mixed methods research was an appropriate answer to it, combining qualitative data and quantitative data. In this research, its strategy had been chosen

the Case Study as the qualitative methods and the Survey as the quantitative methods. Case study was a design of exploration as the first research strategy to investigate the two career centers (*the Southeast University* in China and *the Università degli Studi di Milano-Bicocca* in Italy) to explore what are the potentials of service improvements. The strategy of Case Study included Phase 1- unstructured interviews and documentation, Phase 2- semi-structured interview, and Phase 3- open-ended questionnaire. Then, the Survey research as the second research method contained Phase 4- quantitative questionnaire. With both theoretical and empirical explorations, the guidelines of campus CCS for first-year students through service ecosystem design perspective with considering institutional, social, economic, political and other relevant factors are emerged. It fills up the theoretical gap that no previous research studied career counselling service through service design angle of vision. Also, the research results demonstrate the value of service design in well-being field, which gives more evidence on service design for psychological health. For contributing to service design knowledge, it elaborates the service ecosystem design model

to open the design space for new forms of service innovation that go beyond the boundaries of the existing service approaches. Practically, based on the SED perspective, this study builds a service improvement guideline for the SEU and the Unimib respectively and summarizes the general CCS guideline for Higher Education Institutions according to the cross-cultural context. In the end, this research extends to more insights from collaborative research to make a common ground for both design research and psychology field, to provide a career intervention reference for students from other years, and to indicate the need of career service network which is combining core service components and the related career services together.

SPACES BETWEEN DESIGN AND ART. THE IMMERSIVE TECHNOLOGICAL EXPERIENCE

Maria Elena Soriero - Supervisor: Giuseppe Finessi

Co-supervisor: Elisa C. Cattaneo

The innate human tendency to go beyond the rational, beyond limits, in the constant search for *Absolute* and *Infinite*, manifests itself, in art, through experiments that exceed physical and cognitive boundaries. Places of imagination where physical and virtual reality blur and that take shape in spaces defined during the course of the research *Immersive*. The research constructs a path through the definitions of *Imaginative Space*, *Virtual*, *Virtual Reality*, *Immersive Space*,¹ *Immersive Technonatural Space*, and *Cyborg*, defining them and reinterpreting them as physical and/or mental spaces in which to experience a growing physical and/or mental involvement in alternate realities. During the investigation are examined their different possibilities of immersion through artistic experience. Along this path, the research develops and introduces a new and original theory, the *Immersive Technonatural Space*, as a new space of immersion, generated by the interference of the natural element, uncertain and uncontrollable, within a *Immersive Space*, virtual and artificial, and therefore determined and controlled.

1. This is a new definition and theory that will emerge from this PhD research.

This definition arises from observation, in the current artistic experiments, of an ever-increasing interference of the natural element within *Immersive Spaces* as traditionally defined. Using the definitions of *Imagination*, *Imaginative Space*, *Virtual*, *Virtual Reality* as its theoretical assumptions, from scientific literature of the sector, this research focuses on the areas of *Immersive Space* and *Technonature*. *Immersive Space* and *Technonature* highlight the human's desire to overcome the boundaries and limits of logic. For *Immersive Space*, the boundary is the physical and cognitive space that is to be surpassed in order to enter into an "other" reality, an imaginative one that brings to mind the dream experience, whereas for *Technonature*, the limit is inherent in the definition of Nature itself and overcoming it means creating a new idea of nature, an almost fantastical one that could recall *Borgés' Book of imaginary beings*. The research, by elaborating the definition of *Technonatural Immersive Space*, tries to broaden the concept of *immersion* identifying the potential of physical and psychic involvement in a reality that is at the same time

virtual, therefore controlled and defined, and natural, therefore free and indeterminate. Rereading the hybridization between *Immersive Space* and *Technonature*, the two research fields considered, the research also investigates the role of the human being within the immersive experience as a founding and active subject, until identifying *Cyborg* as the extreme point of this relationship and the latest emergence of *Immersive Technonatural Space*. The objective of this study is to identify, categorize, and name the spaces of immersion, highlighting their similarities and differences to formulate a new theoretical approach. *Grounded theory*, *cases studies* and *ethnography* were the alternating strategies used for the definition of *Imaginative space*, *Virtual*, *Virtual Space*, *Immersive Space*, *Technonature*, *Immersive Technonatural Space* and *Cyborg*. Through an inductive process of categorization and generalization of Art and Design's selected artworks, a path between the space of immersion is outlined, the new theory of *Immersive Technonatural Space* is defined, and the tools and guide-lines are defined. A transdisciplinary literature

review was the theoretical basis for identifying the research framework. Exhibitions, conferences and festivals², were the avant-garde realities to see the ongoing experiments. The collaboration with *NeonGolden Studio* in Wien, the course *Landscape design* held by prof. ssa E. C. Cattaneo at *Politecnico di Milano*, the *EMDL Research Group at Universität für Angewandte Kunst* in Wien, the course *Sound as source/Theoretical and practical strategies for embodiment* held by K. Salzmann at *Universität für Angewandte Kunst* in Wien were the practical experiences to support the theoretical framework. The search starts by highlighting the value of the *Imagination* and of the *Virtual* and their relative transfiguration in *Imaginative Space* and *Virtual Reality*. *Imaginative Space* is the space of the mind, independent from the limits of material reality and that presupposes an imaginative effort to enter into "other" worlds. The *Virtual* is part of the real, is what exists in power and not in action³ and its actualization produces the experience of *Virtual Reality*. *Virtual Reality*⁴ defined as an experience capable of self-authenticate itself, which legitimizes its existence through the suspension of belief in rational laws, opens the possibility of exploring the imaginary's worlds⁵.

2. In particular *Ars Elettronica festival* in Linz.

3. For *Virtual* see Lévy, P. (1997). *Il virtuale*. Milano: R. Cortina. p.6.

4. For *Virtual Reality* see: Diodato, R. (2005). *Estetica del virtuale*. Milano: Mondadori. p.15.

5. For *Virtual Reality* see: Diodato, R. (2005). *Estetica del virtuale*. Milano: Mondadori.

The definition of *Virtual Reality* introduces the term *immersion* that becomes fundamental to define the *Immersive Space*. The *Immersion* is an innate perception, instinctively recognizable and different from that of the real world and it causes both physical and psychological involvement in an "other" reality⁶. *Virtual Reality* in interaction with the *physical space* generates *Immersive Space*. The cognitive immersion of *Virtual Reality* is added to the physical immersion of the *physical space*.

Immersive Spaces, are the portals to access an "other" world in which the logics of the rational world are suspended, in which the physical and cognitive limits are overcome and the user enters consciously in another reality. *Immersive spaces* overcome the barriers of space, time and relations cause-effect. The user entering in it suspends his faith in rational laws to trust the new world. The natural beings that inhabit the new worlds are hybrids between nature and technology, the human body itself extends its limits, increasing its sensory capacities and perceptions.

Technonature, intended as an experimental modality of union, modification/integration, between the natural and the technological element, declares itself as a new possibility of Nature and *Cyborg* represents its extreme definition. The research proposes the new definition of *Immersive Technonatural Space*, born from

6. For *Immersion* see: Murray, J.H. (1997). *Hamlet on the Holodeck. The Future of Narrative in Cyberspace*. Cambridge, Mass. London: The MIT press. p.98.

the interference of *Immersive Space* and *Technonature*, as a new space in which the user can experiment an immersion in a reality that is at the same time Virtual and controlled, Natural and undetermined. The definition of *Immersive Technonatural Space* is constructed through its relationship with *Technonature*, with Space, with Time, with *Biofilic feeling* with Neural activation. Therefore, the *Immersive Technonatural Space* defines itself as an essential, perceptive/sensorial, tangible and sometimes changeable *Immersive Space*. In its extreme limit it becomes the *Cyborg's* immersive experience. The *Human-Cyborg* becomes the founding and active subject of the *Immersive Technonatural experience*. The *Immersive Technonatural experience* becomes possible without the physical experience of the space; it becomes a personal and reversible experience that can be activated through technology. The *Cyborg* is capable of infinite *Immersive Technonatural experiences*. The research oscillates between determined and undetermined, between *Physical reality* and *Virtual reality*, between Nature and Technology. It outlines a path between the spaces of immersion and tries to broaden the definition of *immersion*. *Immersive Technonatural Space*, defined in its conceptual and spatial categories, constructs a new field of research, in the realm of art, exportable, transdisciplinary, also in other scientific fields.

NOVEL DESIGN STRATEGIES FOR RAISING AWARENESS OF THE EASTERN MODERNIST ARCHITECTURE TOWARDS THE MAJOR AUDIENCE

Bogdan Stojanovic - Supervisor: Raffaella Trocchianesi

Co-supervisor: Davide Spallazzo

In order to initiate the necessary debate, on the design lines of action that should be implemented to stimulate greater awareness and attention of the wider public audience to the contemporary architectural heritage, and the enhancement of the urban realm, it is needed a greater meaningfulness of the values and the connotations of the past, present and possible future. Throughout the nowadays fluxes of virtual data and social links, we can reach any kind of information, but nevertheless the knowledge regarding the architectural heritage of the world cities is very limited, but the problem of its vulnerability due to the lack of understanding of its importance could lead to its destruction or inadequate use, as the knowledge regards just the most commercialized periods of the built design era. The research is trying to understand the novel design processes that are happening with the architecture of the XXth century (1945-1980) after the WWII, with particular attention on the eastern European dimension, and how it could be valorised towards the layperson audience.

We need to identify the problems, strategies and actions to implement, in sense of bringing the knowledge towards the wider

spectators in an innovative way, but without breaking the nexus with the physical dimension of the built architectural heritage. In the proposed work, the main idea is to understand what kind of novel strategies of valorisation could be used to make the wider audience more familiar with the social and cultural value of the "totalitarian" architecture that usually is not on the path of the traditional tourists. The first point regards the narrative infrastructure, needed to convey the story to the audience, by keeping its attention on the high level, giving us the possibility to embed the local intangible heritage value in each user and spread it throughout the narrative thematic paths (*film, art, sport, fashion, politics, war etc.*). The work explores the sensory, structural and cultural aspects of new urban systems and re-examination existing praxis complexities of what constitutes architectural

space in the real-time data environment. Consequently, there is the necessity to add more ingredients to the process in sense of making it spendable on the wider public audience. The *narration* and *on-site experience* will help us to create a tighter link with the user itself in the space, in a particular location and at a specific time. These paths of contemplation, with the *in-situ* experience, are needed mostly for an act of shifting the user interest from the professionals towards the ordinary users that should be implemented by the fragments of the narrative stories that are involving the audience and spreading the knowledge. The system of fragments should be created to narrate the memory and history through relations and customized paths for the non-expert audience. On the other hand, an important topic of investigation is regarding



Fig. 1

the habitual perception of the built environment, the issue that had been already introduced examines the problem of the view perception between a layperson and the architect, and the results are giving the huge difference in the attention and as well in the link towards the object itself. Comparison between laypersons and professionals reveals a huge difference in how they look at and perceive the world. Likewise, the process includes both top-down approaches of space making, as well as bottom-up ones of appropriation. Furthermore, there are several concepts that are also emerging by the investigation as *Situated Cognition Model* and *Space Physicality*. Consequently, the proposal is taking the socialist architecture as a rich heritage with a variety of typologically different elements able to provide different reactions to the contemporary inputs, where we are actually discovering new possibilities for connections between physical and virtual space, that begin to coexist and co-react. It is requested to determine the parameters of the buildings and their relations with the urbanized context in sense of creating the map of common and individual elements that should be considered during the process. Finally, the study considers

the mapping of the pilot site and creating a repertory of the buildings/areas to take into consideration for the valorisation process. The site is densely provided with the so-called "Architecture of the forced standards", in the capital city of Serbia-Belgrade. The New Belgrade area has been initiated after World War II, in a symbolic act to become the capital of a new country that was not been completed during the lifetime of Yugoslavia.

What is provided here is a redefinition of the design principles in the context of sustainable urban heritage and a novel understanding of how an extensive range of physical and cultural-historical characteristics (paradigmatic indicators) can be considered in a systematic way to provide which design principles and strategies are best suited to



Fig. 2

an existing urban issue. It should, however, be pointed out that further investigation will give a possibility to blur the borders between the ordinary user and contemporary architectural heritage, through as well the innovative use of technologies. The appropriation towards this kind of heritage should be done by cancelling the boundary throughout the non-invasive/soft strategies in sense of creating the metamorphic atmosphere of intermediation in perception of the so-called urban open-space "museum".



Fig. 3

FASHIONTECH: INTERACTION ACROSS BOUNDARIES. INTEGRATION PRACTICES FOR DESIGN-ENHANCED USER EXPERIENCES

Susanna Testa - Supervisor: Alba Cappellieri

In the course of history the fashion industry and technological advances have often influenced one another. This process of hybridisation has opened up new possibilities for fashion in terms of innovation, and has generated products and services with enhanced performances, whereas technological inventions have been given the chance to enter consumers' lives and bring innovation to them. The fashion system is nowadays entirely affected by technological progress, and the FashionTech sector, which originated in the interplay between fashion design and digital technologies, is a special disciplinary niche in the contemporary world, as it is marked by elements which are unprecedented in history in terms of revolutionary impact. Indeed, digital technologies have wholly pervaded the fashion system in its processes and products, have altered the DNA of traditional paradigms, and have changed the role of the actors involved. The interplay of various sectors is attracting a growing number of actors and businesses both from the fashion and the technology sector.

The present research focusses especially on the analysis of body equipment with embedded technology: «While the common

definition of the term garment is "an article of clothing," the original source is "garner," meaning 'to equip' (American Heritage® Dictionary of the English Language 2000). This original sense provides a space to expand our definition of garment beyond clothes, to include all items that provide some functional or communicative extension while being in close association to the body.»

The research explores the design process, and it investigates through testing how best to combine technology with fashion, and how the redefinition of their boundaries may enhance human experience.

Although great progress has been made in this field, and the boundary between fashion and technology has become increasingly blurred, the FashionTech sector, and the wearable technologies sub-branch in particular, is faced with a great challenge at the social, cultural, linguistic and methodological level. The collected data shows the slow growth which body equipment with embedded technology experienced at global level; between 2017 and 2018, moreover, a number of startup companies active in this sector have announced their withdrawal from the market.

The analysis presented here

suggests that the limitations of fashion-related technology products aimed at the consumer market are mainly due to the business models adopted by the relevant companies, which appear to struggle to manage all the various stages in the process, especially as far as designing and marketing are concerned. Despite widespread interest in this emerging topic, a structured hybrid methodology which could streamline the process, systematically favour dialogue, and harmonise the various approaches is still in its infancy. Since FashionTech developed out of a branch of the technology sector in which the drive behind innovation is mainly drawn from performance, it comes as no surprise that a methodology to tackle the issue in fashion design's perspective has only just started being developed. The fashion industry has still not been able to exploit the potential derived from technological innovation; the clues to this missed connection are mainly found in the products' aesthetics.

The purpose of the present dissertation is to identify the tools that are necessary to streamline the design process of body equipment with embedded technology. Said design process is initially tested within academic

training, and subsequently presented as a model approach for real practice.

This study endeavours first and foremost to summarise and provide a critical analysis of the state of the art on fashion innovation by making reference both to the relevant contemporary literature and to market analysis documentation. It especially focuses on FashionTech, the sector resulting from the interaction between fashion and digital technology, and it explores the role played by new technologies in creating interactive experiences for consumers.

The interaction afforded by body equipment both at the analogical and digital level is thus analysed and systematised, and the interaction generated by digital interfaces is also brought to the fore by highlighting its revolutionary characteristics. Indeed, products with embedded technology are interactive interfaces that are not completely defined, and can operate autonomously by adapting to the consumers' needs and desires. This work's theoretical research stresses the great opportunities made available by the new digital technologies embedded in products, especially as far as interaction and the generation of consumer experiences are concerned, as well as the widespread interest that pervades markets; on the other hand, it also emphasises their limitations and the open challenges deriving from methodological deficiencies. By using the identified limitations as premise, it then introduces some methodological tests on the

designing of body equipment with embedded technology, which have been carried out both in academic circles and on the market.

The outcome of these tests is presented as a methodological proposal and as guidelines for integration-based design. The research has experienced in different contexts the design process applied to FashionTech products, validating this approach in real practice and creating a bridge between academic studies on the subject and experiences in the reality of the market. It therefore proposes a guidelines for those who have just started familiarising themselves with body equipment with embedded technology which provides a systemic collection of updated case studies illustrating the best and worst practice, and which brings to the fore especially those elements capable of generating an added value for consumers; in addition to this, it also offers guidelines to support the design process. It includes a proposal on design methodology, a comparison of the various approaches to the project (whether tech-driven, design-driven, or transdisciplinary mixed), and discusses the pros and cons of each of them; it also supplies a framework to measure and evaluate the designed products' innovation impact on their specific sector of reference.

The whole research stresses the importance which integration has in FashionTech. In terms of products FashionTech has to combine fashion and technology, whereas in terms of processes it needs to bring together

science and creativity, diverse forms of knowledge and codes, professionals and actors, and cross-cutting skills that range from science to design and marketing. The need to have professional experts in economics who could provide insight into market trends has also been emphasised.

To this end this work vividly discussed the importance of cross-cutting approaches to the project. Involving the various actors in contexts of shared designing, especially during their university training, would help young designers to become more flexible and more open to dialogue in a perspective of shared objectives. During their training designers could develop the foundations necessary to appreciate the technical side of the development of the technology, hardware and software needed for the project; engineers, conversely, could get the chance to become acquainted with the creative process and the basics of design. These hybrid professionals will subsequently be able to mediate between other participating experts, and will guide them towards their shared project goal by ensuring that the tools necessary for knowledge transfer be supplied.

Surely the concept of hybrid figure and transversal competences is not a new concept, but what is new is the very integration between the fashion project and the scientific field. The case studies and experiences described highlight the need for a systematic and synergistic sharing of skills, languages and design methods for the sector.

INTERMEDIATE URBAN SPACE. DESIGN AND LIGHT ART AS CATALYSTS FOR CHANGE: PARTICIPATION BEYOND FRUITION

Isa Helena Tibúrcio - Supervisor: Giovanna Piccinno

The thesis identifies the possibilities of interaction between Design and Light Art to improve the participation of ordinary people in the creative process of urban ambiances and/or urban furniture.

Many interventions in the world transform the urban space without considering the opinions and needs of the people involved daily in the dynamics of the city. In practice, some well-intentioned and creative urban initiatives intervene, many times, negatively in the city, creating or accelerating gentrification processes. In this context, the issue of participation has gained importance in the areas of art, architecture, design, and the management of public or private spaces.

Design plays an important role in supporting the participation of the various actors interested in the restructuring processes of urban spaces. The weight and the degrees of participation attributed to the various parties involved are, however, very debatable. It would be interesting to think about participation throughout the design process, emphasizing the stages of conception and post-occupation of the intervention, for example. Another aspect is that the role held by the designer as facilitator can compromise or substitute the part played by

the designer as a creator and, here, there is a paradox. For this, it is necessary being in tune with the new challenges of the 21st century. One possibility is seeking references in initiatives that act on a micropolitical scale for the creation of environments connected with the daily micro-reality of users, as is the case of several examples found in the scope of Tactical Urbanism and Design for Social Innovation. Regarding light art, to which extent the experience of a participatory art with an element as fascinating as light could awaken in the ordinary people a greater desire for involvement in processes that change the urban space? Light art can be seen as a playful possibility to help the construction of this dialogue because of its immateriality, its illusory character, and its strong potential for communication. Moreover, the duality between simplicity and sophistication can encourage people to interact with technology and strengthen their feeling of belonging. This can bring a sense of "expertise" to ordinary people, and thus "authorize" (give the green light to) them to develop a creative work that they would not have previously imagined having the ability or opportunity to develop.

Thus, the purpose of this study

is to inspire the production of interventions in the urban space, which can, simultaneously, be closer to people's needs and offer aesthetic experiences to any kind of person. Several examples of Light Art show that light has the potential to activate the aesthetic experience of people in indoor or outdoor spaces. As the intention here is not only to reduce the solutions to primary needs, the idea of working with the potential represented by light is precisely to make room for the dream, for the unusual, for the invisible. While referencing Light Art, Tactical Urbanism, and Design for Social Innovation, the research methodology contributes to the discussion through case studies of interventions involving light; interviews with light artists; and a workshop with students of interior design. Different tools were utilized such as surveys, semi-structured interviews, informal conversations, direct observation and more.

The case studies are related to the relationship between light and participation in a number of contemporary art experiences. Three case studies were considered in the methodological approach of the thesis: *Metis Lighting lives in via Padova* (Metis Lighting + Padova Street is better than Milan), *Borderlight*

(*Borderlight/NonRiservato*) and *Green Light Workshop* (Studio Olafur Eliasson + TBA21). There are also collateral case studies involving participation experiences in instances of tactical urbanism and design for social innovation. Case studies tend to encourage more participation of ordinary people in the early stages of the process.

Regarding the interviews, one of the criteria for the interviews was choosing light artists, whose work evoked a strong visual fascination and offered the possibility of raising questions about potential forms of participation and interaction with the public. The interviews with five artists of light art were conceived in order to have a glimpse of the authors' willingness to include, among their inputs in the creative process, the contribution from viewers, and not just in terms of fruition of the works. The interviews indicate a sort of openness to people's participation, more related to interaction and fruition. The workshop, however, shows examples including such participation beyond fruition. This co-design activity, involving interior design students, light artists, and architects, proposed light interventions in some intermediate urban spaces (IUS) of Milan, aiming to make them attractive, exciting and usable spaces for the ordinary citizen, the user of the place. The intermediate urban space (IUS) is a part of the city fabric, a space that has the property of being *in-between* in relation to different and characterized urban areas and/or cultures. It is a physical or symbolic

entity, often associated with conflicted areas in the city, with *no places*, as well as a terrain for as of yet open experimentation. In the workshop, students had access to a large conceptual and technological repertoire relating to light art, as well as contact with three artists chosen from the previous interviewees, and their respective works. The activity was developed in four phases over one week and ended with an exhibition of the proposals (one per group of students) assembled in mock-ups (fig. 1). The IUSs chosen by students were varied, rich and exceeded initial expectations. This may be due to choices that were real and corresponded to the students' daily experiences. The main contribution of this research is to shift the focus of the participation of ordinary people to the beginning of the design process, "the ideation or conception phase of the design process". By the ideation phase of the design process, this study refers to the creative

stages usually occurring at the beginning of the design process, and which can decisively influence the final result, be it a product, service or urban intervention. Another contribution is to present and discuss the concept of "intermediate urban space", and its strong not only physical but symbolic dimension.

Considering the complexity involving the engagement of ordinary people in the design process, the choice of light as the central element of intervention can give potential to efforts aimed at activating the urban space, encouraging a more inclusive experience in the city. Here, light is a metaphor for the intermediate urban space, that space that is within the scope of the symbolic and of all the possibilities of bridges and connections that it entails.



Fig. 1 - Workshop process: phase 3 (Source: Author's Archive, 2017)

DESIGN AS ENABLING AGENT DESIGN CULTURE AND NON-DESIGNERS IN THE CHANGING ROLE OF DISCIPLINES

Rūta Valušytė - Supervisor: Alessandro Biamonti

The research aims to deepen an emerging field of study on design within an interdisciplinary perspective. Specifically, the research focuses on design culture – **D-culture** and its strategic role in social innovation within the disciplinary changes.

The network society and accelerating AI have changed the ways things work. In order to keep up with innovation and ‘survive’ this change, the academy is forced to dissolve disciplinary boundaries, while traditional professions are forced to rethink their roles. The world is in transition, characterized by the continuous need of re-definition of skills and ways of thinking. It is argued that design-related skill-sets are -inter -anti disciplinary and the most relevant for dealing with complexity and rapid change. Three such skill-sets are associated to design: (1) **‘Design Thinking’** skills; (2) **‘Thinking Wrong’** personal qualities; (3) **‘Future Thinking Principles’**, all together in this research labeled as **‘Future Personal Characteristics’ – FPC’s**. According to the statements in literature, **Community-based Projects on D- culture** can play a significant role in transferring the capital of designers to **broad society – non-designers**, while **experience** is recognized as one of the most effective ways

in developing abilities and skills. It might be that **D-culture experience** generated within Community-based Projects on D-culture could influence the improvement of FPC’s among non-designers. However it is not explored either the D-culture experience really influence non-designers to improve FPC’s development and how.

This research investigates the primary assumption that **D-culture experience can influence non-designers in developing FPC’s**. The development of FPC’s might be challenging among non-designers and within unrelated to design environments (non-design environments). FPC’s are the main unit of analysis of this research, while the research domain is non-designers, and **non-design environments** is the main setting for research activities.

During this research, an action research Community-based Project on D-culture - **DLK Project** is implemented within a chosen non-design environment, aiming to generate D-culture experience among non-designers. Qualitative and quantitative research methods are applied in order to find out how D-culture experience influence non-designers in improving FPC’s, which FPC’s are most influenced,

and what relation is present between D-culture experience and improvement of FPC’s among non-designers. **The research findings demonstrate that most FPC’s tend to be influenced positively by D-culture experience – some of them demonstrate a highly significant change.** The findings can be presented to authorities, universities, and organizations within non-designer environments in order to stimulate the social impact of D-culture on non-designers locally. The research contributes to: Individuate, define and characterize the purpose and effects of D- culture within non-designer environments (countries, organizations), provide theoretical insights, reveal new research and Project opportunities, which could help to enhance a more heuristic and diffuse comprehension of D-culture impact on today’s societies and the role in development of the future ones.

INTERNATIONALIZING THE CURRICULUM OF FASHION DESIGN

NURTURING INTERNATIONALIZED TALENTS

Xiaozhu Lin - Supervisor: Arturo Dell'Acqua Bellavitis

Globalization has created a new norm that affects all aspects of our daily lives. We may have noticed that the fashion industry in our time has not only become more global but also more knowledge-based. The new realities and shifts in the job market have fundamentally changed our fashion education system. With an increasingly diverse student body, universities are requested to rethink their long-standing philosophies towards the emerging paradigm. There has been much discussion about ways in which more advanced systems can support the development of fashion education internationalization where there is an urgent need to nurture internationalized talents. Hence, with this study, the researcher intends to explore the operationalization practice of curriculum internationalization within and across the discipline of fashion design, while at the same time identifying potentially effective strategies to internationalize the fashion design curriculum. By applying the defined theory of curriculum internationalization and translating it into new practices, demonstrating the connection between the theory of implementation and the reality of implementation practice. The

researcher hopes that the positive and practical results of this study might offer a valuable reference point and inspire other educators from different backgrounds to better explore the theory and practice related to curriculum internationalization in the future.

Over the past 25 years, internationalization has become a priority for both universities and governments. In the Bologna Declaration of 1999, two demands of internationalization were brought forward: 'cooperation and competition.' However, the definition of these two intertwined dimensions brought about confusion and misconceptions about what, why, and how to internationalize global education. As many scholars claim, one big challenge for internationalization of higher education depends on its core concept of 'curriculum.' As a crucial concept, curriculum internationalization is poorly understood and developed in practice across disciplines. Since the understandings of curriculum internationalization vary in different disciplines, there have been a number of practical and methodical inquiries into the relationship between curriculum internationalization and academic disciplines, circumstances regarding the discipline of

fashion design are even fewer. With this study, the researcher intends to explore the effective operationalization practice of curriculum internationalization within and across the discipline of fashion design. By carrying out this study in such a disciplinary context, it provides us with valuable insight and possible ways forward for developing internationalized curricula in different contexts.

As the objectives of the study had not been previously studied comprehensively, the researcher decided to adopt an instrumental case study as the leading research strategy. One particular case is adopted as an instance to shed light on the study's questions. The structure of this study comprises means methods of data collection, which lead to a triangulation of methods for the analysis. Since a single method can hardly shed light on a complex phenomenon, adopting multiple methods can help researchers develop a comprehensive understanding of the internationalized fashion design curriculum. During the practical implementation, by integrating the defined theory, the researcher applied the designed research strategy and methods, translated them into new practice accordingly

to the target participants within a specific setting. In this study, the practical side was carried out in three developmental phases. Every phase refers to major time segments that span the cycle of a curriculum internationalization process from start to finish. Each phase includes sub-phases, which could be adjusted and 'customized' to merge, to expand, to overlap, to interchange, in order to better adapt and reflect the specific implementation area of the process of internationalization of the curriculum. The key point of every phase is summarized as follows.

Key point I: Avoid overstating or understating the extent of the program, a thorough investigation of the participants is crucial to balance the long-term goals with short-term achievements, the support from intermediate facilitators is indispensable. For any process of curriculum design, from the very beginning, it is essential to clarify the program goals and objectives. It is fundamental to discuss with internal teams and negotiate with external partners to make sure that these are the same goals that both sides aim to achieve. During this phase, the support from intermediate facilitators is indispensable. Expert intermediate facilitators are able to interpret the implicit message of contexts, encouraging meaningful intercultural and interdisciplinary dialogues.

Key point II: To consistently explore the boundaries between the dominant and emerging

paradigms within the discipline, an appropriately differentiated curriculum is effective and beneficial, the establishment of a safe learning space is essential. This phase is considered essential and integral, as it challenged the mechanism hitherto taken for granted, and demands a broaden engagement in constructing the curriculum. The globalization phenomenon has had a significant impact on traditional teaching methods. With students coming from the different cultural and institutional backgrounds, it is challenging to have them together in the same class and teach them with predetermined methods. The curriculum developers suggested during the interviews that one solution is teamwork so that students can learn from each other. Another option is doing personalized curricula, which could help integrate students' disciplinary knowledge and competencies.

Key point III: For ensuring the cyclicity of the process, the multilateral engagement is critical to diminishing the operational gaps: honest feedback and conversations are fundamental. The curriculum structure should be seen as a whole rather than in its isolated parts, the evaluation of the achievements of the outgoing cycle and improvements of the incoming cycle should be discussed and negotiated together by all the participating members. To have an honest dialogue with participating members throughout the program is fundamental. Their genuine feedback can help to stimulate the further improvement

and development of the process. By reflecting on the feedback collected, the sub-phases of the process and the methods adopted during the implementation practice could be adjusted accordingly, in order to ensure the effectiveness of the designed curriculum.

The internationalization of the curriculum is an indispensable part of the higher education internationalization process. Even though much has been achieved in understanding the concept, there is still much more to be done. There is relatively little research and just as little practice regarding the operationalization of curriculum internationalization in disciplines, even less so in fashion design. With this study, the researcher explored the operational practice of internationalization of the curriculum within the discipline of fashion design, with possible improvements and adjustments proposed and to be implemented in the future. This study brings new knowledge and insights to the existed theoretical frameworks. Contributions are made to both the program participants, and the fellow researchers who intend to develop similar works. The researcher hopes that this study might offer a solid basis and reference point for relative future works.