S+S
Dialogues on the relationship between Spatial Design and Service Design

disclosing the fundamentals for a transdisciplinary approach

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ABSTRACT

The central topic of this research is to identify dialogues on the relationship between Spatial Design (SpD) and Service Design (SD), 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.

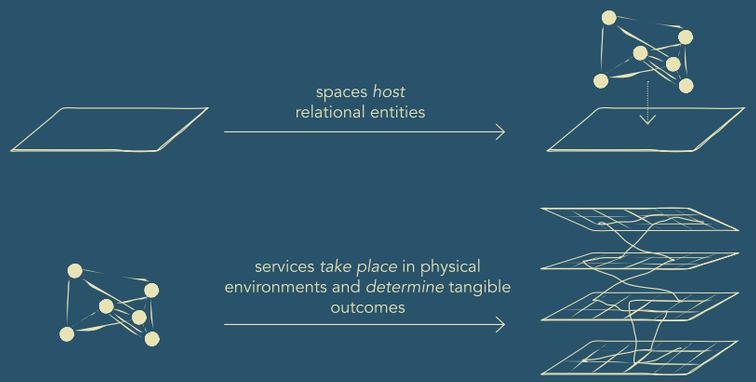


Fig. 1 – Diagram by the author.

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 SpD and SD, meaning disclosing the fundamentals of an S+S design to reconsider the tangibility and intangibility of SD 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 SD and SpD and to focus on an approach going beyond the boundaries of the two disciplines. This taxonomy represents the first attempt to synthetize 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.

ABSTRACT

La ricerca di dottorato è focalizzata sull'individuazione di possibili dialoghi tra il Design degli Spazi e il Design dei Servizi, volti a esplorare le relazioni e le implicazioni disciplinari di un'analisi teorica di aree specifiche del panorama della ricerca nel design. L'obiettivo è avviare un primo approccio definito come Design degli Spazi + Servizi (S+S): la tesi di dottorato vuole essere un atto fondativo in questa direzione.
Il tema è stato studiato nell'ambito della cultura del progetto, con lo scopo di fornire un primo contributo di analisi transdisciplinare per espandere un punto di vista inesplorato sul Design dei Servizi, quello del Design degli Spazi.

Le innovazioni dei servizi ridefiniscono l'esperienza spaziale.
Gli spazi fanno parte del sistema-servizio da progettare.

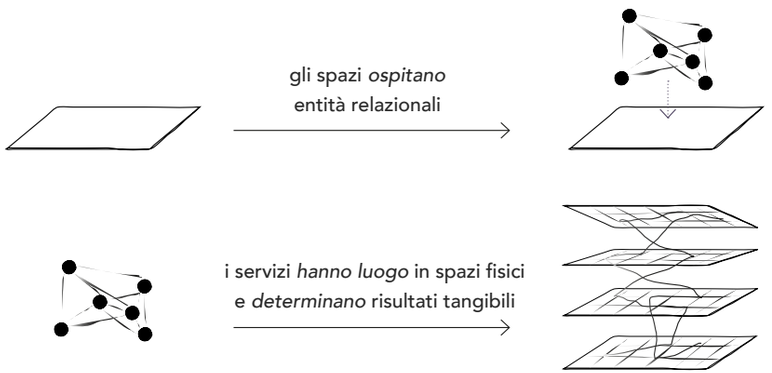


Fig. 1 – Schema dell'autore.

Queste affermazioni iniziali rappresentano il nucleo della ricerca svolta e affrontano l'importante lacuna nel modo in cui spazi e servizi sono correlati dal punto di vista del design. La ricerca nasce, infatti, dalla percezione che i servizi contribuiscono attivamente alla definizione e all'identificazione di un luogo: il Design degli Spazi incontra il Design dei Servizi nell'urbanistica e nella progettazione degli spazi di lavoro, degli spazi commerciali, degli interni privati, dei servizi pubblici e delle infrastrutture. In questi contesti, gli spazi *ospitano* entità relazionali e, viceversa, i servizi *si svolgono* e *hanno luogo* in ambienti fisici, determinando risultati tangibili. Tuttavia, nonostante l'importanza strategica del tema, dimostrata dalle sperimentazioni S+S in corsi universitari e nella pratica professionale, l'assenza di una cultura coordinata del progetto e la mancanza di uno sviluppo teorico nella ricerca in design non è trascurabile.

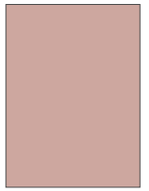
L'obiettivo è quindi quello di identificare un terreno comune alle due discipline, al fine di esplorare aree di differenziazione e di incontro: queste aree sono i *Dialoghi* identificati. Questi hanno lo scopo di creare *strutture di supporto* tra Design degli Spazi e Design dei Servizi, ovvero esplorare i *fondamenti* di una progettazione S+S per riconsiderare la tangibilità e l'intangibilità del Design dei Servizi attraverso una prospettiva spaziale. A questo scopo, la ricerca tenta di proporre una tassonomia di questa relazione, definita *Qualitative Comparison*, volta a dare l'avvio a una riflessione su un possibile approccio transdisciplinare S+S, in grado cioè di superare i confini tra le due discipline. Questa tassonomia rappresenta il primo tentativo di sintetizzare le lacune identificate tra le due discipline e ha contribuito a costruire e sperimentare metodi e strumenti in diverse esperienze dirette, quali progetti di ricerca e sperimentazioni didattiche qui presentate. La sperimentazione di processi di progettazione S+S ha il fine di far emergere le criticità utili a uno sviluppo ulteriore della ricerca dopo il percorso di dottorato.

Con un approccio S+S, le componenti del Design dei Servizi possono influenzare la realtà materiale dei servizi, mentre le componenti del Design degli Spazi possono incorporare il consolidato discorso metodologico dell'human-centred design nel suo sviluppo teorico, evitando che la progettazione degli spazi sia solo una mera cornice per il servizio ospitato. La *tassonomia* proposta tenta di delineare i principi per la fondazione di un approccio S+S attraverso un modello interpretativo astratto e più ampio per iniziare a considerare il contributo del Design degli Spazi al Design dei Servizi.

INDEX

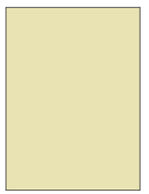
READING GUIDE

SEPARATION BETWEEN
PARTS AND CHAPTERS OF THE THESIS

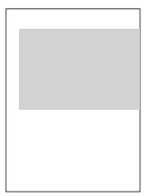


RELEVANT CONTENTS
(e.g. INSIGHTS AND FINDINGS)

REFERENCE CONTENTS OR DESCRIPTIONS
OF SUPPORTING CASES AND CASE STUDIES



SECONDARY INFORMATIONS OR NOTES
THROUGHOUT THE TEXT



0.

INTRODUCTION

0.1 The context of the doctoral research

The main starting point of the thesis topic found its origin within the research activities run by and within my research team, the Polimi Desis Lab.[1] Several direct experiences in research projects and in educational activities(1) were analysed as study cases, in parallel with the examination of the existing literature and the interviews with experts with both academic-based and practice-based profiles. The test environments analysed before and during the doctoral activity identified a lack of a specific literature review in this topic, highlighting the absence of supportive structures that the thesis attempt to start framing. I have been involved in field experimentations in the urban context of Milan, applying participatory processes and co-design tools based on community-centred design. These activities involved students, researchers, and citizens organized in informal groups or local organizations. The team realized that the process of designing spaces to host activities with and for people could be greatly improved by the use of Service Design's tools and approaches. In fact, when the uses change so does the discipline: while changes are happening in practice, a theoretical discussion has been lagging behind. This awareness emerged mainly through the development of the research projects listed below:

- "Coltivando" (2011-ongoing), the convivial garden at the Politecnico di Milano Bovisa campus; [2] a collaborative project where the competences of both spatial and product-service system designers converged. It has been developed by a team of postgraduate students, supervised by researchers and teachers, and co-designed with the local neighbourhood;
- "CampUS research project (2014-16), a funded interdisciplinary research project developed by the Design Department together with the Department of Architecture and Urban Studies (DAStU) and the Department of Management, Economics and Industrial Engineering (DIG) at the Politecnico di Milano. The project's main goal has been to use the university campus as an incubator for social practices to be developed through design skills and to be transferred into the neighbourhood as independent actions; [3]
- "Human Cities – Challenging the city scale" research project (2014-18), co-¬funded by the "Creative Europe" Programme (Category 2 –large scale cooperation projects) of the European Union that explores the way in which the inhabitants reinvent the constant evolution of a contemporary city through experiments in an urban space; [4]
- Educational activities applied in real context within courses run at the School of Design, Politecnico di Milano, especially focused on temporary solutions for underserved urban areas or for establishing connections and relationships among different categories of citizens in an area of the city where a new renovation is causing a new identity to replace the old one.

In the last three years, I have focused on investigating and strengthening the theoretical implications in design research and in design education in the field of S+S and, therefore, the main context of my research and investigation is academic and the main methodologies applied, grounded theory and participatory action research, have been also part of the process at a meta-level, as illustrated in the Methodology.

The research reported in this thesis provides an examination of how SD and its peculiar focus on interactions influences the shaping of spaces, and three areas of research in particular are described:

- investigations into the nature of SD as a field and as a discipline;
- investigations into the nature of SpD as a field and as a discipline;
- investigations into Design Education processes within experiential learning through social innovation and sustainability topics.

This process is based on:

- observation and collaboration throughout the ongoing research activities mentioned;

[1] www.desis.polimi.it
A research team of the Design Department of Politecnico di Milano, which is part of the worldwide DESIS Network (Design for Social Innovation and Sustainability, www.desisnetwork.org) with Design Labs based in more than forty international design schools and design-oriented universities. The Lab involves a group of researchers adopting a strategic and systemic approach to design, particularly focused on design for service and spatial design, alongside contributions from strategic design, user-centred-design, design for territory, communication, economics, planning and sociology.

[2] coltivando.polimi.it
Cf. Fassi, D., Meroni, A., & Simeone, G. (2013). Design for Social Innovation as a form of Design Activism: An action format. ***In Social Frontiers: The Next Edge of Social Innovation Research" Conference Proceedings*** (pp. 14–15).

[3] progettocampus.polimi.it
Cf.: Fassi, D., Galluzzo, L., & De Rosa, A. (2016). CampUS: co-designing spaces for urban agriculture with local communities. ***PAD Journal - Pages on Arts and Design, 13 (Design for Territories)***, 254–278.

[4] humancities.eu
The project is now led by Cité du Design Saint-Etienne, with twelve partners from eleven European cities acting as a multidisciplinary network: Politecnico di Milano, Milan, Italy; Urban Planning Institute of the Republic of Slovenia, Ljubljana; Clear Village, London, United Kingdom; Zamek Cieszyn, Poland; Design Week Belgrade, Serbia; Pro Materia, Brussels, Belgium; Aalto University, Helsinki, Finland; FH Joanneum, Graz, Austria; Association of Estonian designers, Tallinn, Estonia; Bilbao Ekintza, Bilbao, Spain; CultureLab, Brussels, Belgium.

• specific experimentations in three different academic contexts: at the Design Faculty of Ljubljana, Slovenia, the Universidade Federal do Rio de Janeiro, Brazil, and Tongji University in Shanghai, China;
• interviews with academics and experts with a project-based profile: at the Royal College of Art of London, UK, at the ESDI – UERJ Escola Superior de Desenho Industrial of the Universidade do Estado do Rio de Janeiro, and at the PUC-Rio Pontifícia Universidade Católica do Rio de Janeiro, Brazil.

(1) Field experimentation has been disseminated in the following books and papers:
- De Rosa, A. (2017). Unconventional spaces for art and design: enabling community synergy. A methodological approach. In B. Camocini & D. Fassi (Eds.), ***In the neighbourhood. Spatial Design and Urban Activation*** (pp. 103–121). Milan: Franco Angeli.

- Fassi, D., Rebaglio, A., & De Rosa, A. (2017). Designing a cultural event as an inclusive educational activity. In ***Issue of The Design Journal. Design for next. Proceedings of the 12th European Academy of Design Conference.*** (Vol. 20, pp. S988–S999). Taylor & Francis Group.

- Calvo, M., & De Rosa, A. (2017). Design for social sustainability. A reflection on the role of the physical realm in facilitating community co-design. In ***Issue of The Design Journal. Design for next. Proceedings of the 12th European Academy of Design Conference.*** (Vol. 20, pp. S1705–S1724). Taylor & Francis Group.

- Galluzzo, L., & De Rosa, A. (2017). How educational processes and social entrepreneurship can support an urban regeneration in Milan. In ***Proceedings of the 4th International Scientific Conference A.L.I.C.E. 2016, GoingGreenGlobal International Design Week, Sustainable Design Paradigms*** (pp. 72–77). Trzin: Faculty of Design, an independent higher education institute, Associated member of the University of Primorska.

- Fassi, D., Galluzzo, L., & De Rosa, A. (2016). CampUS: How the Co-design Approach Can Support the Social Innovation in Urban Context. In ***Advances in Design for Inclusion*** (pp. 609–621). Springer.

0.2 The problem area

The literature review revealed that this topic has not previously been explored, even if many publications have explored the interdisciplinary nature of SD. For example, in their textbook on service design thinking, Stickdorn and Schneider (2011) explore the basics, tools and cases within the discipline and, specifically, its relationships with product, graphic, interaction, strategic, social, management and ethnographic designs. Spatial and environmental components are often underlying and cited,[5] but never explicitly researched. Furthermore, and most importantly, there is an implicit and frequent misunderstanding when speaking about the spatial component since the word *space* prompts deeper questioning:

What is the meaning of and the differences between "space", "place" and "environment"?
Does "space" only consider the physical dimension or also the digital one?

This broad questioning around the more philosophical and etymological sense opens the door to disciplinary discourse when considering the names of design faculties, which will need further analysis:

spatial design – interior design – interior architecture – environmental design – furniture design

[5] "[…] although services are intangible, they take place in a physical environment, using physical artefacts and do, in most instances, generate some form of physical outcome. Subconsciously, customers perceive this environment with all their senses. We see, hear, smell, touch, and taste the physical manifestation of services" (Stickdorn, Schneider, Andrews & Lawrence, 2011, p. 44).

In the last twenty years, SD has become more and more defined: building its specific approaches and methods (Penin, 2018), (Stickdorn, Hormess, Lawrence, & Schneider, 2018), (Holmlid, 2012), (Sangiorgi & Pacenti, 2010), (Kimbell, 2009), (Morelli, 2002), (E. Manzini, 1993); understanding its boundaries and mutual connections with other disciplines (Stickdorn, Schneider, Andrews, & Lawrence, 2011), (Boland Jr, Collopy, Lyytinen, & Yoo, 2008), (Holmlid & Evenson, 2008), (Holmlid, 2009), (i.e. management, marketing innovation, service science, social/behavioural science, computing and engineering, industrial design, etc.); and being itself an already structured methodology, rich in sets of tools, within the design thinking process. Furthermore, SD received contributions in its definition from those disciplines, as well as from the design tradition, where it has been explored in the branches of strategic design, design for sustainability and interaction design. It is important to clarify that this research is based on a design background: where it concerns the discipline of SD, the research refers to the design stream of the broader field of service science, where design thinking has been integrated into service practices, processes and systems: "service design is concerned with systematically applying design methods and principles to the design of services" (Holmlid & Evenson, 2008, p. 341). In fact, service science in turn built its origins on different streams (Mager, 2008), being an interdisciplinary area of research of its own right. The "spatial" component has been implied within theories and practices when exploring services with physical evidence, but without an in-depth analysis of a direct dialogue with SpD: between the scientific communities involved, and the languages, theories and methods linking them. There is a lack of research on the languages, theories and methods linking them.
These observations basically imply possible new scenarios to design the unfolding of services in physical spaces and open the exploration into this gap of knowledge, that encounters the transformational positioning of the research in design towards contextual design (Lave, Wenger, & Wenger, 1991), (Aranda Jan, Jagtap, & Moultrie, 2016), situativity theory (Greeno & Moore, 1993) and participatory actions research approaches (Star & Ruhleder, 1996), (Carr & Kemmis, 2003), (Björgvinsson, Ehn, & Hillgren, 2010), in a panorama characterized by the alignment and interdependency of local and global processes (Sassen, 2004), the impact of collaborative models on the regulatory system (Botsman & Rogers, 2011), (Baldwin & Von Hippel, 2011), (Jégou & Manzini, 2008) and the sequential shifts towards multidisciplinarity, crossdisciplinarity and transdisciplinarity in design research, practice and education (Muratovski, 2010).

0.3 Overview on the state of the art

As stated in the abstract, the strategic importance of the research theme is demonstrated by S+S experimentations in design university courses and in the design professional practice.

Examples of design university courses are:
• the programme in "Interior & Service Design" at the Thomas More University College in Mechelen, Belgium for undergraduates at their final year of the Bachelor and for post-graduates for specialisation, where "graduates are equipped with the knowledge and skills needed to design objects, furniture and spaces in order to support socially oriented design projects, developing their knowledge of user-centred experiences, service contexts and research for design"; [6]
• the Master programme in Product and Spatial Design at the Aalto University School of Arts, Design and Architecture; in 2015, a call for lecturer in Spatial and Service Design was launched by the Design Department but unfortunately the position as well as the master programme no longer exists. [7] At the Aalto School of Architecture, a research project ("School as a Service") is ongoing, which connects Service Design with an architectural approach close to urbanism; in fact, the project is exploring the service nature in the offer delivered more than

[6] thomasmore.be

[7] It has been replaced by "The Contemporary Design Programme": "it enables designers to nurture an artistic mindset in a multidisciplinary environment that fuels design innovations as well as personal and business engagements. In the program design is understood in a broad sense including experimental and conceptual works from the spheres of critical and speculative design, experimental design, contemporary craft and product design." into.aalto.fi/

in the process development, and the architectural approach is far from the spatial one previously visible;
• the programme of Environmental Design at Tongji University in Shanghai where, due to the double master degree programme PoliTong,[8] specifically with the PSSD classes of the Politecnico di Milano School of Design, approaches and tools of SD have been applied.

It is difficult to find cases where the SpD and SD components are threated on the same level in design projects and in projects in general, and, thus, it is not evident to find supporting cases to proof a seamless interdependency of the two disciplinary contexts. However, in the design professional practice the need to test innovative processes for the development of design ideas and projects is emerging when the service and the spatial components meet. This is the case, for example, of:

• Studio Tilt (studiotilt.com) in London, specialised on "breaking down the complexities of designing working environments for future-focused organisations […] through the process of defining new workspaces with coherent narratives and identities to support creative behaviour". [9] Their approach started from the basic research question "What role does space play?", trying to isolate critical elements throughout their research and practice;
• Frog Design international consultancy (frogdesign.com), with offices in Europe, USA and Asia, has applied SD methods and tools for the development of private and public services and their spaces;
• DINN! (http://www.dinndesign.com), a consultancy working on design innovation and based in Milan and Singapore. They conceive international high-end value projects envisioning brand touchpoints and experiences through branding, service design, interior & architectural design, digital touchpoints. In an interview to the Senior Strategist Giuditta Sartori, [10] she stated that:

> *"our projects are always <<phygital>>. That's why the service component cannot be distinguished from the space. The service needs to come to life within the space, using supports and channels. At the same time, the space is enhanced and amplified through the service"*

• Experientia (experientia.com), an international experience design consultancy. They design product and service strategies with expertise in UX and behavioural insights for design solutions. In an interview to the founding partner and Creative Director Jan Christoph Zoels, he stated that they

> *"do not focus on the materials of spaces but on the behaviours occurring within a space in order to understand how a service works. Service Designers need to be better practitioners and performers; and Interior Designers need to be better thinkers and position themselves more strategically" .*

Many other professionals are touching this research area in different ways, such as Studio Wè in Toronto, DGI in Milan and New York, INNOArchitects in Bern, NONE Collective in Rome, PACO Collaborative in Milan, etc.
It is evident that this is an issue where architecture, experience design and behavioural studies are also involved. [11]

These domains will not be part of this research; however, to conclude this initial overview, it is interesting to mention one of the trends presented this year by Fjord, one of the most influential design and innovation consultancy, in its Fjord Trends 2018:

Physical fights back

> ***"Digital is no longer the centrepiece of brand experience. Emphasis is shifting onto how best to use it as an invisible enabler of physical and sensory experiences. As interactions with users evolve from periodic engagements via a screen to consistent, connected experiences, organizations must create new services that are deeply integrated in the physical world. From Airbnb to Amazon, Deliveroo & Alibaba, a growing number of primarily digital brands are now placing greater emphasis on physical presence while making the most of digital & data to improve experience. We will no longer be able to delineate between digital and physical design — they will be one and the same. This will have huge implications for brands and organizations — both in terms of how their teams are structured, and how they develop products, services and experiences. The future of service design is about blending physical and digital, and already, design specialists are responding.***
>
> ***Organizations must put in place new systems, structures and strategies to optimize physical experiences."***
>
> *(www.trends18.fjordnet.com)*

[8] Double Degree with Tongji University in Shanghai for MSc Design students in Product-Service System Design, Interior and Spatial Design, Integrated Product Design, Communication Design and Digital and Interaction Design. design.polimi.it/en/international-area

[9] Groves, K., & Marlow, O. (2016). ***Spaces for innovation: The design and science of inspiring environments.*** Frame Publishers.

[10] Interview run in October 2018 by Gea Sasso, former master student of the MSc in Product-Service System Design of Politecnico di Milano. I have been Co-supervisor for her master thesis "S+S – Framing the relationship between Spatial and Service design disciplines. An explored intersection through the analysis of their process and tools" (2018).

[11] Ibid.

0.4 Objectives and main steps

The research aim is to define the fundamentals of S+S design by proposing a taxonomy of this relationship. The taxonomy is shaped as a *Qualitative Comparison* for an S+S transdisciplinary approach that synthetize the gaps identified between the two disciplines through the Dialogues, exploring the evolution of the design process as an adaptive dynamic system, the narrative dimension of the design process and the human system of interactions.
They explore a wide range of theories and aspects of the design discipline: the overall research, in fact, has not being focused in a deep understanding of a specific research area, but remains on an upper level of research. This approach was necessary since the thesis is a foundational act towards transdisciplinarity between SpD and SD and the Dialogues act as converging factors in that direction, focused on a mutual and reciprocal theorizing across the disciplines. The research, in fact, doesn't look for an overlapping of the two disciplines, but it attempts to frame a transdisciplinary approach and exploring alternative future developments towards the cooperation among disciplines. Researching the fundamentals of Service+Spatial Design means defining supportive structures to design with an S+S viewpoint, then defining principles and guidelines to the approach and to design by testing models in design education. These experimentations on a S+S design process served as case studies to let emerge criticalities and critiques for future development after this doctoral path. The experimentations were an important field test to gain insights together with the theoretical reflections, and they act as a first step of a longer research that will continue after this doctoral dissertation, whose main contribution is to establish the fundamentals of the proposed S+S viewpoint. Considering the disciplinary level of analysis of SpD and SD, and the fact that the experimentations were a parallel test field for the ongoing theoretical reflections along the doctoral path, these lasts as to be considered more as a supporting process than a scientific endorsement, acting as an iterative process within the ethnography of the research. In the final part, the legacy, the thesis focuses on the lessons learnt with the *Instructor Principles*, within the final reflection on contributions and critiques.
The main objective looks very broad, since it addresses the whole range of two design disciplines, but from one side the research narrows down to a specific and unexplored gateway into SD, that of SpD, and from the other side it tries to test crossdisciplinarity within the wider panorama of a transdisciplinarity in design.
The thesis is a brand-new cross reading of Service Design and Spatial Design.

As mentioned above, the ethnography of the research has been based on: field experiences organized by my research team – at the Design Department in Politecnico di Milano (Italy) within the Polimi DESIS Lab; on direct and indirect interviews with academics and design professional practitioners; and on experimentations in design education meant to highlight the criticisms for the future development of the topic, presented at the end of the dissertation.

The **research questions** are a series of consequential ones, and have been tested throughout the doctoral process:

RQ 1: Which are the key dimensions[12] that are laying the theoretical foundations of an S+S approach?

This question is framed within the analysis of two frameworks for comparison of design disciplines. It relies on the theoretical analysis of transdisciplinarity as a needed factor and states a complex but also first attempt in discussing about a common ground of the two disciplines in order to explore areas of differentiation and of balance among infinite number of possible frameworks for comparing the disciplines.

[12] The comparison relies on two frameworks comparing design disciplines and based on "key dimensions" for the building process.
This is illustrated in Section 1.4.3.

RQ 2: How can a dialogue between the disciplines of Spatial design and of Service design expand the outreach of the comparison of design disciplines towards a transdisciplinary cooperation?

In Chapter 2 the argumentation on complementarity between Spatial Design and Service Design through the ***Three Dialogues***, their findings and their ***complementarity indicators***, then structured in the proposed ***Qualitative Comparison - Taxonomy*** (Chapter 3). The *Indicators* have the scope of introducing the core evidences of the disciplinary dialogue towards transdisciplinarity, developed as a way to "connect the dots" within the critical work on the literature review and to build the perspective for the proposed framework. The definition of the consequential taxonomy built on the comparison corpus, the *Qualitative Comparison*, answers the second research question.

RQ 3: How to start an applied analysis of the proposed transdisciplinary viewpoint for future research?

The analyses of these *dimensions* through the lenses of Spatial Design and Service Design are developed into ***Instructor Principles*** (Conclusions) that emerge from the final criticism exploration of the experimental research into design education experimentations and field experiences (Chapters 4 and 5), which answer the final research question.

The critical section took place through experimentations and field experiences in four different academic contexts, acting as **reflective case studies**: Politecnico di Milano – School of Design (Italy), Universidade Federal do Rio de Janeiro (Brazil), Tongji University in Shanghai (China), and Faculty of Design in Ljubljana (Slovenia). For these, I adopted two main research methodologies: grounded theory with a constructivist approach, and participatory action research. The primary role of these experimentations in their theoretical meaning was in merging with the assumptions in the literature review, which lay the core foundations of the findings of the thesis, and in being applied in the didactic and research experimentations in which an S+S approach was tested. The experimentations aimed to combine the limited visual evidence of services with the essential visual evidence of spaces through the design tools for the visualization of design processes.

The objectives are:

- understanding how the two disciplines connect, according to the current paradigms, and then proposing the fundamentals of a S+S approach;
- setting a comparative and qualitative analysis based on the definition of key dimensions of the two disciplines in order to assess and consolidate the transdisciplinary approach introduced and the complementarity of the two disciplines;
- defining supportive structures for the S+S approach towards a comprehensive theoretical framework;
- testing the research findings through the construction of design processes in design studios, based on converging tools and methods from the two disciplines. These are part of the thesis iterative process and serve as cases of application of the S+S approach in design education to provide critiques for future developments.

The Qualitative Comparison explores the cultural dimension of design, trying to identify and highlight common ground and differentiation in order to frame, support and expand the comparison between the two design disciplines.

0.5 Overview of the chapters

The dissertation is divided into two main parts: an exploratory part, Chapters 1-3, dedicated to the interpretative research from the bibliography and the explanatory framework and theoretical model deducted, and an experimental part, Chapters 4-5, focused on the testing environments and ending with the lesson learnt and the conclusion.

PART I – Exploratory research

Chapter 1. Contemporary paradigms and transdisciplinarity as a needed factor

This chapter frame the background knowledge of this dissertation, both in terms of thesis exploration and meta-thesis exploration. Since the latter has been investigated through social innovation and sustainability topics, it appears necessary to outline the ongoing process within the current scenario from a social point of view. The first part chapter outlines the shifts of the contemporary paradigms in the societal dimension that are reshaping of the design object. The second part illustrates the core of the background analysis to search for a transdisciplinary foundation, it presents two frameworks for the comparison of design disciplines and the starting point for the proposed taxonomy.

Chapter 2. The Dialogues. Complementarity between Spatial Design and Service Design

The second chapter illustrates the areas of investigations that generate the proposed *Qualitative Comparison* in the following chapter. This exploration has been framed through literature review and historical research spanning the wider research topics of *design culture and the design object*, of *Spatial design within the design culture* and *Service design: theoretical background* on the basics and foundations of the concerned disciplines and of the *PSS concept*. the discussion provides here the reference and the critical understanding in which to frame the proposed comparison through three Dialogues: 1. Space as permeable platforms; 2. Narrative and *mise en scène*; 3. Space and ownership. Each dialogue extracts *findings* and *complementarity indicators* for S+S to then guide the definition of the proposed taxonomy in Chapter 3. The *complementarity indicators* have the scope of describing the core evidences of the disciplinary dialogue towards transdisciplinarity, developed as a way to "connect the dots" within the critical work on the literature review and to build the perspective for the proposed framework.

Chapter 3. An explanatory framework for a qualitative comparison: the taxonomy

This chapter concentrates on the definition of the explanatory framework that specifies the relationships among the concepts identified. The aim of this framework is to propose conceptual tools (interpretative models) and operative tools (design methods and tools) for an integrated approach to the design process based on disciplinary cooperation (Jantsch, 1972). Thanks to the previous theoretical development through the *Three Dialogues*, the related *findings* and *complementarity indicators for S+S* are structured here into the *Qualitative Comparison* framework

Thus, the previous two chapters are instrumental in framing the first research question – *RQ 1: Which are the key dimensions that are laying the theoretical foundations of an S+S approach? – RQ 2: How can a cultural dialogue between the disciplines of Spatial design and Service design expand the outreach of the comparison of design disciplines towards a transdisciplinary cooperation?* This chapter then frames the second research question

PART II – Validation and Criticalities: Experimental research

Chapter 4. Experimental research: experimentations and Chapter 5. Experimental research: field experiences

This section describes the actions conducted in three different academic environments and observed and supported by two main field experiences, providing a final analysis of their results through the proposed *Qualitative Comparison*. The experimentations answer the third research question – *RQ 3: How to validate the proposed transdisciplinary approach?*

This Part is defined as "validation and criticalities" since the educational activities were meant to test the ongoing findings during the doctoral path but are also the environment to criticalities to emerge. The understanding of the initial stage of this foundational act for a S+S approach restricts these experiences as case studies for future developments.

Legacy and conclusions

The final chapter suggests the effect of such a supportive structure of fundamentals on the process towards a S+S approach.

0.6 Summary

This thesis will argue that:

- SD and SpD share the development of the design culture towards a direct and integrated cooperation between disciplines and towards a balance between socio-cultural and techno-physical environments;

- Adding the service components to the design of spaces means expanding the systemic view, while SpD contributes to contextualized design services;

- With an S+S approach, the service designer contributes to the materiality of the relational value of services and the spatial designer contributes to the co-production of the immateriality of spaces, within a coordinated narration of actions and interactions in places;

- The research identifies that an integrated design of all components avoids the SpD development being merely a frame for SD but being an integrated part of it, only if a transdisciplinary dialogue overcomes the conceptual distances.

0.7 Methodology: grounding the process

The dissertation states its focus on the definition of a taxonomy to frame the fundamentals of an S+S approach, that is mainly built within the contemporary shifts affecting design research and influenced within the impact of design in practice. However, while the background knowledge is outlined in an internationally based literature review, the context of the research and problem area is mainly grounded on the research activities conducted at the School and Design Department of Politecnico di Milano. Moreover, the sense itself of *spatial* and *interior* design is based on the evolution of the design culture in Italy, especially in the Milanese context.

Although, it is undeniable, and it must be declared from the very beginning of this dissertation, that the topic launched here is both strongly embedded in the international arena of design research shifts within the contemporary socio-human-economic systems, as well being as embedded in the Italian and Milanese design context. The latter has always possessed a certain distinctiveness: the fact of being constantly projected into the international panorama, while maintaining a strong design culture (theories and theorists, methods and approaches), recognized worldwide as an Italian School.

This section describes how the data for this analysis has been gathered using both qualitative and applied approaches. The main qualitative approach is

Grounded Theory. As Muratovski states (2015, p. 98):

> *"this research approach is best suited to conducting transdisciplinary research, […] to look at areas that have not been studied in great depth before, or do not have clear and definite theories associated with them".*

This is exactly the case here: as already stated, un understanding of the link between using approaches and tools from SD to design services, taking into account the design of the space and the SpD implications, has not yet been studied in these terms. As a matter of fact, this dissertation is based on a lack of research on this topic, that is why a Grounded Theory approach was needed.
The collection of qualitative data is based on three levels:

- on historical research through the accumulation of analysis of design discourses about the evolution of the two disciplines,
- on the observation and collaboration in research projects and educational activities, as anticipated in the introduction section,
- and on interviews and conversations with experts.

Through the three levels of investigation, I have been able to understand the conditions that have given rise to the explored issue. These have been framed within the context of the current landscape of design with the examination of the existing literature and through the analysis of existing models of comparisons between design disciplines. The empirical data collection has set the building of the *Dialogues*.

The thesis is also based on **Applied Research**, mainly employed in the meta-level of the thesis itself and this is explained in the way my lab conducts its research, building a mutual and direct influence and combination between research activities, practice-led research and didactics. Education and research, in fact, nurture each other and the relationship between theory and practice is studied on two levels: at the researcher level by avoiding an arbitrary division between research and didactics, which becomes a field of experimentation for topics and methodologies in design education, and which nourishes the very development of theoretical research; and at the didactics level itself, where the link between theory, research and practice is taught.

Didactics has been the environment:

- to test the dialogues between the very limited visual evidence of services with the essential visual evidence of spaces through the design tools for the visualization of design processes (practice-led research of the thesis),
- to teach Participatory Action Research methodologies, Co-creation and Co-design tools and Prototyping actions (practice-based research of the meta-level of the thesis).

In fact, qualitative research has been fundamental to gain an in-depth understanding of the problem and has been expanded in the context of university research, where the theoretical reflection has a mutual development through experimentation in teaching activities applied in real contexts and research activities. It was the same teaching and research activity that brought this latent need to the fore. In these research experimentations, design tools hybridization has progressively conversed with the design research process itself, becoming process codes.

The **teaching experimentations** followed the following S+S disciplinary process of integration:

- design processes with a multidisciplinary approach: tools and methods of the SD discipline informed the SpD development.
- design processes with a crossdisciplinary approach: tools and methods of the SD discipline supported the SpD development.
- design processes with an interdisciplinary approach: tools and methods of the SD discipline merged with tools and methods of the SpD discipline to achieve S+S solutions.

The knowledge acquisition through educational processes has been fundamental in informing reflections and in testing tools.

0.8 Methodology: research ethnography

The examination of the existing literature has been affected by a lack of a specific literature review on this topic. By understanding the area that needs further research, it has been initially important to frame the interconnecting fields needed to nurture the exploration and, secondly, to frame the state of knowledge of the identified fields. This strategy outlined the relevant issues for each topic analysed and then highlighted the leading concepts conducting the process.

The **literature review** has been organized by themes and theories as follows:[13]

1. Design culture and the design object, focusing the attention on the object of design as solution-oriented or as diffuse design (Manzini, 2016), on the design milieu (Branzi, 2006; Brown, 2009; Margolin in Buchanan & Margolin, 1995) and on the design orders (Buchanan, 2001). This has been fundamental in understanding the more theoretical reflections on the design structures so to address transdisciplinary research.

2. Key trend indicators of the current landscape of design, about framing the contemporary design challenges of addressing complex systems. It stressed issues linked to a participatory mind-set that emerged from the field exploration and the didactic experimentations such as: design and

[13] Here follows an overview of the topics explored in the literature review, with brief reference lists to frame the concepts.

democracy (DiSalvo, 2010; Manzini, 2015), activism and agonism concepts (Fuad-Luke, 2013; Hillgren, Seravalli, & Eriksen, 2016; Markussen, 2013; Thorpe, 2008), and community-centred design and collaborative innovation (Baldwin & Von Hippel, 2011; Castells, 1996; Florida, 2005; Meroni, 2007; Perkins, Hughey, & Speer, 2002; Sassen, 2004).

3. Research in design: methods and methodologies, on general frameworks of methodologies (more specific ones have been analysed in the following topics);

4. Design research and design education: mutual influences, about the paradigm shifts concerning the research and practice of the disciplines and the reciprocal influence on design education (Findeli, 2001), on the role of design and of the university in business and society (Muratovski, 2010) and the impact on education based on action research (Bødker & Klokmose, 2012; Carr & Kemmis, 2003) and experiential learning (Cantor, 1997; Chatterton, 2000).

5. Grounded theory and participatory action research, focusing on the methodologies used in the meta-level of the thesis (Björgvinsson et al., 2010; Charmaz, 2005; Sanders & Stappers, 2008; Star & Ruhleder, 1996).

6. Transdisciplinarity, on the shift towards multi-, cross- and transdisciplinarity in theoretical research (Jantsch, 1972), on the shifting boundaries in the design disciplines (Gustafsson et al., 2016; Margolin, 1988) and disciplinary comparisons (Edeholt & Löwgren, 2003; Holmlid, 2009).

7. Spatial design within the design culture and *8. Service design: theoretical background* on the basics and foundations of the concerned disciplines in order to build the research Dialogues, based on (Bachelard, 1957; Bechtel & Churchman, 2003; Bertola & Manzini, 2004; Blomkvist, Clatworthy, & Holmlid, 2016; Branzi, 2006; Buchanan, 2001; Collina, 2005; Luciano Crespi, 2013, 2016; Kimbell, 2009; Krippendorff, 2005; Meroni & Sangiorgi, 2011; Norberg-Schulz, 1979; Pacenti, 1998; A. Rosselli, 1973; Alberto Rosselli, 1974).

9. The PSS concept, exploring the state of the art of product-service systems (Baines et al., 2007a; Mont, 2002; Morelli, 2002, 2006).

10. The role of tools in design, focusing on the crucial role of the visualization of design processes (Ciribini, 1984; Dalsgaard, 2017; Diana, Pacenti, & Tassi, 2012; A. Rosselli, 1973; and 1974; Segelström & Holmlid, 2009; Stickdorn et al., 2011).

The process has been supported by **interviews and informal exchanges** with experts on different topics. The insights collected are integrated into the dissertation process and supporting statements with external observations and knowledge.

- *Experts with an academic-based profile:*
  Graeme Brooker, Head of the Interior Design programme at the Royal College of Art, London (UK)
  Peter Higgins, Visiting Lecturer in the Interior Design programme at the Royal College of Art, London (UK)
  Steve Jensen, Visiting Lecturer in the Interior Design programme at the Royal College of Art, London (UK)
  Susu Nousala, Professor at Tongji University, Shanghai (China)
  Fernando Secomandi, Adjunct Professor, Vice-Coordinator of the Post-Graduate programme in Design at the ESDI – UERJ Escola Superior de Desenho Industrial, Universidade do Estado do Rio de Janeiro (Brazil)
- *Experts with an academic- and project-based profile:*
  Barbara Szamniecki, Adjunct Professor in Visual Design and Researcher at the ESDI – UERJ Escola Superior de Desenho Industrial, Universidade do Estado do Rio de Janeiro (Brazil)
  Samara Tanaka, Designer and social entrepreneur, Visiting Lecturer at the PUC-Rio, Pontifícia Universidade Católica do Rio de Janeiro (Brazil)
- *Exchanges with experts with an academic- and project-based profile at the Design Department of Politecnico di Milano:*
  Anna Barbara, Assistant Professor in Interior Design
  Luisa Collina, Full Professor in Interior Design and in Product-Service System Design, Dean of the School of Design
  Anna Meroni, Associate Professor in Product-Service System Design and in Interior Design
  Antonella Penati, Full Professor in Product Design
  Silvia Piardi, Full Professor in Interior Design, Director of the Design Department

Finally, a useful number of **experimentations in research projects and didactic activities** have been developed to test and validate the ongoing reflections on the S+S transdisciplinary approach. Experimentations specifically developed within this thesis have been developed to test and validate the theoretical reflections (cf. Chapter 4):

- November 2016: **workshop run at the Design Faculty of Ljubljana, Associate Member of the University of Primorska, Slovenia.**
  Goal: short experimentation on an S+S crossdisciplinary approach.
- March-April 2017: **course run at the Universidade Federal do Rio de Janeiro, Brazil.**
  Goal: main experimentation on an S+S interdisciplinary approach.
- May-June 2017: **course run at the Tongji University in Shanghai, China.**
  Goal: main experimentation on an S+S interdisciplinary approach.

Field activities have been developed within my research team and focused on didactic activities within the already mentioned research projects. These field experiences are reported as supporting cases and critical validation of the *Qualitative Comparison* (Chapter 3):

- October 2015-October 2017: observation of the campUS research project. [14]
  Goal: long-term and on-field experimentation on co-design and prototyping actions (supporting case, cf. Chapter 2).
- October 2016-April 2017: Masterclass and Experiment Labs for the EU Human Cities project. [15]
  Goal: long-term and on-field experimentation on co-design and prototyping actions (supporting case, cf. Chapter 2).
- October 2016-January 2017: teaching assistant at Politecnico di Milano.
  Goal: long-term experimentation on a S+S crossdisciplinary approach (field experience, cf. Chapter 5);
- September-December 2017: teaching assistant at Politecnico di Milano.
  Goal: long-term experimentation on an S+S interdisciplinary approach (field experience, cf. Chapter 5).

Research such as that reported in this thesis is always subject to the criticism that is both linked to the nature of the methodologies involved and to the general topic of questioning disciplinary implications in a doctoral dissertation. As to the first, the strategy of applying an experiential learning method to design education means applying a transformative process with the "double challenge of combining both practical action and research potentially leading to conflict where the roles of the collaborative members of the research team are different" (Avison, Baskerville & Myers, 2007, p. 20). Researchers and participants influence each other in a mutual exchange. This is an important point to underline, since most of the criticism around the use of this methodology is aimed at the level of engagement adopted by the researcher towards the context of analysis and at the apparent similarity of the actually different but complementary roles of the actors involved. This approach has been applied, as described above, with a design thinking process, applying "classroom working to real-world community needs" (Cantor, 1997), which demands that the ability to explore different possibilities through an iterative process and that it is ethically committed to real-world issues.

[14] Cf. 0.1 The context of the doctoral research

[15] Cf. 0.1 The context of the doctoral research

0.9 Scope

As a field that is constantly evolving, design requires a transition from an approach based on disciplines to an approach based on transdisciplinary coordination. While design practice requires designers to deal with multidisciplinarity, design education had gone through a long process of creating silos – an understandable transformation of the discipline itself. Design research needs to take a concrete step towards transdisciplinary research (Muratovski, 2011), which means being interdisciplinary while being able to cross borders. [16] In the past decade, in fact, there has been an inverse process: design education has moved towards a transdisciplinary approach.

I don't claim that the design discipline has all the means to govern, deal with and solve such complexity; indeed, I believe that designers are becoming more and more involved in multi-faceted milieus and, regardless of the domain, a specific transdisciplinary approach must be designed to break the boundaries and expand the approaches.

[16] I refer to the notions of hierarchy of increased complexity from multi-, to cross- and to inter-disciplinarity, theorized by Jantsch, E. (1972). ***Technological planning and social futures.*** New York: Halsted Press, a Division of John Wiley & Sons, Inc.

Part I

EXPLORATORY RESEARCH

1.

CONTEMPORARY PARADIGMS AND TRANSDISCIPLINARITY AS A NEEDED FACTOR

Chapter overview

This chapter frame the background knowledge of this dissertation, both in terms of thesis exploration and meta-thesis exploration. Since the latter has been investigated through social innovation and sustainability topics, it appears necessary to outline the ongoing process of alignment and interdependency between local and global processes in order to gain a basic understanding of the current scenario from a social point of view.

Thus, the following sections are meant to outline the shifts of the contemporary paradigms in the societal dimension that are reshaping of the design object. These shifts are influencing the design research, practice and education towards multidisciplinarity, crossdisciplinarity and transdisciplinarity, analysed especially within the design education area and affected by the fundamental impact of experiential learning in higher education and its contextual and phenomenological nature.

Certainly, the research areas considered do not all encompass the redefinition of the design discipline as a (non-linear) system of knowledge and integrative (not optimized) thinking, which has a wider spread of reasons and results. However, the focus on the relationships between grassroots and top-down actions, their significant impacts on the regulatory system and the development of new collaborative models, is seen as fundamental. These external driving forces are shaping a new design paradigm that has taken place over the last twenty to thirty years, connoted co-design and human-centred perspectives, a participatory mind-set and public-sector innovation.

Section 1.1 is focused on the alignment and interdependency of local and global processes and on the phenomenological nature of design. The resulting complex outlook highlights the consequential critical elements, such as agonism, infrastructuring and design/democracy relationship, which define the impact of new collaborative models (*section 1.2*); these concepts converge in the wider shift from positivism to constructivist and participatory approaches in the design research. This theoretical background introduces the converging factors towards a transdisciplinary approach in design and the importance of experiential learning (*section 1.3*). *Section 1.4* illustrates the core of the background analysis to search for a transdisciplinary foundation, it presents two frameworks for the comparison of design disciplines and the starting point for the proposed taxonomy.

It is important to state that complexity is not a prerogative of contemporaneity: a profound change in society, industry, business and the awareness of the systemic nature of reality is taking place – and has become visible – since the 1950s, causing a questioning of disciplinary boundaries and domains. Even if the overview on the evolution of SD and SpD is over the previous decades, to highlight the common viewpoint that has been sought, the issues exposed in the following sections are intentionally narrowed down to a contemporary perspective, focusing on where we are in the process of systematizing the change that has occurred and is still occurring.

1.1 The alignment and interdependency of local and global processes

The actual social context is characterized by the active involvement of people in the transformation of their existence, acting in their environment to achieve social change. This change is "social" because people[1] are not just asking local authorities or national governments – which are responsible for that change in a top-down model – for economic, political or social transformations in a passive and abstract way, but are assuming a proactive role through the development of bottom-up activities and actions, being involved in local organizations and informal groups or through individual initiatives. These processes reveal a growing awareness of specific problems, how to tackle them and how to bring to light common values and beliefs, increasing social networks in more or less local contexts. Activities and initiatives include various subjects, since they are related to specific concerns, but all contribute consequently to an immediate problematic situation

What is remarkable is how the innate creativity and design capacity of human beings to invent and realize something new (Manzini, 2015) is stimulating a shift in contemporary society. The strength of this exciting, motivating force lies in the level of diffusion and in the overall impact of these transformational processes.

[1] The word "people" here refers to groups of lay individuals not trained in social research, such as clients, customers, users or citizens, according to research branches.

As Manzini states:

> *"their diffusion and character result from the combination of two main factors. The first is, of course, the nature of the problems to be dealt with on different scales, including everyday experience. The second is the pervasive diffusion of information and communication technologies and their potential in terms of organizational change. In such a situation, it is likely that a growing number of people facing a problem also see an opportunity and find a new way to solve it" (Manzini, 2015, p. 9).*

The problems in question are the so-called 'wicked problems' the contemporary world is facing and which social innovation embraces, addressing specific, complex and ever-changing issues in a diffused way, and involving multiple actors in multiple configurations of partnerships (individuals, groups, organizations, local governments and trans-national agencies). Design, and so design research, is turning to them, addressing a system of contradictory and continuously changing elements, made of complex interdependencies. Taking into account the whole system of the experience means focusing on the growth of scale and complexity of design problems and, considering both tangible and intangible components of design outcomes; it also means rethinking them in the way they influence the behaviours, relations, and spaces in which they happen. The shift to a holistic approach has caused the designer to consider his/her responsibility in the social context, given the implications of design for society. Moreover, this change occurred while the social context was also transforming, being characterized by the active involvement of people in the transformation of their existence, acting in their own environment to achieve social change. Accessibility and inclusivity have become central topics nowadays, for which the human-centred approach supports design processes in achieving this goal. The design discipline embodies contemporary wicked problems, where the weakness doesn't own a negative value (as inefficiency or inability) but represents a continuous change following organic logics, diffused and diverse processes and reversible strategies (Branzi, 2006, p. 14).

The diffusion of new information and communications technologies (ICTs) gives an added meaning to the multifaceted context and the city is still the place where contemporary issues are revealed. As Castells (1996) and Sassen (2004, 2011) state, new ICTs have enabled local actors to become part of global networks (Leadbeater, 2009), overcoming physical proximity in a move towards transnational spaces and networks of global cities made up of process and flow instead of physical places. In fact, they "*have enabled a*

variety of local political actors to enter international arenas once exclusive to national states" (Sassen, 2004, p. 1). This shift has enhanced a fertile context for innovation at the grassroots level, having an impact on the infrastructural level and turning into definitive structured actions, entrepreneurial projects and institutional processes (De Rosa & Mazzarello, 2018). Thanks to the ripple effect of the *"infrastructuring process"* (Björgvinsson, Ehn, & Hillgren, 2010; Hillgren, Seravalli, & Emilson, 2011; Star & Ruhleder, 1996; Van Reusel, 2016), this ongoing alignment between levels – global into local and vice versa – has generated favourable conditions for innovative models to fit and operate within this context. Furthermore, there is an urgent need for designers to play an active role in addressing the wicked problems scattered among these distributed but resilient systems (Manzini, 2015, pp. 17–18). The introduction of collaborative values has been the main disruptive scenario: the bottom-up initiatives have been possible because the cultural push towards proactive engagement of people is spreading and development of the ICTs has created favourable conditions for it, becoming a critical component in most areas. This grassroots process has opened the way to innovative scenarios that have challenged the socio-technical and economic systems, demanding a more resilient infrastructure and organizational change in the system itself. Today, the context is already favourable for a systemic approach, since infrastructural changes have already grown into place.

1.2 The impact of collaborative models on the regulatory system

The formation of transnational identities and communities advocates for the development of collaborative models and consumption networks (Botsman & Rogers, 2011), (Belk, 2014) with the resulting impact on the regulatory system and on economic growth. This aspect is clearly connected to technological innovation and to transnational networks and flows, and contributes to the growth of innovative (large-scale as well as small-scale) models and, thus, of innovative structures.

The complexity of this branching of shifts into economic, societal and structural systems demonstrates that current changes have already grown into place and have become accessible and understandable to more people. That doesn't mean that the contemporary human-constructed systems are simpler; instead their complexity gains in resiliency since it is continuously dependant on components and their relationships changing constantly; resiliency has become constitutive. As Boyer et al. state:

> *"Modern society is now beginning to see - sometimes painfully - that the most critical challenges we face are also the ones which are most interconnected or systemic in nature. […] By expanding our understanding of systemic problems, we can better appreciate the principles that govern them and the risks they pose to society" (2011, p. 19).*

This is why forms of collective and collaborative intelligence develop: [2] traditional methods are no longer able to deal with non-deterministic contexts and the capacity for cognitive and planning control of the individual is weakened. Complex problems are faced by experts in different aspects and with a participatory approach within an environment of diffuse knowledge; this is possible thanks to an open system and to an open network structure. The method, as we understand it, fits into closed and local systems and solutions are increasingly emerging as the result of a collective effort.

These favourable ingredients have led to:

- investigating the cross-disciplinary nature of the discipline (Muratovski, 2016) in a co-design and human-centred perspective within diffuse design (Manzini, 2016);
- the transformational role of the designer on collective levels when engaging with multiple stakeholders and when involved in public-sector innovation, going beyond user-centred design and towards a renewed attention to design and democracy (Bonsiepe, 2006; Margolin, 2012), to agonism in co-design (DiSalvo, 2010; Hillgren, Seravalli, & Eriksen, 2016; Munthe-Kaas, 2015) and to design for policymaking (Avelino et al., 2015; Boyer et al., 2011; Manzini & Staszowski, 2013; Mulgan, 2014; Selloni & Manzini, 2016).
- the rise of a new form of market: the sharing economy model, also referred to as peer-to-peer (P2P) markets.

As the research focuses on spatial and service aspects, these concepts have an impact on how urban contexts are affected by such changes in terms of transformation of the urban environment (physical and service infrastructuring), and in terms of uses and identities. The space of the metropolis, in its different forms and cultural identifications, is still the common ground for all contemporary artistic, sociological, psychological or aesthetic analyses and practices, and it determines the complicated relationships of today's system (Vidler, 2009). Urban contexts, in fact, are a theatre for important changes and challenges, and they are going through a continuous overlapping of configurations, depending on how people reclaim their use – in terms of time (temporary/medium-/long-term) and in terms of function – how people physically cross these places (new forms of mobility) and new societal dynamics. Urban spaces are not isolated entities but a complex system of places, activities, events, initiatives and actions that happen at the border between ephemeral – all that has a short life – and provisional:

> *"an event originally intended for a medium-short term but which, for various factors whether external or internal to its provisional nature in itself, moves into the medium-long term" (Fassi, 2012, p. 38).*

Spontaneous or more designed actions modify the urban experience and influence the citizens' everyday life, eliciting social and behavioural change. More widely, the urban territory can be seen as a permeable denationalized platform, activated by multiple interventions and inter-related actions, and thus able to accommodate a collaborative platform. Sassen (2004) speaks about the ascendance of sub- and trans-national spaces and actors, facilitated by the weakening of the restrictive formal power of states over national regions. This geography of local networks activating multiple "micro-spaces of daily life" depicts a holistic system in which even marginal locations can become part of global networks and spread their influence. These changes are influencing the design research, practice and education towards crossdisciplinarity, and are affecting higher education with an experiential learning approach.

Summing up, the introduction of collaborative values has generated a disruptive scenario: the bottom-up initiatives have been possible because the cultural push towards proactive engagement of people is spreading and development of the ICTs has created favourable conditions for it. This scenario has already been assimilated in the western context: these values are no longer disruptive but have now been assumed, and the sharing models are no longer unprecedented but have become embedded in the contemporary context. This has been possible because bottom-up initiatives have evolved into more mature forms of organization, supported by P2P information exchanges and *"by different kinds of intervention from institutions, civic organisations, or companies (top-down interaction)"* (Manzini, 2015, p. 82). The western system incorporates the attributes of the contemporary citizen/user, scaled up by putting at the centre of the change – or, more accurately, by being willing to put at the centre of the change – all the actors of the urban structure in a systemic and integrated way: local authorities, administrations, innovative companies, territorial actors, the third sector and representatives of active citizenship.

As a consequence, designers must play an active role in addressing complex issues. I don't claim that the design discipline possesses all the means to govern, deal and solve such complexity; indeed, I believe that designers

[2] Timothy Gowers, MIT, Center for Collective Intelligence.

SOME KEY DATA WITHIN THE EUROPEAN AND ITALIAN PERSPECTIVES

Research papers, national and international agendas, and regional and municipal initiatives demonstrate the already assumed participatory and collaborative mind-set of authorities and administrations.

- *Smorto, G. (2017).* ***A critical assessment of European Agenda for the collaborative economy****. In Depth Analysis for the IMCo Committee. European Parliament.*
- *European, C. (2013).* ***Social innovation research in the European Union. Approaches, findings and future directions****. POLICY REVIEW (Luxembourg: Publications Office of the European Union, 2013).*
- *Welfare Innovation at the Local level in favour of COhesion - WILCO. (2013).* ***Social Innovation Research in Horizon 2020****. Position paper.*
- *The Italian annual report* ***ICITY Rate*** *(icitylab.it): an initiative by FPA, a company dealing with the organisation of national forums and conventions addressed to public administrations, political figures, businesses, associations and citizens, and offering tools such as databases and digital platforms. It aims to put these actors in contact with one another and to create the occasion for head-to-head discussion on the different themes (endorsement: building and strengthening political will; empowerment: internal training for public administrations; engagement: involvement of local stakeholders in the process of innovation).*
- ***"Bilancio Partecipativo"*** *[ed. participatory budgeting] (bilanciopartecipativomilano.it)*

An initiative founded in 2016 in collaboration with the project EMPATIA (empatia-project.eu) funded by the research programme CAPS - Horizon 2020; Milan is one of the pilot cases. The municipality finances projects (public works or the purchase of durable goods) proposed, developed and voted for by citizens.

are getting more and more involved in multi-faceted milieus and, regardless of the domain, a specific transdisciplinary approach must be designed to breaking the boundaries and expanding the approaches. Design, as a field that is constantly evolving, requires a transition from an approach based on disciplines to an approach based on transdisciplinary coordination.

Design methods are able *"to advance public and social innovation and achieve creative solutions beyond the reach of conventional structures"* (Mulgan, 2014, p. 1), providing a strategic approach to complex systems of things. Design research is progressively focused on the role of design as an activator of change: assuming that *"all we do, almost all the time, is design"* (Papanek & Fuller, 1972, p. 17) and that everybody designs (Manzini, 2015), *"design is an act of deliberately moving from an existing situation to a preferred one by professional designers or others applying design knowingly or unknowingly"* (Fuad-Luke, 2013, p. 5). These well-known statements shape the scenario that design studies and design thinking methodologies are approaching, pinpointing the considerable debate around the boundaries of design and the role of designers in the 21st century. Design, as a process for achieving change, embodies activism as a form of shifting to new paradigms and values.

1.3 The phenomenological nature of design

The focus of this dissertation is not on the "objects" of the design, since this is not a solution-oriented discussion, but it refers to the design culture [3] in which the challenge emerges. The phenomenological nature of design finds its disciplinary origin in the influence of phenomenological approaches on environmental psychology,

> *"the study of human behaviour and well-being in relation to the socio-physical environment, emerged during the 1960s as the result of both scientific and societal concerns" (Stokols & Altman, 1987, p. 1),*

trying to explore the ecological context of behaviour that was being neglected by traditional psychology. It has an interdisciplinary orientation, since the professional support for environmental psychology are found in the broad fields of architecture, urban planning, geography, urban sociology, public health, natural resources management, and organizational behaviour (Stokols & Altman, 1987, p. 2). The built environment was then involved in this area of exploration and a phenomenological approach, focused on

> *"a comprehensive study of the lifeworld, that is the world as it is lived and experienced, in which humans perceive and act and of which they are constitutive parts" (Graumann in Bechtel & Churchman, 2003, p. 97),*

had a strong impact on architecture and design disciplines (cf. Norberg-Schulz, 1971, 1979). (cf. section 2.3).

[3] "Design culture" is the English translation of the Italian "Cultura del progetto", where progetto has a broader meaning. It includes any discipline in which there is a planning component, where a prefiguration activity occurs.

Research in design therefore assumes a phenomenological perspective, that is, of observing the reality of the project to derive general rules and principles, which, however, continuously evolve together with the adopted point of view and the context of reference. Predictably, this perspective called for prejudices from the positivist sciences, in the greater debate between quantitative and qualitative methodologies of research that invested the major disciplinary shifts of the last century towards phenomenological, constructivist and participatory paradigms.

A phenomenological perspective refers to a relativistic conception of *culture* that places each culture in relation to its space-time context, with neither claiming a hierarchy of validity between different cultures. This conception has been established in the contemporary scientific mind-set since the Lévi-Strauss ethnography studies in the 1930s. This change in perspective was fundamental and has influenced many disciplinary domains since then, in the overall turn from a positivistic and deterministic view to an epistemology of praxis, that considers the design act as a reflexive conversation with the materials of a situation. It is a reflexive conversation since, in response to the situation, the designer reflects along the action on the construction of the problem, on the strategies of action, or on the implicit phenomenological models (Schön, 1987, p. 103). The turn to the dimension of the reflexive experience as the main tool of knowledge – both in terms of theoretical design practice as in terms of applied design practice – moved in parallel with the influences of social sciences approaches, and in particular to Participatory Action Research (PAR), which is not only a methodology but a design shift in itself. In fact, participatory design is nowadays a core value of design thinking, by affecting its practice and identity, methods and approaches within an established – but still to be fostered – participatory mind-set and a behavioural change in society (institutions, local and global organizations) and complex socio-technical systems.

PAR is a methodology employed in various fields and settings and its terminology underlines a variety of approaches and interpretations: *action research, collaborative inquiry, emancipatory research, action learning, contextual action research, co-operative design, joint application design,* are only some of the terms used. From these emerges the basis of this methodology, highlighting its constitutive assumptions.
First of all, PAR is a social process and has its origins in social sciences: it is transformative in aim, contributing

> *"both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously" (Gilmore, Krantz, & Ramirez, 1986, p. 161).*

It involves researchers, practitioners and people in general (who), through collaboration, inclusion and social action (how), for a planned organizational change to solve real problems (why). Therefore, PAR is applied to real, specific contexts, and sees the active engagement of both the researcher and the traditional object of social research: people. The process of the action itself – cyclical, iterative and adaptable to changing circumstances – is much more relevant than its output, since it deals with continuous co-learning and adjustment. Action research is in fact about learning by doing, through considering/reconsidering data, conditions, standpoints and procedures in the dynamism of human action, in dialectic exchange between theory and practice, subject and object.
The *object* I am talking about is a complex system composed of:

- space (a specific and defined place, area or territory);
- time (a specific period, time range of/for action);
- people (specific groups, communities, citizens).

These three main aspects are strongly connected one to the other, so defining the context of the action that requires combining many elements in a new way and a change in mind-sets.

In design research, the level of participation and involvement are widely discussed. PAR, as mentioned above, has its origin in social sciences and the research around this topic has been and is still extensively examined and analysed. The user-centred approach was acquired by the design discipline and later developed into co-designing with the user: a human-centred design approach. Co-design has been defined by Sanders & Stappers (2008, p. 6) as a way *"to refer to the creativity of designers and people not trained in design working together in the design development process"*. Creativity is defined as the capacity to contribute and participate - in different ways - in a design process. Human-centred design (HCD) scales up to community-centred design (CCD) (Meroni, 2007) when facing complex systems of challenges dealing with groups and communities at society scale, in order *"to create innovative new solutions rooted in people's actual needs"* (IDEO.org, 2015, p. 9). The design discipline addresses a system of contradictory and continuously changing elements made of complex interdependencies.

How are the knowledge and expertise of a participatory research approach transmitted to designers in their education? The changing landscape has influenced, as stated, the evolution of the design disciplines and, obviously, has had an impact on design practice, since new professional profiles are always required and, therefore, renovated business, industry and consultancy are influencing the education in design models. Since the contribution of design methods and design thinking is increasingly recognized as fundamental to facing social and public policy challenges, there is a need for the students' capacity to see possibilities, to carry out problem solving, to adapt methods of ethnography and to prototype approaches that allow fast, collaborative creation of systems and services and, therefore, to be strategic (Mulgan in Boyer et al., 2011). Experiential learning and informal learning are nowadays fundamental in higher education and a silo-breaking process is necessary.

To conclude, the current landscape of design related to the issue explored has been framed within the changes concerning the contemporary world. Why is this connection essential or even considered as existing? Does the design discipline concern such a wide range of scope? I believe that design has no defined object but, rather, has a multi-faceted subject matter since it deals with continuously evolving and expanding contexts, and with possible worlds. The design object is shifting away from fixed and defined entities (technology-centred) to processes and complex living entities (human-centred), i.e. to a systemic view and impact on the cultural, social, economic and physical dimensions (Buchanan, 1992), (Krippendorff, 2005), (Brown, 2009), (Manzini, 2015). The design discipline deals with the project as a solution for the physical world as well as the added cultural value it carries in the socio-cultural world (Manzini, 2016a, p. 55). All their changes have an impact on design research and practice on different levels. In fact,

> *"design today is no longer about designing objects, visuals, or spaces; it is about designing systems, strategies, and experiences." (Muratovski, 2016, p. 138);*

that is why speaking about the main issues of the contemporary shifts is considered here as a major point in framing the emerging S+S design approach.

1.4 The shift towards multi-, cross- and transdisciplinarity in theoretical research and in design education

1.4.1 The design object as a complex system

As stated, the objective is to question the complexity of the *design object* (and not of the design objects), and within a design discipline background to search for a transdisciplinary foundation, explored through the influence of ethnography studies, situativity theory and participatory action research. The notion of *design object* in this dissertation refers mainly to the reflection by Buchanan in *Design Research and the New Learning* (2001). Here the author – tracing the origins of modern design research in western culture, referring to Galileo, Bacon and others, through the development of modern thought about nature, modern physics, sciences of mechanics and humanism – states that *"we are returning to the humanism that is required for a firm understanding of design"* (2001, p. 4). [4] As illustrated later in section 2.1, the design discipline has been lagging behind in its disciplinary formation and was not included in the theoretical development of architecture and remained outside universities, being included in the fine arts approach since, generally, *"theory was highly prized in the universities, practice was tolerated, and production or making […] was generally ignored as a subject of learning"* (2001, p. 5). The Italian situation in the last century outlined above showed the impact of the division between the artistic and humanistic

[4] In this paper, based on a presentation at the conference "Researching Design: Designing Research" held at the London Design Council in March1999, Buchanan is exploring the value of design research in universities specifically with the main North American and British points of view. However, since based on the history of the modern western culture, it is a valuable reference for my purposes, as it is also linked to the specific Italian context previously illustrated.

side of any design practice – merged into the academies of beaux arts – and the more scientific and technologic one, melded into engineering sciences. In the debate that flourished after WW2 (cf. 2.1), the current dialectic was still evident that brought the influence of system theory and operational approaches applied to architecture and design, before the reconsideration of a cultural and humanistic re-balance. Buchanan explores the changing conception of the "product" of design, not in the sense of the physical object of course, but as ***orders*** that are

> *"a place for rethinking and reconceiving the nature of design [where] places [are meant] in the sense of topics for discovery, rather than categories of fixed meaning" (2001, p. 10).*

The four orders defined are:

- **Symbols**: central in the establishment of the profession of graphic (communication) design that, independently from the medium, deals with the communication of information in words and images;
- **Things**: central in the establishment of the professions of industrial design. It concerns the creation and production of tangible and physical things.

The evolutionary process of the design discipline then turned its attention to the living experience of human beings, focusing on the impact of visual symbols and physical artefacts as forms of actions:

- **Action**: central to the establishment of the professions of interaction design that is "how human beings relate to other human beings through the mediating influence of products. And the products are more than physical objects. They are experiences or activities or services, all of which are integrated into a new understanding of what a product is or could be" (2001, p. 11);
- **Thought**: deals with environments and systems, not as systems of things but as human systems: the integration of information, physical artefacts, and interactions in environments of living.

Within his framework, what is interesting for my purpose is enclosed in these sentences:

> *"We can only experience our personal pathway through a system. And in our effort to navigate the systems and environments that affect our lives, we create symbols or representations that attempt to express the idea or thought that is the organizing principle. The idea or thought that organizes a system or environment is the focus of fourth-order design. Like interaction, a new focus on environments and systems — which are where interactions take place — has strongly affected design thinking and design research in the United States and in many other parts of the world" (2001, p. 12).*

This point supports the understanding that the design object has definitely shifted from defined categories to a complex system the experience of the human beings depends. Before narrowing down this through the lenses of SpD and SD, the theoretical background outlined so far towards a transdisciplinary approach is based on the analysis of the converging factors defining the current landscape of design. The attention on the shift of the object of design towards complexity plays an important role because, in order to face the complexity of the environment, it is necessary to build a complex decision-making system, a strategic and systemic vision that takes into account the changed scientific paradigms (which change the models of rationality) and the evolution of technologies (which support the project activity) (Crespi & Schiaffonati, 1990, p. 10).
That opens the way to a renewed design culture in the range of ways of thinking of design, which span from a deterministic view (Pandza & Thorpe, 2010), to a reflective one (Schön, 1987), within a post-industrial era that is the scene of societal challenges, changes and actions, dominated by new emergences (individuals to sharing communities), new dominant structures (hierarchies to networks), and new design approaches (technology-centred to human-centred) (Krippendorff, 2005). In fact,

> *"we shifted to a global, information-based economy and society that asks design to be a multidisciplinary, committed to conceptualisation, configuration, and implementation of meaningful social environments, products, services, systems and brands" (Muratovski, 2010, p. 381).*

The current shifts in the social and economic sphere inevitably affect design practice and hence design research and design education towards social commitment, a real evidence basis and a participative approach.

1.4.2 Transdisciplinarity as an answer to the complexity of the Post-Industrial Era

A merged-knowledge approach is needed, enabling design practitioners to deal with the whole system of relationships within a *product milieu* (Margolin in Buchanan & Margolin, 1995). As a field that is constantly evolving, design requires a transition from an approach based on disciplines to an approach based on strategic planning: from a *know-how* to a *know-what* (Jantsch, 1972, p. 228). While design practice requires designers to deal with that, design education had gone through a long process of creating silos – an understandable transformation of the discipline itself. Design research needs to take a concrete step towards transdisciplinary research (Muratovski, 2011), which means being interdisciplinary while being able to cross borders. [5] In the past decade, in fact, there has been an inverse process: design education has moved towards a transdisciplinary approach.

I don't claim that the design discipline has all the means to govern, deal with and solve such complexity; indeed, I believe that designers are becoming more and more involved in multi-faceted milieus (that can include the development of innovation in the public sector, the reframing of business models, the creation of collaborative solutions or of innovative managerial solutions). Regardless of the domain, a specific transdisciplinary approach must be envisaged to break the boundaries and expand the approaches.

The seminal work of Erich Jantsch in 1972, *Technological planning and social futures*, is considered as the main reference for this dissertation for the notion of hierarchy of increased complexity from multi-, to transdisciplinarity in the cooperation and coordination among disciplines. [6] According to Jantsch, a renewed disciplinary relationship was needed to deal with such changes at a macro level: university needs to become an active institution in society, with a close connection with institutions and industry for a knowledge-based and methodological-based actions towards a proper framework, and consequentially it was needed to break the silos of disciplines toward an increasing cooperation and coordination in the education system, since disciplinarity as a specialization in isolation is meaningless for a purposeful system.
Even if Jantsch's focus was not specifically on the discipline of design, the forecasted issues are extremely relevant in the general scenario depicted. He illustrates the hierarchy as follows:

- **disciplinarity** as a specialization in isolation and as *"a static principle which becomes meaningless if considered in the framework of a purposeful system"* (1972, p. 220);
- **multi-disciplinarity,** when there is no direct cooperation among the disciplines;
- **pluri-disciplinarity**, when there is a direct cooperation among the disciplines without coordination;
- **cross-disciplinarity**, when there is a direct cooperation among the disciplines, with a strong polarization towards one (one within the other);
- **inter-disciplinarity** as a coordination by higher-level concept, meaning that it involves cooperation between disciplines to the point of modifying their concepts, structures and aims through a common viewpoint or purpose, especially in a two-level coordination;
- **trans-disciplinarity** includes a multi-level coordination, *"embracing a multitude of interdisciplinary two-level systems"* (1972, p. 222) that changes the overall purpose of the system.

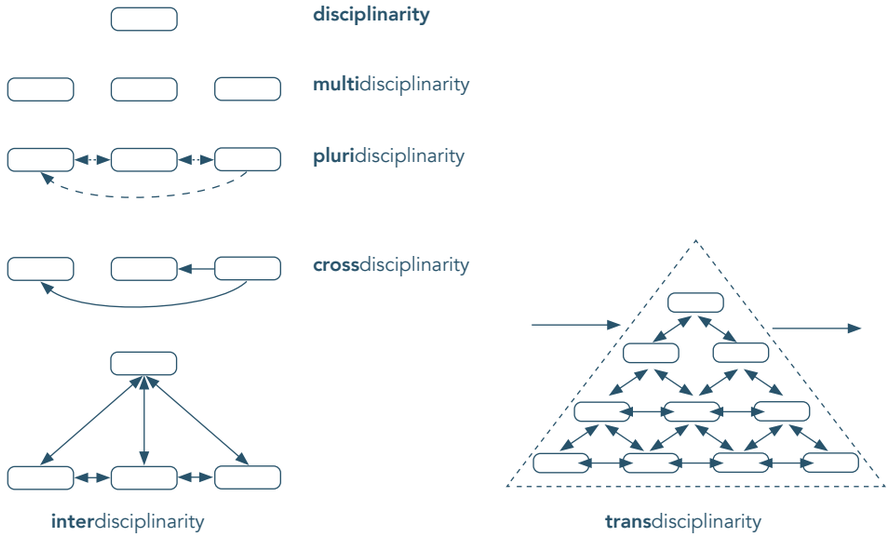


Fig. 2 – From: Jantsch, E. (1972). ***Technological planning and social futures.*** New York: Halsted Press, a Division of John Wiley & Sons, Inc., p.221.

[5] The authors refer to the notions of hierarchy of increased complexity from multi-, to cross- and to inter- disciplinarity, theorized by Jantsch, E. (1972). ***Technological planning and social futures.*** New York: Halsted Press, a Division of John Wiley & Sons, Inc.

[6] Cf. chapters 15 and 16 of the book.

NOTES ON THE WORK OF ERICH JANTSCH

Jantsch carried out a very substantial investigation on the impact of the technological changes within social change and on the multiple implications. He forecasted the shifts due to the technological change's implications on social, institutional and labour issues and the need for an increasing cooperation and coordination of disciplines to deal with on a large and multiple scale. To mention few, he analysed and anticipated a series of questions that are evident today:
- *the shift from a mechanistic and linear thinking to a non-deterministic one to tackle a complex systemic context*
- *society and technology seen as joint systems, including policy, strategic and tactical issues;*
- *the need for future-oriented systems of human decision making over a basic problem-solving approach;*
- *the need for large social systems of participative planning and decentralized initiative matched with centralized synthesis;*
- *the need for universities to become an active institution in society, building and maintaining a close connection with other institutions and industry for knowledge-based and methodological-based actions towards a proper framework;*
- *the consequential need to break the silos of disciplines towards increasing cooperation and coordination in the education system.*

No direct cooperation among disciplines is expected.	**One discipline should support the other within itself.**	**Direct cooperation exists but it doesn't expect the borders of the different disciplines to be crossed.**	**Direct cooperation exists. The borders of the different disciplines are crossed and overcome.**
It refers to adding different isolated disciplines without any direct cooperation in-between.	Where one discipline supports the other within the other.	There is a cooperation in both directions and the results can't be achieved entirely only within one of the two.	It requires an extensive amount of knowledge, a systematic proficiency and a comprehensive theoretical framework.

Fig. 3 – From: Jantsch (1972). Gustafsson et al. (2016). Edeholt & Löwgren (2003). Muratovski (2015).

The dissertation's positioning within this framework is to build an interdisciplinary approach between Service Design and Spatial Design in light of transdisciplinarity in design education.

The precursory and accurate nature of his work is evident, and his notion of hierarchy of increased complexity from multi-, to trans- disciplinarity in the cooperation and coordination among disciplines is extremely relevant for this dissertation. In fact, his work provides a clear framework for the transdisciplinary approach in attempt to be formulated.

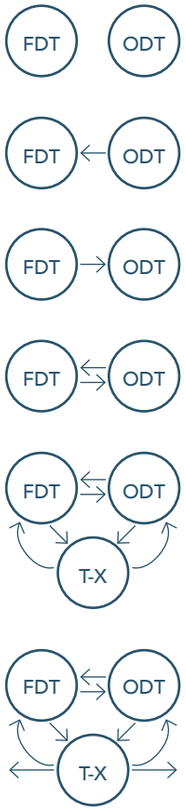
Within this discussion, the contribution of Gustafsson et al. in *Developing service research–paving the way to transdisciplinary research* is particularly important. The paper aims at understanding how service science,

> *"as an interdisciplinary area of research, can increase its potential for transdisciplinary contributions from the perspective of what signifies intra-, multi-, inter-, and transdisciplinary research" and they argue that "service research should strive for transdisciplinary but first the research needs to become truly interdisciplinary" (2016, pp. 1–2).*

In developing different forms of theorizing research, their notions are illustrated as follows:

- **intra-disciplinarity**, when research is conducted internally within a discipline without any explicit intent of making contributions to theories of other disciplines;
- **multi-disciplinarity**, when there is a disciplinary collaboration, classified as theory borrowing (*"one-way contribution of theories developed in other disciplines to describe and explain observed phenomena […] with no explicit intent to make contributions to the borrowed theory"*); theory lending (*"one-way contribution of theories developed in a focal discipline to describe and explain observed phenomena […] with no explicit intent to make contributions to the lent theory"*); mutual theory (*"a two-way theoretical exchange that involves the coordination and/or juxtaposition of theories from various disciplines"*);
- **inter-disciplinarity**, *"occurs at the fringes of established disciplines and leads to the forging of a new discipline when the restrictions and limitations of the parenting disciplines do not allow further theoretical progress"*;
- **trans-disciplinarity**, when *"mutual theory development leads to the development of revelatory, and evolving theoretical explanations that transcend the pre-existing understanding of any of the contributing fields"* (2016, pp. 3–4).

By comparing the two frameworks, it is useful to gather an in-depth understanding of the shift towards multi-, cross- and transdisciplinarity in theoretical research. From one side, Jantsch frames it in a wider discourse around the added value of a disciplinary cooperation to understand the impact of a complex system of knowledge on social, institutional and labour



Intradisciplinary
Development of a theory within a focal discipline (Focal Discipline Theory - FDT) without any explicit intent of coordinating insight with or making contributions to theories developed in other disciplines (Other Discipline Theory - ODT).

Multidisciplinary forms
Theory borrowing: One-way contribution of theory developed in ODs to describe and explain observed phenomena, and increase the quality of intradisciplinary theory-based research in a FD. There is no explicit intent to make contributions to the borrowed theory.

Theory lending: One-way contribution of theory developed in a FD to describe and explain observed phenomena, and increase the quality of intradisciplinary theory-based research in ODs. There is no explicit intent to make contributions to the lent theory.

Mutual theoretical advancement: Two-way interdisciplinary contribution of and to theory that involves a joint use of and/or juxtaposition of theories from various disciplines in ways that help advance, falsify, and/or define the boundaries of the contrasted theories within each of the involved disciplines.

Interdisciplinary
Interactive mutual theoretical development and integration among and on the fringes of different disciplines (with different concepts, methods, data and terms), organised into a common effort on a common problem.
Interdisciplinary research leads to revelatory and evolving theoretical advancement (T-X) and the forging of a new discipline with sustained intercommunication among participants from the different disciplines.

Transdisciplinary
Mutual theory development that leads to the development of a novel, revelatory, and evolving theory (T-X) that transcends the preexisting theoretical understanding in the involved disciplines. Transdisciplinary theorising representing a holistic approach that seeks to relate the involved disciplines into a coherent whole by creating a novel theoretical understanding that is applicable across and beyond preexisting theories in any single contributing discipline.

Fig. 4 – In Gustafsson, A., Högström, C., Radnor, Z., Friman, M., Heinonen, K., Jaakkola, E., & Mele, C. (2016). Developing service research–paving the way to transdisciplinary research. ***Journal of Service Management, 27***(1), 9–20. Diagram by the authors, p.4.

changes and challenges. He forecasted the shifts due to the technological changes' implications on social, institutional and labour issues and the need for an increasing cooperation and coordination of disciplines to deal with these on large and multiple scales. To mention a few, he analysed the shift from a mechanistic and linear thinking to a non-deterministic one to tackle a complex systemic context; the need for future-oriented systems of human decision-making over a basic problem-solving approach; and the need for large social systems of participative planning and decentralized initiative matched with centralized synthesis. According to Jantsch, a renewed disciplinary relationship was needed to deal with such changes at a macro level: the university needs to become an active institution in society, with

a close connection with institutions and industry for a knowledge-based and methodological-based actions towards a proper framework, and consequentially it was needed to break the silos of disciplines toward an increasing cooperation and coordination in the education system, since disciplinarity as a specialization in isolation is meaningless for a purposeful system. The precursory and accurate nature of his work is evident, and his notion of hierarchy of increased complexity from multi-, to transdisciplinarity in the cooperation and coordination among disciplines is extremely relevant for this dissertation. In fact, his work provides a clear framework for the transdisciplinary approach in an attempt to be formulated.

From the other side, the work of Gustafsson et al. supports this exploration within the design research domain, with an attention on service science, being the touchstone of many shifts occurring in the last decades within design research (on the intangibility of the design object; the value of co-creation; the economic and strategic value of design; methods to observe and interpret needs and behaviours; and to transform it into something useful, usable, desirable, efficient and effective (Buchanan, 2001; Holmlid

This research illustrated a process in which the exploration of possible contributions from one discipline to the other has been tested with experimentations in design education with a multidisciplinary approach, in order to then inform more advanced exploration to go beyond their restrictions (interdisciplinary approach), and finally to frame a possible transdisciplinary direction through theoretical explanations.
The proposed framework is still not meant to be forced into a testing environment but, rather, to expand the borders. In fact, multi- / cross- / interdisciplinarity are applicable to testing environments while transdisciplinarity is the perspective for theoretical implications.

& Evenson, 2008). Furthermore, they underline that any levels of theorizing research contain the lower ones, so that the more complex ones embed the simpler ones, which is necessary to have diverse insights towards more comprehensive theoretical understandings.

Considering the possible ambiguity, the language differences (terminology, contexts, methods and levels of analysis), and the tendency to disciplinary protectionism as some of the challenges for transdisciplinary dialogues, Gustafsson et al. argue that

> *"due to its inherent interdisciplinary roots service research has the opportunity to develop service research theory with transdisciplinary qualities if the domain manages to address internal ('stacking' concepts) and external (conceptual distance) challenges [and] has an opportunity to become a more open and creative domain that engages in mutual and reciprocal theorizing across academic disciplines and institutions outside the academia. […] Essentially, [they] argue that service research should strive for transdisciplinarity but first the research needs to become truly interdisciplinary." (2016, p. 8 and 4).*

1.4.3 Frameworks for the comparison of design disciplines

It is necessary here to illustrate the frameworks on which the dissertation's comparison relies.
In 2003, Håkan Edeholt – Professor in Design at the Oslo School of Architecture and Design, Norway – and Jonas Löwgren – Professor of Interaction and Information Design at the Division of Media and Information Technology of the Linköping University, Sweden – published the article *"Industrial Design in a Post-industrial Society: A framework for understanding the relationship between industrial design and interaction design"*. [7] In it, they built a framework by which to understand the relationship between the disciplines of industrial and interaction design, in order to suggest the need of interdisciplinary approaches to go beyond strict divisions in design practice and within the current panorama of the development of ICT, integrated in completely new ranges of products and in heterogeneous systems, and specifically when based on conditions given by the material rather than the virtual world (2003, p. 2). This comparison is contextualized in the disciplines' encounter in the development of ubiquitous computing, where information and communication technology move from the desktop to permeate many aspects of everyday life, analysing the impact of the changing user/computer ratio through the decades and the impact of the evolution of industrial design both in the industrial domain and in the development of two different educational traditions, Arts and Crafts on one hand and the Architecture on the other. Without describing their setting of discussion in more depth, it is interesting to find a parallelism with this comparison between design disciplines with a different historical breadth, with disciplinary needs emerging from a changing design practice and a changing practice of use; this research context shares similarities to this one. Also for that reason, it has been taken as a reference framework for disciplinary comparison in the design field.

The paper's authors initially identified ***3 general areas: Process, Materials and Deliverables***. Each area has three key dimensions with two aspects, that are more or less opposed but this does not mean that a discipline cannot contain the two aspects in equal measure.

> *"For each aspect, the disciplines of industrial design and interaction design are scored on a three-point scale: the discipline is highly oriented, somewhat oriented, or not to any significant degree oriented towards the aspect. […] The scores represent [the authors'] understanding of the current best practice in the respective discipline" on a mainstream level and with highly simplified characterizations (2003, p. 6).*

The Edeholt and Löwgren framework has been then revisited by Holmlid in 2009 in the article *"Interaction design and service design: Expanding a comparison of design disciplines"* that explicitly starts from the 2003 publication and carries on the disciplinary conversation with the added component of the Service design discipline as a further level of encounter with industrial design and interaction design. As Holmlid states,

> *"for design to work in an integrated manner in such situations [business innovation strategies combining process innovation and interactive technology, e-government, etc.] designers need to have an understanding of each other's disciplines [and] by comparing the design disciplines according to dimensions of a small set of areas, [the author] provides a basis to share understanding, create common ground and identify differentiation" (2009, p. 1).*

In accordance with the initial framework, Holmlid added the Service design level, using the same terms and adding others hen necessary according to the new variable of the framework.

[7] Edeholt, H., & Löwgren, J. (2003). Industrial design in a post-industrial society: A framework for understanding the relationship between industrial design and interaction design. In ***Proceedings of the 5th Conference of the European Academy of Design, Barcelona.***
At that time, they both belonged to the Arts and Communication Department at Malmö University College, Sweden.

The Edeholt & Löwgren framework is reported here:

First key dimension: the design process

• ***(P1) Design process: explorative*** – when the design process is open and searching, in terms of problem framing as well as proposed solutions; ***analytical*** – when it starts from the assumption that the problem can be analyzed and specified first, then solved through design:

> *Industrial design processes are highly explorative, somewhat analytical.*

> *Interaction design processes are not significantly explorative, highly analytical.*

• ***(P2) Design representation: depictive*** – when the design representation looks like the intended final result (i.e. volume models); ***symbolic*** – when it expresses aspects of the final result other than its appearance (i.e. flowcharts):

> *Industrial design representations are highly depictive, not significantly symbolic.*

> *Interaction design representations are not significantly depictive, highly symbolic.*

• ***(P3) Production process: physical*** – refers to the production of material artefacts that are manufactured from physical parts, consuming raw materials and requiring machinery and tools; ***virtual*** – refers to the production of software and similar artefacts which in principle have no production cost:

> *Industrial design production is highly physical, not significantly virtual.*

> *Interaction design production is not significantly physical, highly virtual.*

Second key dimension: the design material

• ***(M1) Material: tangible*** – when the design material can be touched and sensed; ***virtual***:

> *Industrial design materials are highly tangible, not significantly virtual.*

> *Interaction design materials are not significantly tangible, highly virtual.*

• ***(M2) Dimensionality: spatial*** – when the design material extends mainly in the three dimensions of physical space; ***temporal*** – when it unfolds over time and it entails concepts such as story and interaction:

> *Industrial design dimensionality is highly spatial, not significantly temporal.*

> *Interaction design dimensionality is not significantly spatial, highly temporal.*

• ***(M3) Aesthetic focus: visual*** – when the aesthetic focus is concerned with the form of an existing or proposed artefact in itself; ***experiential*** – when it is concentrated on how the existing or proposed artefact is perceived, mainly in terms of its use:

> *Industrial design aesthetics are highly visual, somewhat experiential.*

> *Interaction design aesthetics are not significantly visual, highly experiential.*

Third key dimension: the design deliverables

• ***(D1) Scope of deliverable: product*** – when the artefact itself is at the focus of attention; ***use*** – when the artefact is embedded in multiple layers of activities and other artefacts, making it more of a service offer:

> *Industrial design deliverable scope is highly product, somewhat use.*

> *Interaction design deliverable scope is not significantly product, highly use.*

• ***(D2) Flexibility of deliverable: final*** – when the deliverable is relatively static after delivery; ***customisable*** – when it is intended to be modified and further developed after delivery by the customers, by the designers or by third-party actors:

> *Industrial design deliverables are highly final, not significantly customisable.*

> *Interaction design deliverables are somewhat final, somewhat customisable.*

• ***(D3) Customer for deliverable: mass market*** – a mass market view of customers entails consumer-oriented marketing, large numbers of potential customers that are essentially unknown to the designers; ***organizational support*** – a view of the customers related to bespoke development, consulting and contracting work where a single customer organization receives a tailor-made deliverable:

> *Industrial design customers are highly mass market, not significantly organizational support.*

> *Interaction design customers are somewhat mass market, highly organizational support.*

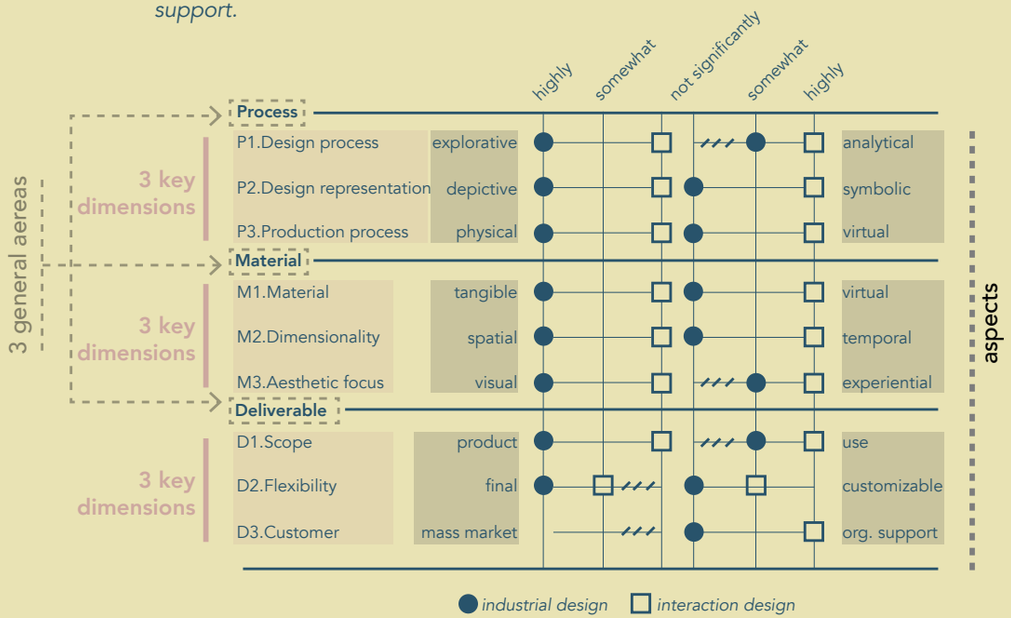


Fig. 5 – Diagram by Edeholt and Löwgren, p.8.

The Holmlid framework is reported here:

First general area: the design process

• ***(P1) Design process: explorative – analytical:***

> *Industrial design processes are highly explorative, somewhat analytical.*

> *Interaction design processes are not significantly explorative, highly analytical.*

> *Service design processes are highly explorative, and somewhat analytical.*

In fact, "Service design is a discipline that is influential in innovation processes, in business and technology development […] With a process that covers so many aspects it would be easy to say that it is explorative as well as analytical. […] The service design processes drive and support divergence, convergence as well as selection. " (2009, p. 3)

• ***(P2) Design representation: depictive – symbolic – enactive –*** when using dramaturgy or choreography to represent the service process:

> *Industrial design representations are highly depictive, not significantly symbolic, and not significantly enactive.*

> *Interaction design representations are not significantly depictive, highly symbolic, and somewhat enactive.*

> *Service design representations are somewhat depictive and highly symbolic, and highly enactive.*

In fact, "depending on who uses the representation for a specific purpose their nature will shift between depictive and symbolic" (2009, p. 4). Service Design deals often with goods, products, and physical spaces as touchpoints of the process where model, sketches, and prototypes are largely used to represent the structural significance of what is represented. The use of theatrical prototyping perfectly embodies an enacted representation, because it uses dramaturgy or choreography to tell the service process.

• ***(P3) Production process: physical – virtual – ongoing*** – since a service is not an "a priori" artefact, but it is in itself a production process:

> *Industrial design production is highly physical, not significantly virtual, and not significantly ongoing.*

> *Interaction design production is not significantly physical, highly virtual, and somewhat ongoing.*

> *Service design production is highly physical, highly virtual, and highly ongoing*

While Edeholt and Löwgren focused here their attention on artefacts, a service is not an artefact existing a-priori but throughout the whole process itself: production, co-production, value-addition (2009, p. 4).

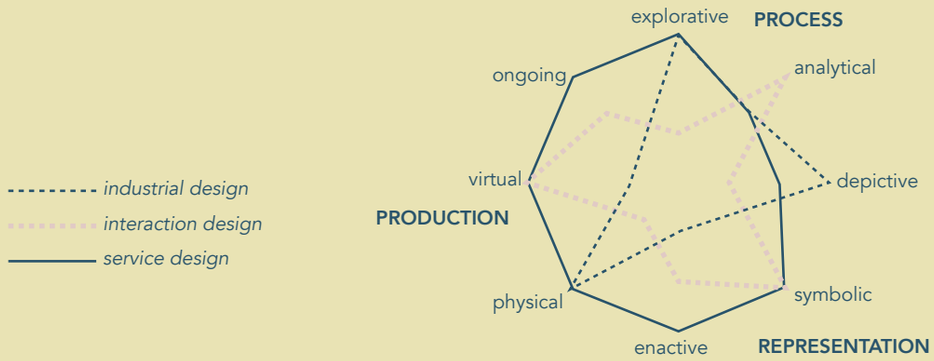


Fig. 6 – Diagram about the dimensions of the Process area by Holmlid (2009) p.4.

Second general area: the design material

• ***(M1) Material: tangible – virtual:***

> *Industrial design materials are highly tangible, not significantly virtual.*

> *Interaction design materials are not significantly tangible, highly virtual.*

> *Service design materials are highly tangible and highly virtual.*

In fact, "In service design it is essential to establish service evidence, and to have a clear service interface, but also to have software, manuscripts and other virtual material" (2009, p. 4).

• ***(M2) Dimensionality: spatial – temporal – social*** – since the temporal dimension also involves the social aspects, the relational dimension is then underlined:

> *Industrial design dimensionality is highly spatial, not significantly temporal, and not significantly social.*

> *Interaction design dimensionality is not significantly spatial, highly temporal, and somewhat social.*

> *Service design dimensionality is somewhat spatial, highly temporal, and highly social.*

In fact, "A service is always produced in a social and physical setting. [...] How the physical environment is layed out can be of major importance for the service. Moreover, a service is temporal in its nature. It is hard to imagine a service that does not unfold over time. [...] Services always have a social (or relational) dimension." (2009, p. 4).

• ***(M3) Aesthetic focus: visual – experiential – active*** – when the aesthetic focus is on the social relationships between the human agents of the service process:

> *Industrial design aesthetics are highly visual, somewhat experiential, and not significantly active.*

> Interaction design aesthetics are not significantly visual, highly experiential, and not significantly active.

> Service design aesthetics are somewhat experiential, highly visual, and highly active.

A service can be considered experiential as it can be tested only when it is used. But, at the same time, the service's tangible touchpoints – such as goods, spaces, and products – reflect its aesthetics, connecting their appearance with the visual aesthetics of the service. The service's active aesthetic refers to the attention toward the human relation, where this dialogue is re- established between the human agents in the service process (2009, p. 5).

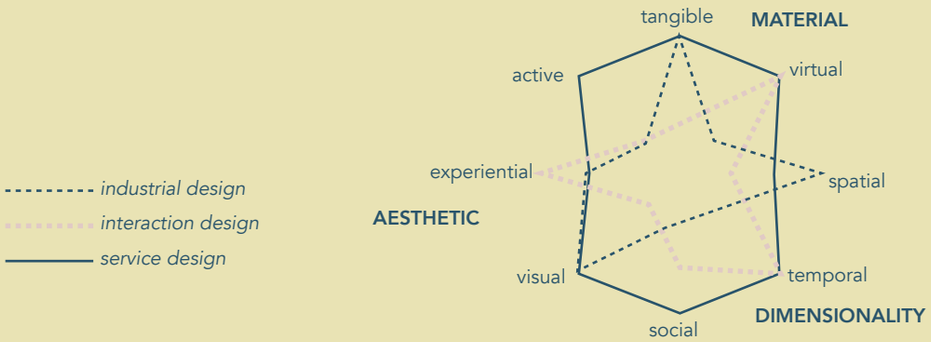


Fig. 7 – Diagram about the dimensions of the Material area by Holmlid (2009) p.5.

Third general area: the design deliverables

• ***(D1) Scope of deliverable: product – use – performance*** – since the deliverable relies on the experience of participation, of value co-creation:

> Industrial design deliverable scope is highly product, somewhat use, and not significantly performance.

> Interaction design deliverable scope is not significantly product, highly use, and not significantly performance.

> Service design deliverable scope is somewhat product, highly use, highly performance.

In fact, "the main deliverable of service design is based in a temporal structure where the experience of participation, action and contribution is at centre stage, but there will be artefacts and products embedded in this activity that are central for the experience of the service." (2009, p. 5).

• ***(D2) Flexibility of deliverable: final – customisable – dynamic*** – given that the service design is not finished until the service is performed, there is a high degree of dynamicity in the deliverable:

> Industrial design deliverables are highly final, not significantly customisable, and not significantly dynamic.

> Interaction design deliverables are somewhat final, somewhat customisable, and somewhat dynamic.

> Service design deliverables are somewhat final, highly customizable, and highly dynamic.

In fact, "A service design deliverable is final, or static, in the sense that when the service is over, it cannot be revoked or changed. For a service customer getting a service once, the service is static, but over time the service can be highly customisable. Given that the service design is not finished until the service is performed, there is a high degree of dynamicity in the deliverable." (2009, p. 6).

• ***(D3) Customer for deliverable: mass market – organizational support – customer's customer*** – since the influence of the customer's customer experience is important:

> Industrial design customers are highly mass market, not significantly organizational support, and somewhat customer's customer.

> Interaction design customers are somewhat mass market, highly organizational support, and somewhat customer's customer.

> Service design customers are highly mass-market, highly organizational support, and highly customer's customer.

In fact, "the deliverable from a service design point of view often is as influential for the customer's customer, and her experience of the service, as it is important for the customers possibilities to give high quality service." (2009, p. 6).

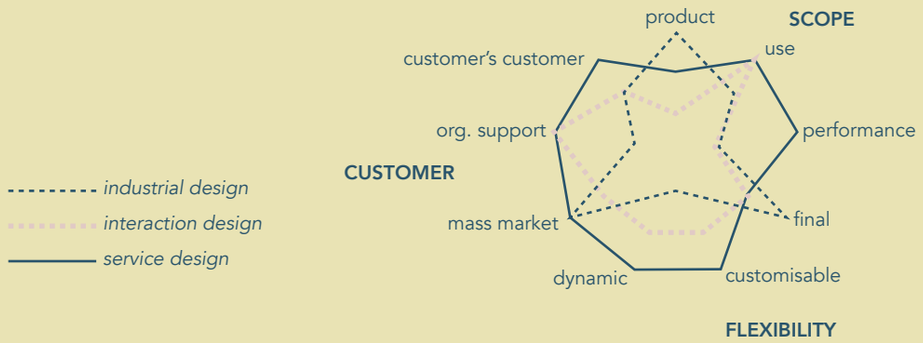


Fig. 8 – Diagram about the dimensions of the Deliverable area by Holmlid (2009) p.5.

These two frameworks are interesting because they offer a parallelism between design disciplines in a clear way, and because of its highly simplified characterisation to represent the current best practices of the disciplines.
This comparison between design disciplines is highly interesting and it has the value of expanding the theoretical reflections of the impact of the design object and the design process – in their wider sense – on multiple layers of their ontological meanings.
However, it is evident that the dependence on specific examples determines the greater variable of this framework, depending on the level of advancement of technologies that are able, as is evident nowadays, to unbalance acknowledged paradigms, such as temporal and spatial paradigms.

For the concerns of this dissertation, this framework has provided a useful inspiration and reference to frame the later proposed Qualitative Comparison (taxonomy) between Spatial and Service Design. However, this taxonomy is not built around a specific disciplinary encounter, such as in the reference, but it is built upon theoretical Dialogues on the nature of services and spaces in their encounter in the physical realm, in order to foster a qualitative discussion on design disciplines' influence and impact in their specific domain.

For this reason, my intention is not to add the Spatial Design level in the presented framework as the main scope of this dissertation, but as a test to support the later taxonomy proposed.
This test has been developed as part of the master thesis in Product-Service System Design by the former graduate student Gea Sasso, that I co-supervised. [8]

Moreover, Holmlid, in the paper's discussion paragraph, also underlined that the areas in which a new term was needed are exactly the areas of expertise of Service design, where the contribution and the competences of the discipline are evidenced.

[8] Sasso, G. (2018). ***"S+S – Framing the relationship between Spatial and Service design disciplines. An explored intersection through the analysis of their process and tools"***. Master thesis in Product-Service System Design, School of Design - Politecnico di Milano. Supervisor: Davide Fassi. Co-supervisor: Annalinda De Rosa.

In accordance with that and in line with the purpose of this dissertation, the scope of framing the fundamentals of a transdisciplinary approach means that – here – the areas in which each discipline expresses its contribution to the wider reflection on the design research is exactly where the disciplinary coordination and cooperation should be explored.

However, the framework here presented has been a fundamental reference to rely on, both in its structure and in the contribution of the authors around the disciplines for a definition of the comparisons. Furthermore, Holmlid also relies on Buchanan's framework on the design orders, defining it as a

> *"partial model, […] valuable to interpret the design disciplines as integrative disciplines or as boundary openers of the model" itself (2009, p. 7).*

This observation is important: from one side, because it underlines the impossibility to strictly categorize established design disciplines, but is useful to orient their initial conception; from the other, **it supports the outreach of the design disciplines towards a transdisciplinary cooperation.**
From Jantsch's hierarchy of increased complexity from multi-, to transdisciplinarity in cooperation and coordination among disciplines, interdisciplinarity and transdisciplinarity were defined as follows:

- *Inter*-disciplinarity as a coordination by higher-level concepts, meaning that it involves cooperation between disciplines to the point of modifying their concepts, structures and aims through a common viewpoint or purpose, especially in a two-level coordination;
- *Trans*-disciplinarity includes a multi-level coordination, *"embracing a multitude of interdisciplinary two-level systems"* (1972, p. 222) that changes the overall purpose of the systems.

Assuming that both SpD and SD are already disciplines generated by the evolutionary contributions of many other disciplines in and outside the design domain,

> *"only with inter- and trans-disciplinarity the science/innovation system becomes 'alive' in the sense that disciplinary contents, structures and interfaces change continuously through co-ordination geared to the pursuit of a common system purpose. Inter- and trans-disciplinarity thus become the key notion for a systems approach to science, education and innovation." (Jantsch, 1972, p. 224).*

Through her work, it emerges that:

First general area: the design process

- ***(P1) Design process: explorative – analytical:***

  > Spatial design processes are highly explorative, and somewhat analytical.

Spatial Design has a highly explorative process because it usually investigates several different ways to problem framing. It usually collects case studies and faces the research mainly through the exploration of existing good practice within and outside the disciplinary context. It rarely formulates requirement specifications that lead to a traceable way for testing. However, it is somewhat analytical because space has always to answer technical requirements, that offer constraints and opportunities in the evolution of the process.

- ***(P2) Design representation: depictive – symbolic – enactive:***

  > Spatial design representations are highly depictive, highly symbolic, and not significantly enactive.

The representation in Spatial Design is highly depictive and it is intrinsically connected to the core nature of the discipline. The majority of Spatial Design's means of representation are visual and depictive. The symbolism is also a strong component in the design representation of spaces, and it is connected to the values of eternity inherited by architecture. SpD is not significantly enactive during the design process, even if space could be a potential stage for mise-en-scène.

- ***(P3) Production process: physical – virtual – ongoing:***

  > Spatial design production is highly physical, not significantly virtual, and somewhat ongoing.

SpD's production process is highly physical, due to the strong tangible nature of spaces. On the contrary, the production process is not significantly virtual – while it is highly virtual in the design process –, as the most part of SpD takes place in the environment with tangible elements. In the end, the production process for SpD is somewhat ongoing. In fact, even if spaces are in a certain way meant to last and designed to be absolute and everlasting, they are also subject of requalification, of restoration and, above all, subject to the modification through the use.

Second general area: the design material

- ***(M1) Material: tangible – virtual:***

  > Spatial design materials are highly tangible, not significantly virtual.

- ***(M2) Dimensionality: spatial – temporal – social:***

  > Spatial design dimensionality is highly spatial, somewhat temporal, and somewhat social.

The dimensionality of SpD is of course highly spatial. The SpD's dimensionality is somewhat temporal, as space is partially influenced by time. It has to be considered that the idea of the space refers to the absolute paradigm of eternity. Howe, to the human presence. This is connected to the social dimension of the space as encounter. So, the social dimension of SpD results as somewhat social: the human presence has influence on the dimensionality of the space that usually is perceived as a container. These observations are especially valid for the way in which the social and the temporal dimensions enter in the design process discourse. Of course, spaces are highly social and the temporal; but only "somewhat" when referring to their predominance in the design process so far.

- ***(M3) Aesthetic focus: visual – experiential – active:***

  > Spatial design aesthetics are highly visual, highly experiential, and highly active.

The aesthetics of SpD have to be highly visual, as the perception of SpD is channeled through visual means. The experiential aspect of its aesthetic is as important as its visual aesthetics. There is great attention to the possibilities of usage of the artifact, as SpD focuses on the human activities and their functions. SpD's aesthetic focus is somewhat active, as the discipline takes somehow into consideration the moment of the encounter.

Third general area: the design deliverables

- ***(D1) Scope of deliverable: product – use – performance:***

  > Spatial design deliverable scope is highly product, somewhat use, and highly performance.

The scope of the deliverable is highly product, because there is a great attention to the production aspects of the space, in a material sense. The deliverable scope is somewhat use, because space is part of the ecosystem of actions, so it is somewhat performance too.

- ***(D2) Flexibility of deliverable: final – customisable – dynamic:***

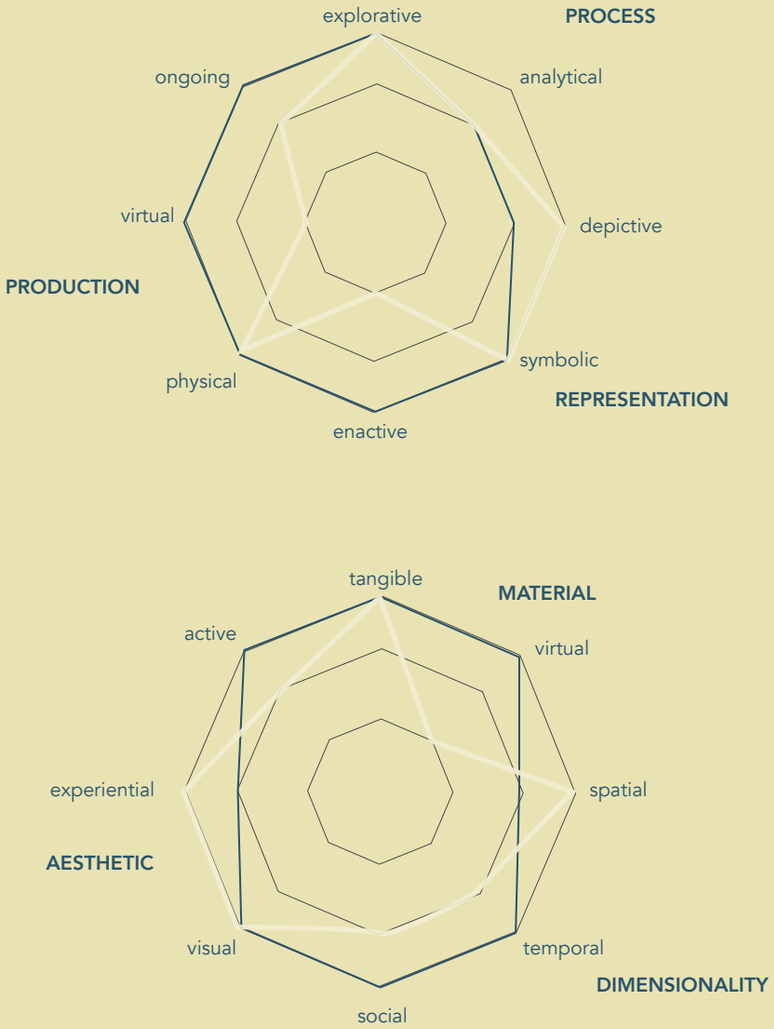
  > Spatial design deliverables are highly final, somewhat customisable, and not significantly dynamic.

It is quite difficult to modify the space after, it could happen but usually with spaces imagined to be subject of transformation. This clearly refers to structural material transformations. In this sense, SpD deliverables are somewhat customizable, because they may be designed to evolve or transform, or in some cases, they can be adaptive. Space is rarely dynamic because, in order to change it, it is necessary to do hard operations that are usually complex.

- ***(D3) Customer for deliverable: mass market – organizational support – customer's customer:***

  > Spatial design customers are highly mass market, somewhat organizational support, and not significantly customer's customer.

SpD customers are always mass market as spaces are designed to be used by anyone, their value is related also to this capacity.



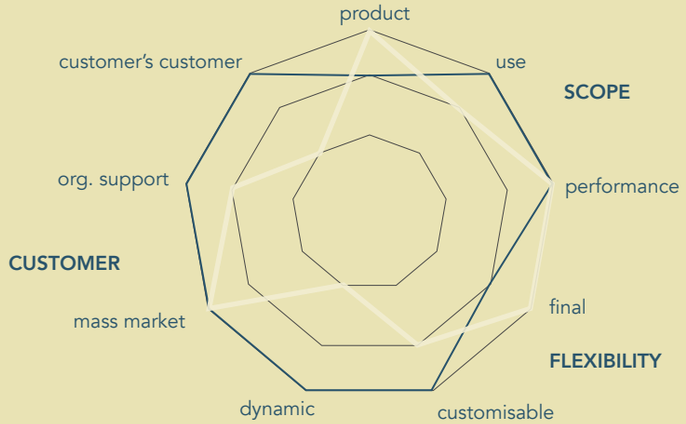


Fig. 9 – Diagrams by Holmlid (2009) with the added Spatial Design analysis by Gea Sasso (pp.24-29).

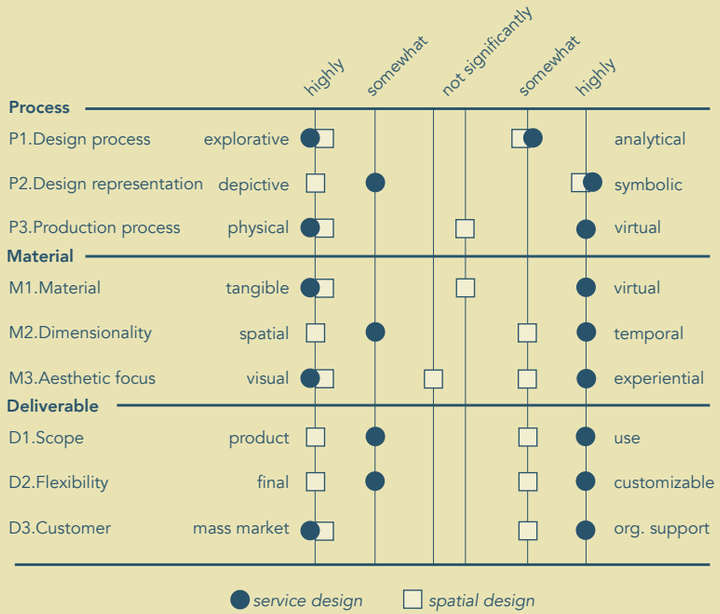


Fig. 10 – Diagrams by Edeholt and Löwgren(2003) with the analysis of Spatial Design and Service Design by Gea Sasso (p.29).

RQ 1: Which are the key dimensions that are laying the theoretical foundations of an S+S approach?

1.4.4 The starting points for the proposed taxonomy

My purpose is to abstract the key dimensions and to attempt to evidence one aspect for the two disciplines here analysed in order to highlight the most relevant contribution of each. The key dimensions proposed are meant to transcend the design process, material and deliverables in order to start the process of identifying supportive structures for the S+S relationship, meaning disclosing the fundamentals.
The SD level added by Holmlid to the Edeholt and Löwgren framework, and the tested SpD level outlined above, show that there is an upper level of analysis that could be taken into consideration before entering into a more descriptive classification such as the one of reference. The proposed dimensions are:

- the environmental dimension
- the temporal dimension
- the social dimension

In fact, the lack in a theoretical development in the research in design between SD and SpD makes necessary a complex but also first attempt in – at least – discussing about a common ground of the two disciplines in order to explore areas of differentiation and of balance. Before presenting the taxonomy proposed, a further step is then needed: the ***dialogues*** exploring the relationship between SD and SpD. These wide dimensions serve to synthetize the gaps identified between the two disciplines, that are seen as occasion to discover where SD and SpD could be complementary to each other and that contains the relevant macro-areas of investigation Edeholt and Löwgren:

- Dialogue 1 – Spaces as permeable platforms: it explores the **materiality** of spaces and networks **(M1)**;
- Dialogue 2 - Narrative and mise en scène: it explores the narrative dimension of the design process, in terms of generation (the management of complexity to trigger the creative thinking) and of **representation (P2)** (the management of data transfer), and their impact on the **aesthetics** of the relationship **(M1 and M3)** within the design outcome;
- Dialogue 3 - Space and ownership: it explores the human system of interactions **(M2 and D1)**, linking the co-design of the design process **(D2)** with the place ownership embedded in the design outcome.

In the complex but humble attempt of this work, an interdisciplinary approach between SpD and SD has been tested in the experimentations through a hybridization that progresses with a disciplinary process of integration, as illustrated in Chapter 4, **in light of transdisciplinarity in design education**:

- design processes with a *multidisciplinary approach*: tools and methods of the Service design discipline informed the Spatial design development.
- design processes with a *crossdisciplinary approach*: tools and methods of the Service design discipline supported the Spatial design development.
- design processes with an *interdisciplinary approach*: tools and methods of the Service design discipline merged with tools and methods of the Spatial design discipline to achieve S+S solutions.

In these research experimentations, design approaches' hybridization has progressively conversed with the design research process itself, becoming process codes. The knowledge acquisition through educational processes has been fundamental in informing reflections and in testing tools.

For all these reasons, the proposed *Qualitative Comparison (taxonomy)* is built on the following Dialogues, exploring a wide range of theories and aspects of the design discipline, and remains on an upper level of research. This approach was necessary since the thesis is a foundational act towards transdisciplinarity between SpD and SD and the Dialogues act as converging factors in that direction, focused on a mutual and reciprocal theorizing across the disciplines.

Parts of the sections of Chapter 1 have been already published in:
- De Rosa, A., & Mazzarello, M. (2018). Italianway: An Entrepreneurial Innovation for Hospitality in Contemporary Cities. In Bruglieri M. (Eds.), ***Multidisciplinary Design of Sharing Services*** (pp. 229–239). Springer.
- Fassi, D., Galluzzo, L., & De Rosa, A. (2018). Service+Spatial design: Introducing the fundamentals of a transdisciplinary approach. In ***Proceedings of the ServDes.2018 Conference.*** Linköping: Linköping University Electronic Press.
- Calvo, M., & De Rosa, A. (2017). Design for social sustainability. A reflection on the role of the physical realm in facilitating community co-design. In ***Issue of The Design Journal. Design for next. Proceedings of the 12th European Academy of Design Conference.*** (Vol. 20, pp. S1705–S1724). Taylor & Francis Group.
- Fassi, D., Galluzzo, L., & De Rosa, A. (2016). CampUS: co-designing spaces for urban agriculture with local communities. ***PAD Journal - Pages on Arts and Design, 13 (Design for Territories),*** 254–278.

2.

THE DIALOGUES. COMPLEMENTARITY BETWEEN SPATIAL DESIGN AND SERVICE DESIGN

Chapter overview

The second chapter illustrates the areas of investigations that generate the proposed *Qualitative Comparison* in the following chapter. This exploration has been framed through literature review and historical research spanning the wider research topics of *design culture and the design object*, of *Spatial design within the design culture* and S*ervice design: theoretical background* on the basics and foundations of the concerned disciplines and of *the PSS concept (cf. Introduction).*

After the analysis of the reasons why multi- / cross- / and interdisciplinarity are applicable to testing environments while transdisciplinarity is the perspective for theoretical implications (Chapter 1), the discussion provides here the reference and the critical understanding in which to frame the proposed comparison through three Dialogues.

Each dialogue extracts *findings* and *complementarity indicators* for S+S to then guide the definition of the proposed taxonomy in Chapter 3. The c*omplementarity indicators* have the scope of describing the core evidences of the disciplinary dialogue towards transdisciplinarity, developed as a way to "connect the dots" within the critical work on the literature review and to build the perspective for the proposed framework.
Chapter 2 paves the way for answers to the second research question of this dissertation:
RQ 2: How can a dialogue between the disciplines of Spatial design and of Service design expand the outreach of the comparison of design disciplines towards a transdisciplinary cooperation?

While the resonance of the research topics faced is transversal to the international design community, the disciplinary exploration has a predominant ***focus on Italian design culture****, as stated in the introduction of this dissertation. Especially concerning the SpD reflection, it is fundamental to declare the focus on the specific theories and reflection on the Italian literature on the value of space and on the definition of its branch of design.*
It is also important to underline that the areas of research revealed and the Indicators later identified are based on the guiding aspects of the ***interdisciplinary nature of services****. According to the service-dominant logic model (Vargo & Lusch, 2004) – that focuses on the transaction to a new perspective of dominance of intangible resources, co-creation of value and relationships – the fact that "no divide exists between goods and a service, since a service encompasses goods" (Penin, 2018, p. 29) and that "goods and services cannot be seen as two different things, since they are actually the same thing" (Penin, 2018, p. 31) will bring my* ***focus on transferring these concepts to SpD, highlighting dialogues, as yet not adequately explored, and through the lens of a cooperation model between disciplines****.*

2.1 The evolution of the design process: the multidisciplinary nature of the establishment of the discipline

Both SpD and SD are already disciplines generated by the evolutionary contributions of many other disciplines in and outside the design domain. The roots of SpD are situated between the history of architecture and industrial design and it has not yet been investigated as an autonomous disciplinary corpus (Branzi, 2006) because of its origin and because of its elusive nature. SD is a younger but consolidated discipline with a multidisciplinary nature: while service science's origin is based on different streams (management, design, social sciences, marketing, operations), SD is also connected with traditional design domains, and especially to the core concepts of design thinking and human-centred and user-participatory methods models, and it is in turn an active part of public policy, business and management areas. This is valid if considering its establishment as well as the domains of applications today and the areas being explored with renewed attention: design and democracy (Bonsiepe, 2006; Margolin, 2012); agonism in co-design (DiSalvo, 2010; Hillgren et al., 2016; Munthe-Kaas, 2015); design for policymaking (Avelino et al., 2015; Boyer et al., 2011; Ezio Manzini & Staszowski, 2013; Mulgan, 2014; Selloni & Manzini, 2016); service evaluation (Drew, 2017; Foglieni, Villari, & Maffei, 2018); and data use for policy making. In fact, complements from other disciplines are strengthening its analytical components: in its evolutionary path within the so-called Fourth Industrial Revolution (Costa, Patrício, Morelli, & Magee, 2017; Morrar, Arman, & Mousa, 2017); in its relationship with the physical realm, going across the SpD discipline as studied here (Pine & Gilmore, 1998; Felix, 2011; Fuad-Luke, 2012; Blomkvist et al., 2016); and the human-to-human and human-to-digital interactions. [1] The overall value of this nature is central in relying on Jantsch's (1972) and Gustafsson's (2016) frameworks and discussion on the shift towards multi-, cross- and transdisciplinarity in theoretical research (section 1.3).

It is then seen as important to explore the evolution itself of SD and SpD, especially in relation to the evolution of the design process. In fact, since SD has developed in the last 20 years a structured operational capacity through recognised methods and tools and SpD, instead, lacks in the development of a shareable method, it is useful to identify a linkage between the meta-design approach of SpD through its evolution from Architecture and the structured acquisition of provisional and probabilistic components into the SD methodology.

The design act is, in general terms, a multifaceted act since it is at the same time a creative process, where experience and intuition have a fundamental role, and a scientific process, with criteria for decision-making and rational systems. When theoreticians began to deal with design, they brought with them the philosophy and practice of analysis as the premise for a scientific approach (Rosselli, 1973, p. 5). After WW2, in fact, dealing with the concept of complexity as a determining condition for an *open* methodological approach in architecture, where intuition and creativity, on one side, and an analytic and deterministic method, on the other, were not already explored as dialectical counterparts. It emerged in fact that both intuition and hermeneutical as well as analytic and deterministic methods were not enough to encompass everything. As Rosselli stated, one does not exclude the other: in fact, intuition does not exclude the method, but it requires it as a dialectical counterpart. In that period, the need for a rationalization of the design process led to the effective introduction of methodologies coming from other important scientific fields, such as information sciences, mathematics and statistics (Collina, 2005). Within the emerged debate, it began clear the indissoluble relationship between, from one side, reality seen as a complex system to be approached and understood, and, from the other, the way – *method* – to deal with reality's issues – *design opportunities* – as a complex system as well as the factors to be analysed, to be synthetized into ideas among the unlimited possible solutions and, finally, to be validated for production and dissemination. That means, that the elaboration of a

[1] From: De Rosa, A., Ayala García, C., & Parisi, S. (2018). The PhD Special Seminar on service design: unfolding a proof of concept. In ***Proceedings of the ServDes.2018 Conference.*** Linköping: Linköping University Electronic Press, p.1189.

comprehensive, unique and right method to deal with any design problem was neither a solution nor the object of design methods studies. The qualitative and intuitive creative act needed a supportive methodological approach: not mechanistic but a sense-making of the design act immersed in the contemporary socio-technical system. As Rosselli [2] stated in the booklet *"I metodi del design"* [Design methods] (1973, pp. 9–10), design methodologies must not be operational – that means depending on the final good and according to its determination – but must be reconnected to a philosophical research in order to reframe them within problems that are dimensionally different. A methodology, in fact, is not directed to solve problems but to understand the relationships among the components of any complex system. Relationships among the things are the object of a method and any procedural method maintains an analytical process aimed at sizing the system of the problem into simpler components, to put them in a hierarchy and to evaluate smaller groups of variables (A. Rosselli, 1973, p. 8 and 17). The so-called wicked problems (Buchanan, 1992) are the subject matter of design thinking in fact; this assumption can be seen as an unresolved way to express something, but it brings us precisely to the understanding that a linear approach to any subject matter is not suitable. A transition from a deterministic view of the system to a complex one occurred, so while a systemic approach is needed, the system escapes from the possibility to be controlled, weakening the ability to design it. Methodologies in design were then seen as fundamental for guiding a sense-making of the design act and, to do so, design methodologies need to be hybridized too since systems with higher levels of complexity and with a higher number of variables need a reformed attitude.

This debate generated internal contrasts within the field, and the innovative approaches had an impact on the transformation of the idea itself of Architecture. In particular the impact of the technological changes within the economic and social transformation and their multiple implications, had a relevant influence in the debate around the design methodology and in the development of Interior and Spatial Design approaches, operating between spaces and relationships. A crisis of the discipline's unity becomes a great cultural opportunity, opening new possible paths to the design culture. We must take a step back to what happened specifically after the Second World War, when a debate in the educational process about the role of architects in rebuilding cities resulted in an original point of view about the role of the technology of architecture, in that it needed transforming, and its relationship to a design approach. The need for methodological research developed from the inadequacy of an intuitive procedure in architectural education, which was unable to cope with new dimensional, quantitative, operational and productive problems. This reflection evolved through a forceful debate via articles in the major journals and had an impact on the evolution of courses and programmes in Italian universities of architecture: in fact, the main

[2] With the research team of the Facoltà di Architettura of the Politecnico di Milano, Progettazione artistica per l'industria [Artistic design for the industry] course, composed by Alberto Rosselli, Adriana Baglioni, Costantino Corsini, Luigi Moretti, Marco Simonazzi, Giuseppe Turchini. Alberto Rosselli (1921-1976) was an Italian architect, designer and professor of the Faculty of Architecture at the Politecnico di Milano, co-founder of the ADI - Associazione per il disegno industriale (Industrial Design Association).

NOTES ON THE LINK WITH SYSTEM THEORY

It is interesting to point out how the concepts of complexity and method are intertwined by the systemic logic, where the lower relationships are the focus of an analytical process. SD itself, coming out of the evolution stream of service science, has acquired design's added value of creating meanings: this aspect is expressly and clearly illustrated in the book "The semantic turn: A new foundation for design" published in 2005 by Klaus Krippendorff, where he stresses the value of design language, able to create meaningful objects through the design process, within a wider ecology (Kimbell, 2009, p. 7).
It is necessary to introduce the relation between SpD and system theory, in order to frame it in the arguments made so far. Spatiality is part of a complex system and this will help in understanding the challenge and objective of the thesis. The systemic approach in the discipline of SpD is not evident and its relationship with the discipline of SD is the first identified issue explored here.

A system may be described as an organized complex of interacting components, together with the relationships among them; a set in which the entities influence each other and, if they leave the structure, undergo alterations; in their unity, they are in some way active. The structure is the constitutive aspect of a system and the relationships make the system significantly useful (Ciribini, 1984, p. 50). The general system theory can be then considered as the scientific doctrine of totality: as a holistic notion – where the system is the union of multiple knowledge gathered under an idea (Kant, I. 1781. "Critique of Pure Reason") – or as a hierarchic conception – if we think for example of the 253 patterns defined by Alexander (1977) that form the network of language and of the structure of human environments: buildings, towns, regions are living entities if made and shared – co-created and participated – by people in society (Alexander, 1977, p. X). If a system is a structure of interactive components, the discipline of architecture – as any design act – is an example of a system of elements and of knowledge: it has a systemic nature both if considering any architectural artefact (a building in itself and within a district, a city and so on, as well as a square), and if looking at the rational procedures to get to it, requiring the joint participation of competences, models and diagrams. However, this last assumption is the result of a long debate that took place mainly in the second half of the last century, that stems from an international debate aimed at achieving a science status for design. In fact, decades after the Industrial Revolution, design continued to be an implicit and experiential operation in between artistic-craft skill, producing cultural products/content, and scientific practice producing technical products/content, without developing into a codified discipline (Hesmondhalgh, 2002).
In this extensive debate covering the whole spectrum of design practice, the inputs from system theory entered in the reflection on the evolution of design as a cognitive and operational act, within a general transformation in many disciplinary domains, due to the changing paradigms in the socio-technical orders that brought to the development of ethnographic studies, community psychology, or human ecology, among others.

theorists were prominent figures of the Italian education system as well as, in many cases, of the professional one. Thus, according to the Italian scientific community, this was influenced by considering the technical elements as objects with which to compose the building system. In order to begin, it required a credible policy of industrial and technological (re)organization (cf. Giulio Minoletti, Alberto Rosselli, Marco Zanuso). Theorists and designers questioned how the university and university teaching could assimilate the new data of the techno-scientific industry, looking for a crucial connection of the academy with the field of practice. [3]

> *"Italian design has been known to elaborate a specific critical culture [that] has laid the foundation for the subsequent development at an academic level of a peculiar research approach […]. The research on Made in Italy design has actually dissociated itself increasingly whether in terms of the desire to emulate the sciences (such as mathematics, physics etc.) or in methods and tools - a typically Anglo-Saxon approach - or in terms of the temptation to remain a magical and ineffable territory, as that of art - an approach typical of Écoles des Beaux-Arts." (Seassaro, A. in Bertola & Maffei, 2008, p. 8). 4*

Parts of these reflections have already been anticipated above, when *Design Methods* by Alberto Rosselli was mentioned. It is interesting how that booklet was intentionally addressed to architects, to provide them with a collection of documents about the international debate around the development of rational design process as systemic and operative procedures. The theories and methods reported in that publication evidenced the need for an overall understanding of the industrial design concept as a reconciliation between function, market and production issue in a final solution, so as to understand the ongoing reflection between creative process and operational method and to transfer it into the education of architects. The design approach was discussed as a method that integrates logical analysis with creative thinking into a unified system [Jones, J. (1959). A systematic design method. In *Design*, n.124, 49-52], as a response to needs to be analysed within the dialectic between situations, activities and objects, where life is read as a sequence of actions [Moles, A. A. (1958). *Théorie de l'information et perception esthétique*], or as the creation of creative and original models, prior to the final work, that meet the needs identified [Archer, L. B. (1969). *Systematic Method for Designers*. Council of Industrial Design]. This is a line of publications that, starting from different areas of interest, considers design knowledge and practice as a programmable process divided into phases, far from the vision of a creative genius, and regardless of whether it is

[3] Cf. "L'insegnamento dell'architettura nelle università italiane" [Architecture Education in Italian Universities], edited by Ludovico Quaroni, 1959-60).

[4] Alberto Seassaro was the first dean of the Faculty of Design of Politecnico di Milano and one of the authors – with Raffaella Crespi and Leonardo Fiori – of the founding document of technological teachings in the Faculty of Architecture in 1970.

mechanical engineering, architecture, design or something other. Furthermore, in the essay "*Lo spazio aperto. Ricerca e progettazione tra design e architettura*" [The open space. Research and design between design and architecture] (1974), Alberto Rosselli clearly states that the overcoming of the contrast between architecture and design was desirable through the development of a methodology broad enough to accommodate a more evolved and relevant social need, towards a complementarity between culture and method. Within this complexity, the design outputs were already seen as ***relational phenomena***, not obtainable through linear processes but through a complex system of prevision (models) with an impact overcoming the borders of the output itself. This logic has been transferred to the space, which can't be qualitatively solved within the architectural object but must be understood as part of a socio-economic sphere, where an integrated relationship between spaces and objects needed to be explored. Neither places nor objects should be seen as independent parts: the object is part of a system in time and space and space is a relational issue, resulting from certain situations, certain activities and certain objects (1974, p. 8).
Clearly rooted in this debate, a need emerged throughout the '70s to include the systemic approach in the design process itself and not only in the nature of design, thus introducing the meta-design approach and clearly driving the architectural studies reflections into the design ones, opening the Italian *cultura del progetto* to the international meaning of *design* as a disciplinary field (and not only as the pure translation of *progetto*). Ciribini[5] spoke about the management of the design process as *"an adaptive dynamic system"*: a sequence of actions of the programmatic action of the designer, that works through qualitative models and preventive solutions (Collina, 2005). The iteration along the whole process is constitutive: using a meta-design approach means structuring norms able to indirectly produce infinite and different but homogeneous morphological solutions. [6] Pushing forward that discussion today, meta-design and the design method are not only a sequence of operations in a scientific methodological process for exhaustively listing functions, purposes, requirements, constraints and any other factor that can drive the project, but it must also deal with an abductive process of inquiry. The design activity must surrender to an integral control of both the process and the output since the project embodies the unexpected as a constitutive element (Crespi, 2013).

In these definitions, the basic notions pertinent to the design process are evident: the *notion of system* – the structural order of the relationships

[5] Giuseppe Ciribini (1913-1990) was an Italian engineer and professor of Architectural Technology at the Politecnico di Torino. He is considered the father of the discipline of Architectural Technology in Italy. It is important to report that the process that resulted in the foundation of the School of Design – the former Faculty of Design after the Italian reform (L. n. 240 of 30/12/2010) – developed from the Department of Technology, then to the Department of Planning, Design and Construction [Dipartimento di Programmazione, Progettazione e Produzione Edilizia].

[6] Alessandro Mendini, "Metaprogetto sì e no" [Metadesign yes or not], in ***Casabella, n.333***, 1969, p.13.

between the parts in a given set; the *notion of process* – when the time variable introduces the dynamic sequencing of states; and the *notion of iteration* and the *notion of creativity*. This last is not opposed to a systemic approach but is its *dialectical counterpart*: the system is the undeniable structure of reality; the system is the undeniable structure of the method as an operational and cultural reformulation of problems; creativity is the undeniable and founding variable of any human act. Hence, the design method progresses through being systemic and strategic into the techno-physical system and by acquiring provisional and probabilistic components of the human and socio-cultural environment (Norman & Stappers, 2015; Rosenman & Gero, 1998), renouncing an integral control of the reality to which it is applied, through a strategic and abductive approach (Crespi, 2013, pp. 28–29).

There is a clear connection with the Product-Service System (PSS) dimension. A PSS is defined as a system of products, services, supporting networks and infrastructure designed to be competitive, user-centred and sustainable (Mont, 2002) and *"a marketable set of products and services capable of jointly fulfilling a user's need"* where a product is a "*tangible commodity manufactured to be sold"* and a service is *"an activity (work) done for others with an economic value and often done on a commercial basis"* (Goedkoop, Van Halen, Te Riele, & Rommens, 1999, pp. 17–18). The PSS concept represents the shift from a purely tangible dominant practice to an integrated design strategy oriented to design solutions, where the connection between products and services is not casual but conceived from the very beginning (Meroni, 2008). Goedkoop et al. (1999) define PSS as *"product(s) and service(s) combined in a system to deliver required user functionality in a way that reduces the impact on the environment"*, where the hardware (product component) + the software (service component) are combined in a systemic logic taking into account ecological and economic (value creating) issues in its development; all these parts are inseparable in order to deliver a required user functionality in a way that reduces the impact on the environment. So, the PSS concept should be considered an advanced – or another – vision on the integration of the tangible and the intangible of the service-dominant logic. In a continuously changing society, new forms of consumption and new social demands require a participated complex and contextualized product-service-systems (Meroni, 2008, p. 32), designed, made and delivered on a case by case basis and viewed from the client's perspective (Baines et al., 2007, p. 1549). SD aims at providing a holistic approach in order to get an understanding of the system and of the actors and factors within the system (Mager & Sung, 2011b). Holism is embedded in a cultural and humanistic re-balance of the scientific process.
Transcending the hardware/software relationship and for the clearer tangible/intangible one.

- Tangible (product): extension of the traditional functionality of goods by incorporating additional services;
- Intangible (service): an activity (work) done for others with an economic value often done on a commercial basis
- System: a collection of elements including their relations.

(Baines et al., 2007, p. 1545, paraphrasing Goedkoop). [7]

Since PSS includes acquiring knowledge about the end users as well as all the various players (administration, associations, companies, supply chain actors etc.) and may include their engagement in some phases of the design process, this perspective is explored through processes of co-creation and co-design [8] that are frequently discussed in SD and which have their origins in strategies of inquiry in the social sciences, e.g. Participatory Action Research (see Chapter 1). [9] Also here, an overall system view invests both the object of research and of practice as well as the necessary operational and cultural dimension. As Morelli states (2002, p. 6), the extension of a design activity to incorporate services requires the use of new methodological tools to address PSS, in terms of: understanding the users' needs and the friction between complex technologies and the users; the complexity of variables entering into the design process and the tools and methods to deal with this; and validation of the process (representation, communication and dissemination).

The overall paradigm shift brought about disciplinary reflection on how the approach to the design project changes and how that has an impact on design education, turning from *product creation* to *process creation* (Muratovski, 2010), and setting a balance between artistic, technical, aesthetic and analytical skills. Nowadays, universities – as complex hubs for research and education merged within the physical space of the city and in the transnational system of the global panorama – are fostering their pivotal role within communities of practice and communities of learners. Their renewed cultural and civic role between localization and globalization (Chatterton, 2000) involves more and more design research and design thinking as a strategy to *"advance public and social innovation and achieve creative solutions beyond the reach of conventional structures and methods"*

[7] "Tangible" and "Intangible" terms have been introduced instead of "hardware" and "software" as for the original source.

[8] Co-creation and co-design are creative and interactive processes. It is a method, a strategy, embedding today from co-creation to -production to -evaluating etc. as an expansion of the overall participatory era in which we are. Participatory approaches developed as methodologies from the social sciences in the 1970s, entering into the exploration phases of the design process and, later, within the user- and human-centred design discourse. Today, its expansion of concepts and, consequently, of methods, tools and areas of application, make participatory design central in issues such as democratization, decision making, policies.

[9] Participatory processes had little impact on service development, while they have been strongly assimilated by service design because of its co-created nature. See:
- Holmlid, S. (2012). Participative; co-operative; emancipatory: From participatory design to service design. In ***Conference Proceedings ServDes. 2009; DeThinking Service; ReThinking Design.*** (pp. 105–118). Linköping University Electronic Press.

- Gilmore, T., Krantz, J., & Ramirez, R. (1986). Action-based modes of inquiry and the host-researcher relationship. ***Consultation: An International Journal.***

(Mulgan, 2014).
Throughout this section, the disciplinary evolution within system theory has evolved on two levels: in its implication for the codification of disciplines (theory) in the international and Italian debate, and for the design act from a phenomenological point of view (object), contributing to the foundation of an investigation towards transdisciplinary approaches of a systemic and strategic nature. The incubation of such interest within higher design education is necessary to increase the impact of addressing contemporary needs with strategic thinking.

To conclude, it has been illustrated that there is a linkage between the contextual impact on the methodological development in the SpD discipline and the development of a meta-design approach with the later structured acquisition of provisional and probabilistic components into the SD methodology, dealing with the complexity of variables entering into the design process through the contextual processes of co-creation and co-design. SD has developed in the last 20 years methods and tools linking the creative and the operational sides of the design process, with the *relational* component at the centre of its methodological evolution. SpD, instead, lacks in the development of a shareable method.
The experimentations done evaluated ways to hybridise the methods and tools of SD and SpD towards a S+S testing environment.

Finding 1. ***A transition towards a transdisciplinary coordination and cooperation is needed, rather than an approach based on separate disciplines. This cooperation should take into account a dialectic between the creativity of the design act and the operational nature of the design method.***

Finding 2. ***The systematic nature of the design object is intertwined with the systematic nature of the design process. SD and SpD share a semantic turn towards an open and humanistic methodological approach, where ethnography, community and environmental psychology, play a fundamental role.***

1.COMPLEMENTARITY INDICATOR FOR A S+S TRANSDISCIPLINARY APPROACH

The structured methodology of the design process of SD can expand the operational capacity of the one of SpD in light of the understanding of the common ground they share.

2.2 Dialogue 1. Space as permeable platforms

*Dialogue 1 explores the **materiality** of spaces and networks (M1).*
The connection illustrated above has led to the understanding of the mutually constitutive aspects of services and spaces since both are necessary to achieve a more comprehensive perspective.
The link to the *spaces of flows* and *spaces of places* theorized by Castells (1996) is a useful support in the research for a dialectic connection on how spaces are defined in this dissertation as **permeable platforms**. In *"The rise of the network society. The information age: Economy, society, and culture"*, Manuel Castells reflects on the shift to an informational society, structured around networks that are built on nodes of flows of information through technology. The reflection turns around a global network point of view, where new forms of economy and new technologies have huge impacts on social polarization and social exclusion. The *space of flows* he has theorized is a structure – a system – that is not hierarchically organized, since it depends on the variable of the flows, a vulnerable process and continuously and simultaneously in place. In this versatile network, the city is not a place but a process: a process by which centres of production and consumption of advanced services, and the subordinate local societies, are connected in a global network through information flows which, at the same time, reduce the importance of the connections of global cities with their hinterland (1996, p. 445). The *spaces of flows* introduced new spatial forms and new spatial processes: social processes influence the space by acting on the built environment, inherited from socio-spatial structures that are prior to those taking place now (1996, p. 471).
That is why he introduces the notion of *spaces of flows* in relation to the *space of places*: while *spaces of places* are the **material support** of social practices of sharing time, *spaces of flows* are the material organization of the social practices of sharing time that **operate through flows**. Flows are repetitive and programmable sequences of exchange and of interaction between physically disjointed positions occupied by the social actors: this means the fracture of the relationship between society and its building environment, where places had a social meaning and function, and a loss of meaning of a sense of belonging due to a physical proximity. On the other hand, an absence of physical proximity and the enhancement of flows' mediums have increased a sense of belonging linked to transnational communities and identities (Sassen, 2004) due to social and typological similarities. The *crisis* of the relationship between society and its building environment corresponds to a detachment between city and architecture, since *"eternal structures"* are no longer possible in an urban system composed of sub-systems that are continually renewed, invalidating codes and foundations towards temporariness and reversibility (Branzi, 2006, pp. 65–67). It is no longer possible to speak of unity of the urban and non-urban territories and therefore it is no longer possible to speak of unity of the project, where processes, objects, people and communications prevail.

The *permeable platforms* introduced above are meant to express spaces that are complex systems and networks where relationships and interactions take place and where services affect the *space of places* while operating within the *space of flows*. This is a conception that sees a network of spaces existing only since an overlapping network of services is able to link them: in fact, spaces are not a system in themselves but they are **enablers** of the service network. Through an environmental psychology perspective, a place is a socio-physical unit of analysis, with a place specificity, localized and dynamic because of human interventions that are *"able to influence and also to be influenced by individual behaviour and experience outside of personal awareness"* (Bonnes and Bonaiuto in Bechtel & Churchman, 2003, p. 31). The intertwined link between the notions of *place-centred* and *trans-territorial* expresses a re-democratization of cities through a co-created sense of belonging that is possible thanks to a democratization of flows and spaces. Furthermore, the underlying concept of *liquidity* (Bauman, 2013) implies a

permanent crisis of networks, flows and the design culture; a positive crisis, since it encompasses the dynamic of continuous development (Branzi, 2006, p. 16).
The link between places and network of services has been seen as more suitable in the research about the existing literature on this topic. Just to mention it, the SD discipline as explored for a while in the 90s the concept of ***servicescape*** (Bitner, 1992) where service and landscape are two ingredients.

NOTES ON THE NOTION OF <<SERVICESCAPE>>

The approach of Bitner is strongly related to a customer-oriented marketing view which results interesting and useful but marginally related to the aims of this dissertation. In 1974 there is a first mention about an existing relation between service and its "atmosphere", where importance is given to the impact design of space could have on the senses of the clients (Kotler, 1973). Emphasizing this examination, Bitner claims how "objective environmental factors are perceived by both customers and employees and that both groups may respond cognitively, emotionally, and psychologically to the environment" (1992, p.59), adding one more discriminating factor about human's perception, influenced now also by roles inside the experienced space. In order to talk about customer's perception of a service inside a surrounding, a framework for spatial characteristic is given by Bitner (1992) who identifies ***three macro groups of features for spaces: condition of the environment, space's layout with functionality, as last signs, symbols and objects.*** *The quality of the interiors is strictly related with the five senses' perception of the customers, while layout, functionality and signs are a guidance for the customer and have a more tangible aim. She explains how clients react to the surrounding through cognition, feelings, and their reaction is the cause of their behaviors.*
This is extremely interesting, as a service may be influenced by how the space is perceived, in negative as well as positive way. A compound of different elements – rather that individual factors - is what affects the customer's final perception. Later, an idea of customer experience has been associated with the holistic perception of the environment, especially in the retail sector, where the space becomes the field for enabling an extraordinary customer experience.
It has to be considered, as already said by Bitner in the 1992, that the interest on the surrounding in service was not sufficient. After her warning about this problem, in the latest years a lot of research has been conduct, even though the actual state of the art is still patch-worked and restricted.
Servicescape - intended as an area of research - has to be considered as broad and mutant because of its several interconnections with other many topics that go from the emotional and psychological sphere to architectural and interior studies. In any case it gives an interesting point of view on the themes of the experiences within spaces where services are offered, from a marketing and retail perspective.

* Cf. the master thesis by the former graduate student Gea Sasso, that I co-supervised: Sasso, G. (2018). ***"S+S – Framing the relationship between Spatial and Service design disciplines. An explored intersection through the analysis of their process and tools".*** Master thesis in Product-Service System Design, School of Design - Politecnico di Milano. Supervisor: Davide Fassi. Co-supervisor: Annalinda De Rosa.

2.2.1 Tangibility and intangibility

There has been much discussion on the tangibility and intangibility of the design object within the discipline of SD (Vargo & Lusch, 2004), especially in the '90s, when the increased interest in the discipline questioned and investigated its relationships with the traditional categories of design research. The reflection on the *design object qualities* specifically gave rise to the comparison between service and product design and the then prevalence of intangibility designated the SD object as strategies, interfaces, technologies and interactions. Certainly, the whole design domain was interested in the process of expanding the boundaries of design through attention towards semiotic values, technology advancements, information data, the relationship with the user and so on; although with a prevailing pivotal focus on the *object* in the traditional sense; in fact, SD was positioned relative to industrial design. [10] Today, a return of attention towards the tangibility of service artefacts made this discourse actual again; as mentioned in the Introduction of this dissertation, one of the trends presented this year by Fjord, one of the most influential design and innovation consultancy, in its Fjord Trends 2018 is:

> *"Physical fights back: The future of service design is about blending physical and digital, and already, design specialists are responding. Organizations must put in place new systems, structures and strategies to optimize physical experiences." (www.trends18.fjordnet.com).*

However, if SD is the application of resources for the benefit of another party and service designers design to enable new services to happen, then SD objects could range from tangible to intangible things. And, more importantly, by avoiding focusing on the objects, it emerges that there is no sense in detaching one concept from another: a design approach goes beyond the single, material or non-material artefact, including relationships, interactions, processes and technologies within the environmental and temporal awareness. The material manifestation of services is inherent to more than objects, processes and technologies combined, through physical artefacts and spaces, digital interfaces and devices (Penin, 2018, p. 34) and *"no divide exists between goods and a service, as a service encompasses goods"* (2018, p. 29). The actual predominance of the soft components in PSS requires coordination within the System design approach for integrated inclusion of the spatial expertise. The tangible, intangible and systemic components of the SpD can also be illustrated in a parallel with the PSS logic:

- Tangible aspects are form, structure and functional infrastructure;
- Intangible aspects are light, memories, rituals and symbolic relationships;
- Systemic aspects are the system of the technological infrastructure, issues of the contemporary condition, computer networks, product systems, environmental components, commercial information, the social value of meaningful social environments.

[10] See the development of the reflection at the Hochschule für Gestaltung in Ulm in the 1950s and '60s with Tomàs Maldonado and Guy Bonsiepe.

See also:
Margolin, V. (1988). Expanding the boundaries of design: The product environment and the new user. ***Design Issues, 4***(1–2), 59–64.

Margolin, V. The product milieu and social action. In ***Buchanan, R., & Margolin, V. (1995). Discovering design: explorations in design studies.*** University of Chicago Press.

This comparison highlights the extension of the relationship between SD and PSS where the physical environment is part of its tangible milieu, thus expanding the relationship to SpD.
The design process is essentially a strategy aimed at achieving a goal, initially only discerned, of materiality and of human experiences to be made alive, towards which a random process proceeds to the search for systemic balances that are always reached and always elusive, because they are open to the future (Ciribini, 1984, p. 107). The *certain/uncertain* of the design act is linked to the *tangible/visible* and the *intangible/invisible* of the design outcome: it is in balance between the *"project"*, as a programmatic action, and *"non-project"*, the human actions, memories, rituals and symbolic relationships in the spaces (Crespi, 2013).
The materiality of services is still a multifaceted issue, focused on its touchpoints (the points – digital, physical, person, object, place – of interactions of the user with the service, where users meet the service) or on its evidences, when intangibility is visualized in terms of physical evidence (Stickdorn et al., 2011). In the *design material dimension* of the illustrated framework of Edeholt & Löwgren (2003), carried on by Holmlid (2009), the materiality includes not only tangibility but also its unfolding in time and space, and its social and aesthetic experiential aspects. However, this dimension is not the physical object of SD, but only its representation. In that, it represents the ontological ambiguity of *materiality*: as a constituent of the whole, as something to be formed, as the object of study or as the plot of the performance (Blomkvist et al., 2016). SD thus owns the *materiality* in a multiple dimension, in its elaboration (components and procedures) and its fulfilment (actions, interactions, experiences and locations) as well as in its representation (visual evidence). The materiality of spaces stands as both space and place (see Dialogue 3).

Finding 3. ***The design object of Service Design is the design process, and it enacts the design object within the process.***

Finding 4. ***The systematic nature of the design object of services and spaces implies the reconsideration of tangibility and intangibility of services through a spatial perspective.***

2.COMPLEMENTARITY INDICATOR FOR A S+S TRANSDISCIPLINARY APPROACH

If spaces are relational phenomena and are permeable platforms offering the material support for social practices that operate through flows, this permeable platform is indissolubly a complex network of relationships and interactions; this exists thanks to an overlapping network of services able to link them and, equally, thanks to spaces that are enablers of the service network.

2.3 Dialogue 2. Narrative and *mise en scène*

Dialogue 2 explores the narrative dimension of the design process, in terms of generation (the management of complexity to trigger the creative thinking) and of ***representation (P2)*** *(the management of data transfer), and their impact on the* ***aesthetics*** *of the relationship* ***(M1 and M3)*** *within the design outcome.*

In particular, it creates a linkage between the sequential dimension of the design operational process – see above – into the sequential dimension of the physical evidences of the service interface. the inadequacy of a single intuitive procedure as a unique design methodology was argued, towards complex, non-linear, systems of previsions (models) able to understand the relationships among components within a higher level of complexity and of variables. These *models* provide sequences of actions towards infinite possible solutions (Collina) and encompassing the unexpected (Crespi). By reaffirming the focus on the design process rather than on the final design solution, the approach of SD is embraced: SD is about the process of designing rather than about the outcome (Stickdorn, Schneider, Andrews, & Lawrence, 2011, p. 14). Thus, the focus on the deconstruction of the design process into steps is fundamental. Focusing on that doesn't mean to deny the attention to the solution but, rather, deny an attention *only* on the result that would prevent the capacity to judge complex and dynamically changing situations, with emphasis shifting from *know-how* – in the strict sense of being single-track professionals – to *know-what* (Jantsch, 1972, p. 228). In fact, the object of the project tends to blend with the project path (E. Manzini, 1993). If for Pacenti (1998, p. 104) the fact of dealing with a range of possibilities could mean a loss of the programmatic nature of design, towards the concept she proposed of *"expanded direction" [regia ampliata]*, it emerges the need for a specific sensitivity including the coordination of the process (management) together with a coordination of the overall identity of what is designed. The concept of an "expanded direction" opened the way to the one of *performance*. SD is strongly embedded in the *experience economy* (Pine & Gilmore, 1998), since services happen in the moment of the encounter, when the interaction takes place. It is when the service is *performed* (through a face-to-face interaction, a digital one or through a combination of channels between the user and the provider) that the scene of the performance becomes alive. However, as Kimbell states:

> *"Pine and Gilmore's argument that value creation is about creating experiences is not matched by conventional ways of analysing gross national product. Experiences don't feature – yet – as measurable and governable economic outputs, but services do." (2009, p. 1).*

In that, the service scene includes the design of the physical environment, of the tools used by the operators, of the products that the user uses directly to obtain the result and of the communicative and visual elements. The physical evidences constitute the scenography and the props of the service interface. But the design of the interface also includes the plot of the interaction between the user and the delivery system as a whole, including the interaction with service operators, and the human elements of the interaction scene (Pacenti, 1998, p. 97). And this plot is potential, among infinite but defined possibilities.

In the same way, the interpretation of the space is not univocal; spaces are also **possible mises en scène**, depending on the variables and on the complexity of the context as well as depending on the plot of the interaction. Crespi (2013, p. 41) sees the connection to worlds that are contiguous to SpD – such as cinema, visual arts, theatre and television – as inspirational for the connection between human beings and places, for the elaboration of the programmatic design idea in terms of narration, allegories and metaphors. Thus, the narrative dimension of spaces stands both in their uses and in their elaboration: spaces are, actually, the **enabler** and the support for interactions to take place, within a higher level of **unpredictability**. The relational space between artefact and observer/user is a concept that evolved

throughout the last century especially with the contribution of visual art: art movements such as futurism, constructivism and surrealism researched, in the occupation of the space by the artwork, the relationship with the observer, questioning the notions of space and time in different ways (Krauss, 1981). This cultural process merged into the loss of ability to govern the space and the need for solutions that are not univocal but flexible. This is one of the core SpD processes: the deconstruction of the process corresponds to the structured embedding of the other components – actions, interactions – integrated in the narration of the *journey [percorrenza] into spaces*. In this way, the no longer static understanding of spaces could have found in its dynamic narrative a new way to design and interpret it, where the univocal correspondence of positivism does not exist anymore. Architecture triggers a process of exchange, being a system that creates and defines relations and exchanges between the subjects. It acts on time; it is not a closed but open and flexible system, potentially ready to accept changes (Crippa & Di Prete, 2011, p. 38). Thus, the narrative structure is open: open to the unexpected as well as to an operational act. In terms of visualization of the process, SD usually adopts the concept of **sequencing** to break down actions and interactions and to focus on the different components of the service. This is the *service period*, divided into pre-service, during-service and post-service phases: various methods and tools are used to explore and exploit the steps and the variables along the sequence, both as generative tools and as representational ones. The first is the case of live narratives such as: the *desktop walkthrough*, a physical model where designers *play out* the sequence of interactions to envision insights; the *bodystorming*, where the experience of a service is acted with props and scenes. Representational tools are: the *storyboard*; the *journey map* (also called *customer journey map or experience map*), focusing on the journey of a user in a service, described through a chronological sequence of actions and through corresponding touchpoints; the *system map,* a visual description of the service's technical organization showing the different actors involved, the mutual links among them and the flows of materials, energy, information and money through the system. Also, the *service blueprint*, not focused on the user's point of view since it is an overall view of the service within its whole organization (front-stage + back-stage). Without going in-depth in the description of these tools, codified and shared by the whole scientific community (both in the academic as well as in the agency and practice environments), it is interesting to highlight how SD has identified structured ways to deal with the processional nature of services and to transfer them into the design process, at the operational level and at the representational one, to operate the creation, validation and capacity of communication of the complexity of the object to be designed. Instead, SpD, even if has itself defined within the development of a design methodology as illustrated above, has not yet incorporated sequential, temporal and narrative components in its representational tools, still more connected to a static visualization of the overall physical evidence, and limiting the communication of possible futures embedded in the design of a place. Plans, sections and 3D models, at the same time, have the capacity to provide an overall representation of the physical side and diagrams of flows or functions are unlikely to be able to provide the sense or the **aesthetics of the relationship**, meaning the narrative structure of the story (Pacenti, 1998, p. 105) that includes any time-span. ***Aesthetics, which has traditionally been connected to the spatial dimension and to its symbolic values transferred through words-images-forms, has then acquired a temporal dimension and unfolded into the time of the interaction, the engagement, the participation; then, of the relation.*** Even if the focus on *relationship and interaction with design objects* has been acquired as a core value of the design act – with an attention to community of use, expectations and needs, supported by strategic planning, participatory design and human-centred design – a shift must be considered when considering products *"as a mediating influence in their interactions with other people and their social and natural environments"* (Buchanan, 2001b, p. 14), thus as a temporal phenomenon. The design discipline moved a step further to what Castiglioni stated:

> *"a good project arises not from the ambition to leave a mark, but from the desire to establish an exchange, even a small one, with the unknown person who will use the object you have designed; the research phase is everything and the final result is just a milestone"* [11] *(in Vercelloni, 2008, p. 115).*

Design has been affected by *ecology, human geography* and *environmental psychology* studies, acquiring the influence of the study of relationships – various, changing and complex – between the environment and society, of the study of people's and communities' relations with and across space and place, and of the *place construct* as a central socio-physical unit of analysis (Bonnes and Bonaiuto in Bechtel & Churchman, 2003, p. 30). Representational and generative tools from SpD and SD could then be explored as possible **complementary approaches**, to include the physical evidence, the aesthetics of the relationship and the sequencing within the time-span. I am focusing here on the visual aspect of representation in

[11] Translation by the author.

the design process, balanced out by the strong diagrammatic nature of its processes: in fact, this last aspect has been strongly exploited, as illustrated above, since it was needed for the communication of a service to final users as well as in the final process.
This need emerged when SD emerged as a discipline. As Diana et al. state (2012, p. 2), visualization took on a crucial role

> *"as it could make the ideas more tangible, complexity more readable and alternatives shareable, [in order to] support the communication between all the actors involved, the development of the process itself and its outcomes".*

The issue of visualization certainly concerns the typologies of recipients to whom the content is addressed: other designers, other professionals involved in the design process, clients, users, and so on. This aspect will not be explored in this dissertation, which remains set upon the exploitation of the layers of transdisciplinarity within the design community and towards design education. But, it is interesting to highlight the work done by Diana et al. around this concept: they evidenced two basic parameters for service visualization, *iconicity* and *time*, and the related opposite polarities, *abstract-real* and *synchronic-diachronic*. Iconicity is the coherence between the representation of an object and the real appearance of the object itself: i.e. while a pictogram is abstract, a photo is closer to reality. The continuous shift between these two polarities during the design process and the progressive level of detailing during it, distributes the typology of tools used according to the content to be shown: systems are represented necessarily in abstract ways, envisioning can deal with realistic visualizations. The relationship with time, instead, explores the use of tools to express *"an instantaneous picture of the service – synchronic – or can either visualize the sequence of actions and stages that compose the service experience – diachronic [narration]"* (2012, p. 3). By the intersection of the two axes of parameters, the authors built a representational field diagram, which positions maps, flows, images and narratives according to the polarities.

Focusing the attention on the diverse methods and tools of SD for representing and managing the complexity, for making tangible the service performance and for expressing assumptions and processes, offers a codified range to represent the full story of a service broken up in fragments and to expand the SpD methods and tools, that tend to represent the object of the design itself as a complete story.

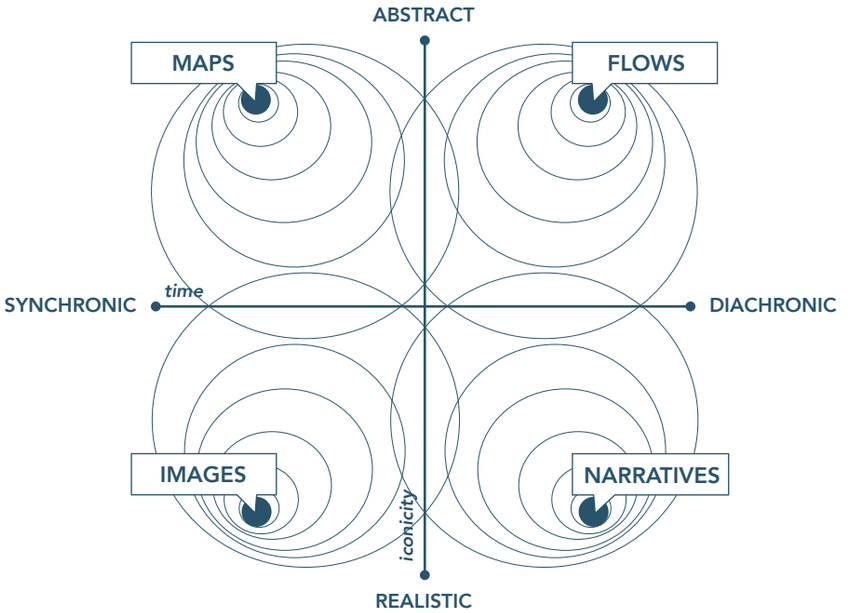


Fig. 11 – Representation field diagram in: Diana, C., Pacenti, E., & Tassi, R. (2012). Visualtiles: Communication tools for (service) design. In ***Conference Proceedings ServDes. 2009; DeThinking Service; ReThinking Design*** (pp. 65–76). Linköping University Electronic Press.

It is valuable to realize the capacity of **SD to have developed a diverse range of methods and tools for representing and managing the complexity of the systems taken into account and to be designed, aware of the fact that there is no unique way to represent *the full story* of a service. Visualizations serve as a way to make tangible the service performance, to express and highlight assumptions.** Visualizations are used in SD, especially in the research phase, mainly as tools for translating raw data into insights and as a way to communicate these; more to interpret data than to describe them, while the prototyping phase is less interested in its use, according to the research done by Segelström and Holmlid

(2009). Conversely, **SpD has explored, throughout its history linked to the discipline of Architecture, methods and representational tools aimed at representing the object of the design itself and with codes and regulations, but lacking *the rest of the story*, in other words lacking in defining codes and tools to generate, communicate and visualize the place capacity to be enabler for interaction to take place within its exploitation.**

The unfolding of services in the physical environment implies and determines a narrative dimension where the physical evidences constitute the scenography and the props of the service plot. Both the design of services and the design of spaces are possible *mises en scène*, enabled by the design itself and within unpredictability. The *sequencing* nature of SD's object and process is codified into operational and representational tools while SpD representational tools are still more connected to a static visualization of the physical evidence. Time sequencing and spatial aesthetics should merge in a complementary orientation towards an *aesthetics of the relationship*, including the spatial dimension and its symbolic values as well as the time of the interaction, the engagement and the participation. This leads to an integrated design of spaces taking into account the narration of flows.

Finding 5. ***The unfolding of services in the physical environment implies and determines a narrative dimension where the physical evidences constitute the scenography and the props of the service plot. Both the design of services and of spaces are possible mises en scène, enabled by the unpredictability of the design activity.***

Finding 6. ***The sequencing nature of SD's object and process is codified into operational and representational tools. The SpD representational tools are still more connected to a static visualization of the physical evidence, thus limiting the exploration of the possible futures embedded in the design of a place.***

3.COMPLEMENTARITY INDICATOR FOR A S+S TRANSDISCIPLINARY APPROACH

Time sequencing and spatial aesthetics should merge in a complementary orientation towards an aesthetics of the relationship, including the spatial dimension and its symbolic values as well as the time of the interaction, of the engagement and of the participation. This leads to an integrated design of spaces taking into account the narration of flows passing through it.

2.4 Dialogue 3. Space and ownership

*Dialogue 3 explores the human system of interactions **(M2 and D1)**, linking the co-design of the design process **(D2)** with the place ownership embedded in the design outcome.*

Throughout the concepts uncovered so far, an in-depth analysis of the meaning of space, place and context is necessary, especially to highlight my perspective in dealing with the understanding of the relationship between the tangibility and intangibility of spaces and services within forms of reciprocal encounter.

An analysis of the physical evidences of human artefacts and the spreading impact on multiple layers, has been seen as a way of understanding the cognitive design act, necessary to guide an integrated design of spaces by taking into account the narration of flows passing through it. Within this complex reflection, a definition of the world of references for the concept of space is now necessary.

These values are embedded in the human experience of physical environment, the one that Norberg-Schulz (1979) defines as an *existential foothold* connected to the Heidegger concept of *dwelling* (1971), defined as the scope of architecture. For Norberg-Schulz, within a phenomenological approach influencing the environmental sciences (see also section 1.4), human beings *inhabit / dwell* when they can orient themselves in an environment and when they can find an identification with it, or more simply, when they experience the meaning of an environment. In this sense, ***an inhabited space is a place***: a meaningful place supporting the human action of inhabiting. A place is the phenomenology of a space, and architecture – the physical artefacts defining a place – is the physical manifestation of inhabiting because it discovers meanings potentially present in the given a priori environment. The discussion between space and place has been analysed in many domains that will not be reported here. As Graumann (in Bechtel & Churchman, 2003, p. 108) summarizes: space

> *"is the term for abstract geometrical extension indifferent with respect to any human activities" and place "in contrast, has in itself a strongly experiential connotation […], constructed in our memories and affections through repeated encounters and complex associations".*

This is influenced by the *"Poetics of Space"* of Bachelard, where he states that places, in their thousand cavities, enclose and compress time since it is a *"psychological diagram"* that transcends the geometrical space (1957, p. 73). SpD has made these theories its own, melding them with its peculiarity – in relation to architecture: a design thinking and a human-centred approach, a practice based on technologies and other materials and towards reversible interventions.

> *"The spatial arrangements express the group's identity […] the group is established, assembled and united by the identity of the place" (Augé, 1992, p. 45).*

Yet, the place value of a space has not easily found ways to be expressed and communicated, nor it has been integrated and highlighted in an interdisciplinary process, in order to become a dialectical counterpart in the design of spaces. In this dissertation, the aim is exactly this: **to highlight the fundamentals of the design of spaces and of services, in order to highlight the inner connections present – the *Dialogues* – and to influence the design process of spaces + services through a cooperation among the disciplines.**

Thus, the relationship between human beings and places shapes social identities and community engagement, building a cohesion within the physical realm: correspondingly, space undergoes social processes and changes. In that frame, practices of **co-creation, co-design and co-production could enter into the spatial discourse**. Those are incorporated into SD, since services are irremediably co-produced by all the actors

involved to generate value and to, actually, take place. This discourse enters not only in the practical implications of providing services (industries and production), but also into public sector innovation supporting democratic challenges within an overall participatory mind-set and within a diffuse design perspective (Manzini, 2016), where SD strategies stimulate personal motivation (design as a living agent in communities) towards change and to make room for co-design through their (non-designers') own action. For what concerns the far less-explored topic of *co-creation of spaces*, the point of view of Fuad-Luke is interesting: exploring how

> *"co-designing our services could be the next critical evolution of service design [could] ensure the sustained integration of human and natural ecologies of our cities" (Fuad-Luke in Kuosa & Westerlund, 2012, p. 103).*

That recalls a connection to the space of flows and space of places conceptions by Castells (see section 2.1), whose question Fuad-Luke redefines within the SD as

> *"how the design of services, many of which operate within the space of flows, genuinely affect the space of places (and so the lives of the civic population)" (Fuad-Luke in Kuosa & Westerlund, 2012, p. 109).*

Forms of participation, in fact, are strongly affecting places and, today, the city still remains *"the tangible symbol and historical framework of the state of society"* (Bourriaud in Bishop, 2006, p. 160). This affection is explored through different points of view: from a community psychology perspective – a multidisciplinary area of psychology addressing social problems at the local levels concerned about human diversity, common good and community participation and empowerment and behavioural factors (Perkins, Hughey, & Speer, 2002), from the reflection on design and democracy, to *agonism*. **Agonism** is a term that denotes a democratic model that defines 'the political' as the dimension of confrontation, which is inherent to human relationships (Mouffe, 2000). Hence, agonistic space refers, within this model, to a permanent (abstract) space where such interpersonal confrontations can be expressed and re-channelled in a collective positive way through the compromise of diverse standpoints – observing the conflict as an opportunity to create positive change. Democratization helps turn *"antagonism into agonism"* (Björgvinsson, Ehn, & Hillgren, 2010, p. 48) and is fundamental in enhancing a sense of shared ownership, engagement and legitimization of the process of transformation of a given space. [12]

[12] In Calvo, M., & De Rosa, A. (2017). Design for social sustainability. A reflection on the role of the physical realm in facilitating community co-design. In ***Issue of The Design Journal. Design for next. Proceedings of the 12th European Academy of Design Conference.*** (Vol. 20, pp. S1705–S1724). Taylor & Francis Group. pp. S1718–S1719

By turning this discourse into design education and through informal learning, spaces could be explored as testing environments able to generate and support collective activities. This reflection suggests that, as well as services that are less discussed as design object and more as a means for supportive collaborative societies and economies (Sangiorgi, 2011), spaces could also be more understood as ***enactive*** of interaction and processes and not only studied and communicated in design disciplines as a physical object. Together with the concept of agonism, *infrastructuring* is also relevant in this discussion. **Infrastructuring** is a notion with a specific meaning in organizational transformation with an ecological point of view. It has been theorized by Star and Ruhleder (1996) and occurs in the work of Björgvinsson et al., 2010; Hillgren et al., 2011; Van Reusel, 2016. Framing an infrastructuring process means going beyond the design project in the task of creating favourable conditions to build long-term relationships and to create networks by providing an open-ended design structure. In fact, Star and Ruhleder define it as a *"relational concept since it becomes infrastructure in relation to organized practices"*: a structure we rely on, integrated into other structures, supporting them, reachable beyond a single use and occurring *"when local practices are afforded by a larger-scale technology, [resolving] the tension between local and global"* (1996, pp. 4–6). [13] The direct involvement of people in a performed test contributes to the process of establishing long-term relationships between people and places. Practitioners and users run part of the prototyped scenario: by this is intended a long-term effect of temporary solutions, in their capacity of instructing public spaces and *"building long term relationships with stakeholders in order to create networks from which design opportunities can emerge"* (Hillgren et al., 2011, p. 1). Corresponding to the temporariness of places and settings is the temporariness of users, the so-called *"interim user"* (Belloni, 2008) who lives here and now in the urban place and generates the transformation.

To conclude, the relational indicator is decisive. As illustrated, design outputs are relational phenomena, dealing with social need, towards a complementarity between culture and method. Spaces are enablers and the support for interactions to take place, within a higher level of unpredictability, as arenas for infrastructuring and agonistic scenarios. However, the co-creation of spaces is not yet entered in these terms in design theory and practice, therefore it could take advantage of its consolidated discourse in SD. Places are seen as containers of values that can be supported and enhanced through a strategic design encompassing phenomenological,

[13] De Rosa, A., & Mazzarello, M. (2018). Italianway: An Entrepreneurial Innovation for Hospitality in Contemporary Cities. In Bruglieri M. (Eds.), ***Multidisciplinary Design of Sharing Services*** (pp. 229–239). Springer.

aesthetic, relational and co-produced values and approaches. And services are also complex and relational entities (Sangiorgi, 2011), where SD is the design of the area where the interactions between the service and the user take place (Pacenti, 1998). Throughout this exploration, the purpose has been to cover the main points of investigation towards the understanding of places as physical, complex and relational entities, enabler of interactions and *owned* by people through forms of identification.

Finding 7. ***The design object of SpD is an enabler for interaction to take place within its exploitation.***

Finding 8. ***Design products are temporal phenomena within the place construct that are meaningfully part of the human system rather than of the system of things.***

In the next chapter the exploratory phase of the research will reach its assessment and consolidation through an explanatory framework, structured on the definition of a Qualitative Comparison (taxonomy). The critical background knowledge covered so far already contains the basic milestones of the research path to build on the core framework of this doctoral dissertation.

Parts of the sections of Chapter 2 have been already published in:
- Fassi, D., Galluzzo, L., & De Rosa, A. (2018). Service+Spatial design: Introducing the fundamentals of a transdisciplinary approach. In ***Proceedings of the ServDes.2018 Conference.*** Linköping: Linköping University Electronic Press.
- De Rosa, A. (2019). Dialogues on the relationship between Spatial and Service Design. In L.Rampino & I. Mariani (Eds.), ***Advancement in Design Research at Polimi. Notes on doctoral research 2019.*** FrancoAngeli.

4.COMPLEMENTARITY INDICATOR FOR A S+S TRANSDISCIPLINARY APPROACH

Co-design practices should enter into the SpD towards the co-creation of spaces. Since processes of space ownership are constructed by the human action of dwelling and spaces are enactive of interaction, spaces enter with full rights in the reflection of design and democracy through agonism and infrastructuring notions.

3.

AN EXPLANATORY FRAMEWORK FOR A QUALITATIVE COMPARISON: THE TAXONOMY

Chapter overview

This chapter concentrates on the definition of the explanatory framework that specifies the relationships among the concepts identified.
The aim of this framework is to propose conceptual tools (interpretative models) and operative tools (design methods and tools) for an integrated approach to the design process based on disciplinary cooperation (Jantsch, 1972).
The comparison relies, first of all, on Buchanan's framework on design orders, introduced in section 1.4.1, and questions the comparison among design orders through the lenses of the dissertation's topic. The comparison specifically refers to the framework provided by Edeholt and Löwgren (2003) and advanced by Holmlid (2009), which has been presented in section 1.4.3.

The critical background knowledge done so far has already contained the basic milestones of the research path to build on the core framework of this doctoral dissertation. Thanks to the previous theoretical development through the *Three Dialogues*, the related *findings* and *complementarity indicators* for S+S are structured here into the *Qualitative Comparison* framework. The *findings* and the *complementarity indicators* encompass the declaration of the core evidences of the disciplinary dialogue towards transdisciplinarity, developed as a way to "connect the dots" within the critical work on the literature review and to build the perspective for the proposed framework.

The exploratory phase of the research reaches its assessment through this explanatory framework. In fact, The understanding of the initial stage of this foundational act for a S+S approach restricts the experimentations in Part II as case studies for future developments and for criticism.

The definition of the consequential *Qualitative Comparison* built on the comparison corpus, *completes the two research questions*:

RQ 1: Which are the key dimensions that are laying the theoretical foundations of an S+S approach?

RQ 2: How can a dialogue between the disciplines of Spatial design and of Service design expand the outreach of the comparison of design disciplines towards a transdisciplinary cooperation?

3.1 An explanatory framework for a qualitative comparison: the taxonomy

As stated, the *Qualitative Comparison* proposed is built on a broad range of topics as key dimensions that arise from the analysis of the frameworks of reference (sections 1.4.3 and 1.4.4).
Compared to the disciplinary framework of inspiration, my purpose is to abstract the key dimensions and to attempt to evidence one aspect for each discipline within the dimensions, in order to highlight their most relevant contributions. The scope of framing the fundamentals of a transdisciplinary approach means that – here as in any of the infinite number of possible frameworks for a comparison of the disciplines – the disciplinary coordination and cooperation should be explored exactly where each discipline expresses its contribution to the wider reflection on the design research.
For these reasons, the *key dimensions* identified relate to the primary dimensions on which a research aiming at understanding the fundamentals of a transdisciplinary approach should rely on: ***environmental dimension, temporal dimension and social dimension.*** They lay the theoretical foundation of the overall scope and, throughout each aspect identified for the two disciplines, the purpose is to demonstrate the complementarity towards the possible coordination and cooperation between them.

Each discussion around the *Dimension* is supported by a case from the field observation in the research team activities, reflecting the component analysed and the complementarity towards a transdisciplinary coordination and cooperation between SpD and SD.

Parts of the sections of Chapter 3 have been already published – including here additional study and evolution – in:
Fassi, D., Galluzzo, L., & De Rosa, A. (2018). Service+Spatial design: Introducing the fundamentals of a transdisciplinary approach. In ***Proceedings of the ServDes.2018 Conference***. Linköping: Linköping University Electronic Press.

3.2 Environmental dimension

• Spatial Design: dialectical

SpD identifies, gives meaning and shapes places. The physical experience with the context is amplified by the ***endless dialectic*** between the inhabitants of the space and this last feature.

This dialectic is embedded in the human experience of physical environment, the one that Norberg-Schulz (1979) defines as existential foothold connected to Heidegger's concept of dwelling (1971). Human beings 'inhabit' when they can orient themselves in an environment and when they can find an identification with it. In this sense, an inhabited space is a place: a place is the phenomenology of a space, and the built environment – the tangible artefacts defining a place – is the physical manifestation of inhabiting because it discovers meanings potentially present in the given a priori environment. A place

> *"has in itself a strongly experiential connotation […], constructed in our memories and affections through repeated encounters and complex associations" (Graumann in Bechtel & Churchman, 2003, p. 108).*

Places, in their thousand cavities, enclose and compress time since it is a *"psychological diagram"* that transcends the geometrical space (Bachelard, 1957, p. 73). SpD has made these theories its own, melding them with its peculiarity – in relation to architecture: a design-thinking and human-centred approach, a practice based on technologies and other materials and towards reversible interventions.

> *"The spatial arrangements express the group's identity" […] "the group is established, assembled and united by the identity of the place" (Augé, 1992, p. 45). (cf. Dialogue 3)*

• Service Design: unfolded

Services are experienced through interactions that unfold in the service scene, which become alive in the moment of its exploitation.

SD has identified structured ways to deal with the processional nature of services and to transfer them into the design process, at the operational and representational levels, to operate the creation, validation and capacity of communication of the complexity of the object to be designed. What is interesting is the capacity of SD to have developed a diverse range of methods and tools for representing and managing the complexity of the systems taken into account and to be designed, aware of the fact that there is not a unique way to represent the full story of a service. Visualizations serve as a way to make tangible the service performance, to express assumptions and to highlight assumptions (Dialogue 2).

Towards a transdisciplinary coordination and cooperation S+S:

Services take place in physical environments and SD establishes – but does not arrange – the service evidence as physical evidence, which shapes the experience of services. Yet, the place value of a space has not easily found ways to be expressed and communicated, nor has it been integrated and highlighted in an interdisciplinary process, in order to become a dialectical counterpart in the design of spaces.

By establishing a cooperation between the deconstructed plot of the interaction scene with the design of the physical evidence constituted by the scenography and the props, spaces can be seen as possible mises en scène integrated in the narration of the journey [percorrenza] into spaces, possessing a multilevel dialectic with the designed environment.

> *> Spatial Design designs places with the added symbolic component.*
> *> Service Design designs service evidences with the added sequential component.*

Fig. 12 – Diagram by the author. First level of the *Qualitative Comparison*: the Environmental Dimension.

SUPPORTING CASE: THE SHARING SERVICES

To support this dimension, a broad topic seriously explored by the design discipline has been chosen: the rise of a new form of market – the sharing economy model – also referred to as the peer-to-peer (P2P) market. According to Michael Bauwens (Founder of the P2P Foundation, p2pfoundation.net),

"P2P specifically designates those processes that aim to increase the most widespread participation by equipotential participants, [where the shared asset is] a use-value for a community of users [and where] its distribution is a peer property mode, different from private property or public (state) property" (Bauwens, 2005).

As previously stated, permeating factors make the development and spread of a P2P economy possible; Bauwens lists these factors as infrastructural requirements: a technological infrastructure (access-based technology); the existence of a software infrastructure and of a legal one; an autonomous communication system. Underlying these, a cultural shift paved the way for the diffused assimilation of concepts like shared ownership, collaborative models and consumption networks. The infrastructure system makes these social transformations viable. How are urban contexts affected by such changes in terms of transformation of the urban environment (physical and service infrastructuring), and in terms of uses and identities? The introduction of collaborative values is an emblematic scenario that disrupted the geography of local networks, modifying the urban spaces as a *permeable platform* eliciting social and behavioural change. This scenario has already been assimilated in the western context: these values are no longer disruptive but have now been assumed, and the sharing models are no longer unprecedented but have become embedded in the contemporary context.

This has been possible because bottom-up initiatives have evolved into more mature forms of organization, supported by P2P information exchanges and *"by different kinds of intervention from institutions, civic organizations, or companies (top-down interaction)"* (Manzini, 2015, p. 82). The western system incorporates the attributes of the contemporary citizen/user, scaled up by putting at the centre of the change—or, more accurately, by being willing to put at the centre of the change—all the actors of the urban structure in a systemic and integrated way: local authorities, administrations, innovative companies, territorial actors, the third sector and representatives of active citizenship. The flurry of initiatives and demands for processes of social change by people do not only imply social innovation in the sense defined by Phills et al. (2008, p. 36) as

"a novel solution to a social problem that is more effective, efficient, sustainable, or just as existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals".

Although, it does introduce the concept of disruptive innovation (Christensen, Baumann, Ruggles, & Sadtler, 2006) where a change is a generator of new experiences and perspectives that imply a proactive attitude towards the future, also overriding the way of thinking and interacting within commonly accepted actions by creating new rules and new values, new habits and new behaviours. Not only collaborative models aimed at improved utilization of existing assets, and strengthened social networks, but also evolved forms moving in the direction of Platform Capitalism, the so-called on-demand or gig economy. They touch on the typology of a changing panorama that has shaped and is shaped by those models. Temporary bottom-up initiatives revealed citizens' growing interest and awareness, while the collaborative and P2P economy embraces those principles and—thanks to new technologies and its business models—both are rapidly transforming cities. These outlined models are increasingly becoming an object of study for institutional actors within the urban, national and international structure, who are trying to assess the impact of this change on the urban environment, on the regulatory system and on economic growth, in order to funnel this change into the existing model to make it more flexible. Within the Italian domain, there is currently interest in mapping the impact of research and innovation on the wider systems within Italian cities (governance, economic growth, tourism and culture, digital transformation, employment, education, etc.) with a view to shifting towards smarter cities that are closer to the needs of citizens, more inclusive and more liveable. As Smorto (2016, p. 4) states: cities are recognized as *"laboratories for sharing practices with a central role in shaping an entirely new economy"*.

The case presented in this section is the Milanese company *Italianway* (www.italianway.house.), an example of the ripple effect of these changes into the entrepreneurial

system that has, in some way, acquired the contemporary socio-technical systems at both global and local levels, introducing a hybrid model able to be embedded in the specific context of Milan. The *Italianway* platform was founded in 2014 by two Milanese property managers - Davide Scarantino and Gianluca Bulgheroni - who were renovating the concept of "albergo diffuso" and applying it at metropolitan scale in Milan. The "albergo diffuso" model happens when the components of a hotel are scattered around different spaces within the same urban area, generally a small one, answering the ongoing issue of empty buildings in rural areas. The company's main goal was to find a niche in the "sharing economy" value system, adapting recognized international practices to a local environment and developing an innovative business model.

Italianway arose from the interpretation of a territorial need that has been highlighted and turned into an entrepreneurial opportunity within the real-estate business sector. The idea stems from a generalized issue: the fact that many properties sit empty or unlet. On the one hand, to meet the needs of property owners, *Italianway* adds components that collaborative services like Airbnb do not provide; on the other, to meet the needs of travellers, it offers a hybrid service somewhere between the idea of Airbnb and that of traditional hotels. How does it work? *Italianway* proposes to take care property owners' real-estate assets by making them available for a different kind of rent; property interiors are renovated in a "Milanese style" and made ready to receive temporary guests. Properties are placed on the *Italianway* digital platform, which takes care of the whole process (requests, contact with guests, preparing the house, payment transactions, providing the guests with any information they need, cleaning the house at the end of a stay, and so on). Thus, the owner no longer needs to seek out information about how to deal with this kind of process (as for a P2P model), since every aspect is handled by the *Italianway* logistics. The platform provides clear guidance and personalized support at all stages of the service. The process contains easy steps for prospective guests: they can book online via the *Italianway* website or through an existing web platform such as booking.com or expedia.it. The platform guides the guest through the travel details and indicates the closest *Italianway* reception for their check in, information and luggage services. It even provides details about various tourist experiences available in Milan (sports and leisure, food, shopping, outdoor activities and cultural tours), some of which are well-established services within the city while others are benefiting from customized support by the *Italianway* staff.
By seizing the opportunity presented by underestimated real-estate assets in the Milan area, and their strong touristic potential that has yet to be fully developed, *Italianway* intends to make full use of the temporary hospitality offer and the "albergo diffuso"-style services. In fact, *Italianway* consisted in 2017 of about 400 apartments, for two to six people, spread throughout the city of Milan, and is attempting to keep increasing this number.

In terms of their aesthetic quality, the apartments reflect the neighbourhood in which they are situated. The receptions (physical touchpoints of the service) are located in strategic positions around the city, and the touristic "experiences" offered integrate the whole system into the city, generating a hospitality service fit in Milan. "Experiential" tourism is the objective of integrating some non-hotel services into the action network; the online platform seeks to be an intermediary and a tool to integrate the hospitality service with different experiences, for example related to transportation, places of interest or food. This integration with services in the local region serves to expand access to the city with a precise aim: for a user to feel like a citizen - and not a guest - of a city, during a temporary stay there on holiday or for work.
In addition to boosting the number of apartments on offer, the founders of *Italianway* want to increase the number of receptions, in order to facilitate the service's procedures and distribute the physical ecosystem of their platform around the city. They are also looking to establish training opportunities, and hire property manager figures to then spread the service also outside the Milanese context. However, while on the one hand the service is operational and growing, with occupancy rates of more than 90% for the apartments, the use of the integrated services is still embryonic, requiring a further push to help it become successful.

However, *Italianway* is not exactly a P2P model because of the actors involved: it is an innovative service for property owners with no transfer of competences; it creates an innovative network between owners and the real-estate system; it is integrated in the city's system of public and private spaces and services, and it offers a physical and digital ecosystem. *Italianway* is a local company that owns the means of its local entrepreneurship approach: an example of innovation in management embedded in contemporary social and economic transformations.

In this case, it is interesting to highlight how these typologies of services are strongly impacting the social, economic and environmental structures of contemporary urban spaces, regenerating temporary relationships within places. This is an example of a service with a specific sequential structure and scheme taking place in designed physical environments to let the narration happen. The city is also part of this narration, creating the multilevel dialectic between actors and places that happens only when the service is unfolded.

Parts of this section have been already published in:
De Rosa, A., & Mazzarello, M. (2018). Italianway: An Entrepreneurial Innovation for Hospitality in Contemporary Cities. In Bruglieri M. (Eds.), ***Multidisciplinary Design of Sharing Services*** (pp. 229–239). Springer.

3.3 Temporal dimension

• Spatial Design: abstract (endless time of the memory)

Places enclose and contain the time of the human experience, occurring in a space; and the human experience in the place projects memories and values (Bachelard, 1957). Furthermore, the physical realm enables interactions among people and enhances a sense of shared ownership and the engagement of people. The certain and uncertain aspects of the design act are linked to the tangible/visible and the intangible/invisible of the design outcome: it is in balance between the "project", as a programmatic action, and "non-project", the human actions, memories, rituals and symbolic relationships in the spaces (Crespi, 2013).

However, SpD's representational tools are more closely connected to a static visualization of the physical evidence, thus limiting the exploration and the communication of the possible futures embedded in the design of a place. At the same time, plans, sections and 3D models have the capacity to provide an overall representation of the physical side, and diagrams of flows or functions are unable to provide the sense or the aesthetics of the relationship, meaning the narrative structure of the story (Pacenti, 1998, p. 105) that includes any time-span. (cf. Dialogues 2 and 3)

• Service Design: sequential (limited time of the use)

Services exist only when the relationship takes place (at a designed touchpoint). Otherwise, they fall back into non-existence. At the same time, the SD process deals with pre-/during-/post-service phases that visualize the service as a sequence of interrelated actions to be performed both in the service's design and in the service exploitation. SD usually adopts the concept of sequencing to break down actions and interactions and to focus on the different components of the service. This is the service period, divided into pre-service, during-service and post-service phases: various methods and tools are used to explore and exploit the steps and the variables along the sequence, both as generative and representational tools (live narratives such as the desktop walkthrough; the live act of *bodystorming*; the representations of a chronological sequences with storyboard; journey map; or the overall view of the service within the organization of the service blueprint). These are codified methods and tools, shared by the whole scientific community, in the academic, agency and professional practice environments (cf. Dialogue 2).

Towards a transdisciplinary coordination and cooperation S+S:

It is clear that the space-time spans considered in Service and SpD are different, as in the design process and design representation. And this is strongly dependant on the time span of the object designed. While SD focuses its attention on the interaction moment between the user and the service, making the rest of the design consistent with that, the time span of SpD researches a longer relationship between the user and the space designed, building a world of references in the design as well as envisioning the intangible connection that through time human beings create with the space.

Aesthetics, which has traditionally been connected to the spatial dimension and to its symbolic values transferred through words-images-forms, has acquired a temporal dimension, unfolded into the time of the interaction, of the engagement, of the participation, of the relationship. By creating a cooperation between the endless memories of spaces, tracing the rituals and symbolic relationships of human actions, with the sequencing breakdown of actions and interactions in a designed environment, the design of spaces can be explored and supported with the structured enhancement of its human-centred side by taking advantage of the consolidated methodological discourse of SD on co-design and co-production processes that also explores the steps of the actions. The sequencing dimension of the performance, overlapping its time-component with the unfolding of the actions designed in the space, can inform the design of spaces by narrating all the sequences of the interactions and of the activities in a complex view. The design of spaces can mutually inform the service's design with its invisible values since SpD explores the user experience in spaces (Arìs, 2002; Bachelard, 1957; Norberg-Schulz, 1979).

> Spatial Design designs places with a timeless component.
> Service Design designs relationships with a defined duration (hic et nunc)

KEY DIMENSION	SPATIAL DESIGN	SERVICE DESIGN
TEMPORAL DIMENSION	***abstract*** ***(endless time of the memory)*** *Spatial Design designs places with a timeless component*	***sequential*** ***(limited time of the use)*** *Service Design designs relationships with a defined duration (hic et nunc)*

Fig. 13 – Diagram by the author. Second level of the *Qualitative Comparison*: the Temporal Dimension.

SUPPORTING CASE:

"Human Cities / Challenging the city scale" research project

"Human Cities - Challenging the city scale" (http://humancities.eu) is a European project that explores the way in which the inhabitants reinvent the constant evolution of a contemporary city through experiments in an urban space, and was co-founded by the Creative Europe Programme of The European Union, 2014- 2018. The project is now led by Cité du Design Saint-Etienne, with twelve partners from eleven European cities acting as a multidisciplinary network: Politecnico di Milano, Milan, Italy; Urban Planning Institute of the Republic of Slovenia, Ljubljana; Clear Village, London, United Kingdom; Zamek Cieszyn, Poland; Design Week Belgrade, Serbia; Pro Materia, Brussels, Belgium; Aalto University, Helsinki, Finland; FH Joanneum, Graz, Austria; Association of Estonian designers, Tallinn, Estonia; Bilbao Ekintza, Bilbao, Spain; CultureLab, Brussels, Belgium.

The project is structured to answer challenges faced by contemporary cities: use of public space, collaboration among people, quality of life, sustainable development and multidisciplinary approaches to solve these issues. The focus of Human Cities Network (2014-2018) is to analyse, test and implement the process of engaging people in co-creating and challenging the city scale as a subjective environment, innovating with people and using design as a creative and sustainable methodology and approach. The challenge has been to go beyond the traditional planning practices through an interdisciplinary approach, based on thirteen shared values: respect, sustainability, aesthetics, solidarity, well-being, conviviality, leisure, imagination, sensoriality, empathy, intimacy, accessibility and mobility.
"Human Cities" aimed at developing the following outputs during the four-year programme, with the involvement of all the international partners:

- "State of the art": a collection of best practices in all partner cities on how public space is used by citizens in a collaborative way through grassroots initiative-based case studies. This was intended to build a foundation among the partners so they would share a common point of view towards the topic. [1]
- "Co-creations briefing sessions": planned to define a shared brief for interventions in the partner cities. Each session is led by an expert together with local partner researchers and involved local stakeholders. The aim is to give a tool to the local partner to be used to build further actions.
- "Master classes": education and training sessions for post-graduate students, young professionals (ten to fifteen participants per session), PhD candidates, led by experienced and renowned designers, architects or artists. The master classes developed the brief into design outputs. The aim of these practical sessions was to challenge the urban dimension, developing specific scenarios to enhance the quality of life, the human dimension and the well-being of individuals in contemporary cities. Tangible results (projects, sketches, graphic material, video creations...) were included in travelling exhibitions in the partner cities.
- "Experimentations": after the co-creations briefing session each partner was asked to set up an interdisciplinary field team together with external professionals (associations, artists, professional designers etc.) to develop design solutions for the chosen urban context in close collaboration with local actors. The outcomes of the experiments led to prototypes and concrete results made in collaboration with partner companies from different regions, also allowing exchanges between business clusters in different countries. The aim of the experimentation labs was to prototype the design solutions in a real context together with the citizens.
- "International conferences" to disseminate the results of the previous outputs and allow for discussion of the results. These conferences were held in selected partner cities.
- "Dissemination": a website, Facebook page and a digital catalogue designed to support the results and to make the project known in an international context.

The focus here is on the masterclass and experimentation done in the Milanese context of La Piana, a 10,000m2 area in front of the main entrance of the suburban Milanese theatre called Atir Ringhiera. The theatre is managed by the Atir local association, which is not only involved in setting the theatre's calendar but also in the neighbourhood activities to give new life to La Piana through citizen involvement. Since the Atir company took over the management of the theatre in 2007, there has been an ongoing dialogue with the people of the neighbourhood, local organizations and the administration in order to open up the public space of the theatre to the city. There

are hidden spaces, not because they are hidden from the public, but because they are related to historical memory and are no longer considered contemporary places: this is the case of the Boifava district, located on the edge of the attractive area of Navigli - a densely populated urban area - and Parco Agricolo Sud - a protected rural area in the south of Milan. How can La Piana become the point of connection between these two typical features of Milan? How can the residents' stories related to La Piana be "put on stage"?

Since 2014, the theatre, thanks to its Social Programme, has organized the Street Art Festival (atirteatroringhiera.it), when it invites international artists to re-design the square through temporary works of art, performances and installations. The artistic process involves citizens and the local community in a sort of "composition game", from collecting the needs and wants of the local people up to the co-construction phase, with the collaboration of institutions and the local administration. The ongoing process of enhancing citizens' identification in the La Piana context has been considered as an interesting basis for setting up a basic framework for innovation and an incubator of social experiments. In the Academic Year 2015/16, students were involved in the process of designing temporary activities for La Piana square and contributed to the process of social inclusion and urban development through a design thinking approach. The course "Temporary Urban Solutions" was delivered to sixty-two international postgraduate students from various design areas (interior, service, communication, industrial, design, product for innovation and architecture) at the School of Design at the Politecnico di Milano.

The training process was based on the Temporary Urban Solutions educational format, and supplemented by the Human Cities framework. The educational format and related research were based on the observation that the public space sphere is becoming a place of social innovation in which creative communities act to create new solutions to everyday problems that the economic system and society are no longer able to provide. The bottom-up actions of these active groups of citizens who are looking for answers are combined with top-down actions of the institutions that can no longer ignore the obvious needs of the citizens. Temporary solutions often give a new perspective to the use of public spaces by creating real scenarios that could be developed into long-term solutions after a prototyping and testing phase. The strategy of applying an experiential learning method into design education for social innovation processes has a twofold potential: to enrich students' design skills and to trigger a change in the specific context by improving the level of engagement and by leading to new dynamics and opportunities for dialogue.

Co-briefing sessions, co-design activities and the prototyping of design solutions represent tangible and intangible components of the design process, which operate on the urban platform as acupunctural urban acts. As described above, actions on the local scale can achieve a global span in the contemporary holistic system, scaling up in a longer-term ripple effect. These activities embrace three main design goals: creating urban interactive installations for local residents to use this area in an active way; designing services to support the use of the area and installations on site; and developing a visual identity and effective way-finding signage. The SD tools, combined with SpD, have been able to strengthen the link between the La Piana area and the neighbourhood, by defining a system of design actions in order to stimulate its use on a long-term basis.

The process was structured as follows:

- Co-creation briefings aimed to find the issue, scale, awareness, impact, planning and participatory process of future experimentations. Organized with a large group of local stakeholders and partners, they consisted of a two-day long session held at "La Piana", including brainstorming, and an exchange of ideas and knowledge, aided by design tools. Three members from the Atir Association, four Polimi Desis Lab researchers and one facilitator were involved in the session. This was useful for exploring the area, collecting information about former activities in the same place, getting to know its history, and identifying a common strategy to be used in the subsequent activities. The Atir theatre staff acted as the main intermediary with the network of local actors; the spaces of the theatre are a recognized pivotal place of the neighbourhood, being increasingly identified as a point of connection between the neighbourhood communities;
- Co-design activities, that allowed the students to meet local organizations and informal groups of inhabitants to discuss ideas, collect information and data;
- Experimentation days, that staged the proposed scenario of the design solutions, which were tested in the space and in the interactions with the area's inhabitants and stakeholders.

Students designed a set for the actions and a way of interacting with visitors by explaining what the action was about and by letting them interact with it. From reuse of industrial remains to urban games, from environmental infrastructures to art performances, the eleven design actions showed possible uses of La Piana, by figuring out new scenarios for future utilizationof the space. The space acted as an empty canvas, ready to receive constant transformation, in the process of enhancing citizens' sense of identification.

This case provided an environment to test the possibility of exploring how the understanding of the changing attachment of a community with a city place throughout the decades, could be an intangible material to be funnelled into a renewed and temporal experience of the same place through spatial artefacts enabling interactions that for one day tested the setting up of innovative services to make the place alive again. The methods of SD made possible the exploitation of experiences in a limited time of use embedded in an endless engagement with the spatial values. This temporary exploitation demonstrated how space can be potential places, incubators of memories and symbolic relationships to be performed.

[1] The results have been published here: Daëron, I. et al. (2018). Human Cities / Challenging the City Scale 2014-2018 / Investigation. © Cité du design, 2018, available here in open access: http://humancities.eu/casestudies/publication-challenging-the-city-scale-2014-2018-investigation/

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Parts of this section have been already published in:
- Calvo, M., & De Rosa, A. (2017). Design for social sustainability. A reflection on the role of the physical realm in facilitating community co-design. In ***Issue of The Design Journal. Design for next. Proceedings of the 12th European Academy of Design Conference.*** (Vol. 20, pp. S1705–S1724). Taylor & Francis Group.

My role within this research project has been mainly of collaborator in the 3 Work Packages (Masterclass – as teaching assistant –, Touring Exhibition – as co-curator – and Experimentation Labs – as co-curator. I also supported the elaboration of the Interim and Final Report addressed to the EU and I joined the technical meeting and related activities at Cité du Design (Saint-Etienne, Framce, 2017), at Aalto University (Helsinki, Finland, 2017), at Zamek (Cieszyn, Poland, 2018) and at the Association of Estonian Designers (Tallinn, Estonia, 2018).

Fig. 14 – One of the co-design sessions held by the design students with the local citizens (December 2015).

Fig. 15 – One of the prototyping sessions held by the design students at La Piana - Milan (January 2016).

3.4 Social dimension

• Spatial Design: semiotic

SpD explores the user experience in spaces. The figurative act embodies the wicked problems of the contemporary condition and shows the new configurations of a changing society. In fact, places are a relational condition made up of cultural and ritual relationships.

Spaces are relational phenomena and are *permeable platforms* offering the material support of social practices that operate through flows. This *permeable platform* is a complex system and network of relationships and interactions that is possible thanks to an overlapping network of services that are able to link them and, thanks to spaces, are enablers of the service network. The phenomenological nature of design finds its disciplinary origin in the influence of phenomenological approaches on environmental psychology, *"the study of human behaviour and well-being in relation to the socio-physical environment"* (Stokols & Altman, 1987, p. 1), trying to explore the ecological context of behaviour that traditional psychology neglected. Through an environmental psychology perspective, a place is a socio-physical unit of analysis, with a specificity of place, localized, and dynamic because of human interventions that are *"able to influence and also to be influenced by individual behaviour and experience outside of personal awareness"* (Bonnes and Bonaiuto in & Churchman, 2003, p. 31). The intertwined link between the notions of place-centred and trans-territorial expresses a redemocratization of cities through a co-created sense of belonging that is possible thanks to a democratization of flows and spaces. Thus, the relationship between human beings and places shapes social identities and community engagement, building a cohesion within the physical realm: equally, space undergoes social processes and undergoes changes. In that frame, practices of co-creation, co-design and co-production could enter into the spatial discourse. Forms of participation, in fact, are strongly affecting places and, even today, the city remains "the tangible symbol and historical framework of the state of society" (Nicolas Bourriaud in Bishop, 2006, p. 160). This affection is explored through different points of view: from a community psychology perspective – a multidisciplinary area of psychology addressing social problems at local levels concerned about human diversity, common good and community participation and empowerment and behavioural factors (Perkins et al., 2002) – from the reflection on design and democracy to agonism (cf. Dialogues 1 and 3).

• Service Design: relational

Services are complex and relational entities and SD deals with the area where the interactions between the service and the user take place.

> *"[…] Services are not anymore conceived as an 'end' in itself, but are increasingly considered as an engine for wider societal transformations. [They] are less discussed as a design 'object', but as a 'mean' for supporting the emergence of a more collaborative, sustainable and creative society and economy." (Sangiorgi, 2011, p. 2).*

The design object of SD refers to the understanding of what the results of the design process should be, as a way to enact the design object within the process (cf. Dialogues 1 and 2).

Towards a transdisciplinary coordination and cooperation S+S:

By turning this discourse into design education, spaces could be explored as testing environments able to generate and support collective activities. This reflection suggests that, as well as services that are less discussed as design object and more as a means for supportive collaborative societies and economies (Sangiorgi, 2011), spaces could also be better understood as enactive of interaction and processes and not simply studied and communicated in the design discipline as a physical object. Together with the concept of agonism, infrastructuring is also relevant in this discussion, supporting the cultural and meaningful enhancement of a democratic development of social territories. By setting a cooperation between the figurative act that embodies the wicked problems of the contemporary condition with the relational focus of the experiential act with the wider spectrum of SD, it introduced an added value of the narrative dimension of SpD, the one that underlines the performing of social roles and the hierarchies of relationships through the actions and the actors involved in a time-span.

> *Spatial Design designs social identities through a figurative act*
> *Service Design designs relational entities through an experiential act*

Fig. 16 – Diagram by the author. Third level of the *Qualitative Comparison*: the Social Dimension.

SUPPORTING CASE:
"campUS. Incubation and settings for social practices" research project

"campUS" (progettocampus.polimi.it) is a funded interdisciplinary research project developed by the Design Department together with Architecture (Dastu – Department of Architecture and Urban studies) and Engineering Management (DIG - Department of Management, Economics and Industrial Engineering) departments at the Politecnico di Milano. It has been financed by the Polisocial Award, a prize for social innovation research projects at the Politecnico di Milano, acting for a virtuous relation between University spaces and competence, and the local context in which they are located. The project's main goal has been to use the university campus as an incubator for social practices to be developed through design skills and to be transferred into the neighbourhood as independent actions. This relation between urban neighbourhoods and universities was be made possible through the organization of spaces and actions that are able to increase resilience and facilitate interaction, integration and social cohesion. The campUS project falls within this scope and aims to become a flexible model for the interaction of local, social spaces, and an agent for the implementation of social practices.

Based on previous successful design researches and activities (cf. related publications mentioned in the footnote), the project benefitted from this network of actions and attempted to establish a more structured way of developing design for social innovation solutions by using a combination of: the skills and competences of the researchers and students; spaces on the campus; and a network of local associations and informal groups.
The project was organized into four main work packages, one per goal to be achieved:

- the development of a new community garden on common land close to the campus;
- the implementation of the web social-TV involving "neets" (young people who are "Not in Education, Employment, or Training");
- setting up a mobile pavilion in the neighbourhood to host activities by different associations in a four-month period during spring/summer 2016;
- developing an economically sustainable model to support the long-term life of the three previous goals.

The focus here is on the community urban garden action, as part of a longer research process: campUS is the second step in a complex, structured path started in 2011 with the creation of "Coltivando, the convivial garden at the Politecnico di Milano". In 2011, the Polimi Desis Lab research team started to work in the context of the Milano Bovisa campus, considering the main green area as a hidden public space to be empowered. The campus, hosting the School of Design, was built at the end of the '90s on the grounds of "Ceretti & Tanfani", a historical company producing cable railways, which designated the Bovisa neighbourhood as a working-class district. The campus became an "island for students" and most of the people who knew the place as an industrial area never had the chance to see how it had been transformed. Coltivando attempted to change this. For this reason, the actors involved in this process were both from the academic community (professors, students and researchers) and from the neighbourhood (inhabitants and local organizations). The co-design activities played a central role in the design process, largely involving the local communities in the development of a new shared urban space hosting a community garden.

This research project, now an established place in the neighbourhood and recognized throughout Milan, led to the campUS action-research, which tried to expand the experimentation into other contexts of the university district, advancing the idea of the community urban garden as a means of social inclusion. The context constituted a system of contradictory and continuously changing elements, made of complex interdependencies, approached with a human-centred design scaled up to community-centred design (Meroni, 2007) since facing a complex system of challenges dealing with groups and communities at a local scale, in order to create solutions rooted in people's neEds.
During the two years of research, the experimentation took place in different contexts,

engaging various combinations of actors: local organizations, groups of inhabitants, the local middle school community (children, teachers, parents) and Politecnico di Milano design students (masterclass, Master's thesis for in-depth analysis and actions, trainees). All these actions tested out co-design methodologies for social innovation and social inclusion, with a strong educational component along the iterative field research process. The research project started with a three-month exploration by mapping the operational entities in the district in order to select touchpoints in the context. In this phase, the research team focused on intercepting local stakeholders (organizations, informal groups, ongoing initiatives) and the exploration continued during the co-design and co-creation process of the Bovisasca community garden and led to contact with interlocutors at local schools. A further six months of involvement were fundamental to the team-building process and the development of co-design workshops. Then, a prototyping process started, planning and implementing activities for the co-creation of the community gardens (hard and soft components). The system of actors (researchers, Politecnico di Milano design students, teachers and children) worked on: the orchard layout and fencing, positioning and planting the different species and building an insect house; the orientation and communication system, including the orchard manifesto; the distribution of tasks and roles for the following months.

This applied project provided meaningful insights about how spaces could be testing environments supporting collective activities throughout the whole process of co-creation of a space providing a socially oriented service for community engagement. The involvement of different communities in team-building, co-design and prototyping actions, became the experimentation of how an integrated design of actions, interactions and spaces could form these into operative and sense-making places, designed to enact interactions. The co-designed community gardens – all through specific re-modulation of the process according to the actors involved, their specific needs and goals – are the results of a democratic development of social territories, where the progressive actions during the process under the guidance of the researcher team supported and adjusted the performance of the social roles. In fact, the interconnections between the actors affected the level of impact of such a process on the urban fabric. The design process supported a re-appropriation of territories in order to build a shared identity and a sense of renewed ownership of space, possible through the transfer of value around a shared co-created and prototyped service.

Fig. 17 – One of the co-creation action done throughout the research process towards social engagement at the Bovisasca community garden during the "Sabato della Bovisasca" event in March 2015.
This action named "Piantastorie/Planting stories": a red wooden bench where people were invited to tell stories connected to key local places, and, using the toolkit supplied, to create short video interviews. The kit included a picture of one of the local places and a seed to be planted in the garden to leave a memory of the interview. This activity became a web-series and it is now shown on PlugTV, the neighborhood social TV station.

Parts of this section have been already published in:
- Fassi, D., Galluzzo, L., & De Rosa, A. (2016). CampUS: How the Co-design Approach Can Support the Social Innovation in Urban Context. In ***Advances in Design for Inclusion*** (pp. 609–621). Springer.
- Fassi, D., Galluzzo, L., & De Rosa, A. (2016). CampUS: co-designing spaces for urban agriculture with local communities**.** ***PAD Journal - Pages on Arts and Design, 13(Design for Territories)***, 254–278.

My role within this research project has been mainly of observer and collaborator in some field activities.

3.5 The Qualitative Comparison

Here follows the complete visualisation of the Qualitative Comparison proposed.

Summing up:

First, the Reference Frameworks analysed *(cf. 1.4.3 and 1.4.4):*

- served to explore possible models to build supportive structures for the S+S relationship, meaning disclosing the fundamentals;
- served to understand that a S+S relationship, at this moment, can be explored only by transcending the design process, material and deliverables, remaining on an upper level of analysis since disciplines are "boundary openers" and not strictly classifiables and since the design object shifted from defined categories and entities to complex and systematic ones.

Then, the Key dimensions identified:

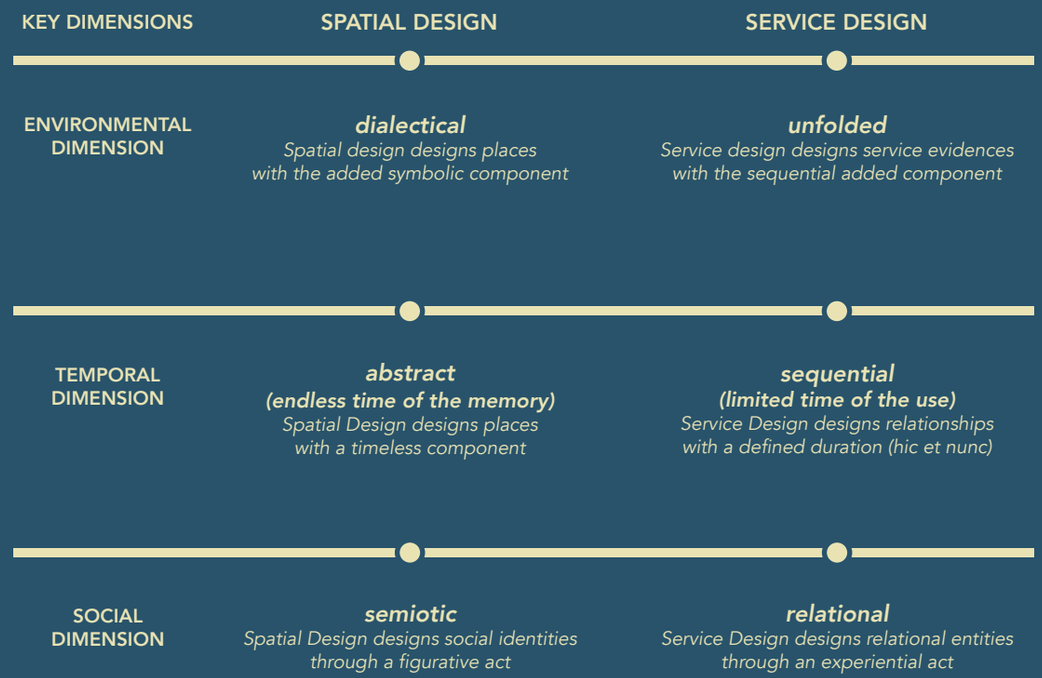
- attempt to evidence one aspect for the two disciplines, analysed in order to highlight the most relevant contribution for each;
- are not descriptive classification, such as the dimensions of the reference frameworks;
- are wide dimensions, serving to synthetize the gaps identified between the two disciplines. These gaps are opportunities to discover where SD and SpD could be complementary to each other (and contains the relevant macro-areas of investigation of the reference frameworks).

The Dialogues:

- explored the relationship between SD and SpD, discussing about a common ground of the two disciplines in order to explore areas of differentiation and of balance;
- act as converging factors in the direction of the foundational act towards transdisciplinarity between SpD and SD;
- focused on a mutual and reciprocal theorizing across the disciplines.

The resulting Complementarity Indicators:

- have the scope of describing the core evidences of the disciplinary dialogue towards transdisciplinarity, developed as a way to "connect the dots" within the critical work on the literature review and to build the perspective for the proposed Qualitative Comparison.



The exploratory phase of the research reaches its assessment through this explanatory framework. In fact, the understanding of the initial stage of this foundational act for a S+S approach restricts the experimentations in Part II as case studies for future developments and for criticism.

Fig. 18 – Diagram by the author. The Qualitative Comparison diagram.

Part II

VALIDATION AND CRITICALITIES: EXPERIMENTAL RESEARCH

Part II overview

The critical understanding of the *Complementarity Indicators* and of the *Findings* passes through the experimental research (Chapters 4) and field experiences (Chapters 5) into design education experimentations.

The conception of multiple methodological process for the design studios I run or collaborated for were meant to guide students to design S+S solutions.
For this reason, Part II is defined as *"validation and criticalities"* since the educational activities acted as the environment for criticalities to emerge during the doctoral path. The understanding of the initial stage of this foundational act for a S+S approach restricts these experiences as case studies for future developments.
In fact, the analysis of the research insights through the lenses of Spatial and Service Design applications into design education served to turn them into possible *Instructor Principles* (*Legacy and conclusions* of this dissertation).

PART II attempts to answer the question:
RQ 3: How to validate the transdisciplinary viewpoint introduced?

The experimentations try to combine the limited visual evidence of services with the essential visual evidence of spaces through the design tools for the visualization of design processes.

Chapter 4 reports the three Experimentations run, while Chapter 5 reports the two field experiences relevant for this dissertation for which I collaborated.

As illustrated in the diagram, the experimental phase has followed an evolution in which the field activities have been progressively interpreted as multidisciplinary, crossdisciplinary and interdisciplinary where the thesis experimentations acted as a shifting reflection from one to the other.

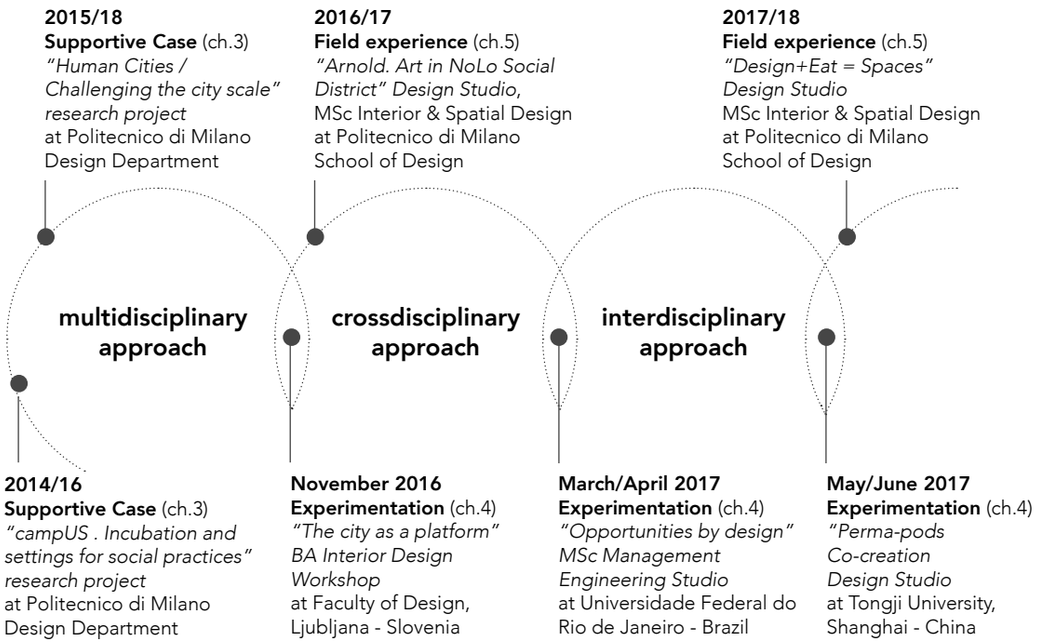


Fig. 19 – Experimental phase: progressive evolution from multidisciplinarity to interdisciplinarity of the field activities and of the observed cases around the three doctoral experimentations as a turning point.

4.

EXPERIMENTATIONS

Chapter overview

This chapter is devoted to the illustration of the actions conducted in three different academic environments.
During the doctoral path, these had the role of building a back and forth process of questioning and validation of the Complementarity Indicators reflections and of the Qualitative Comparison that has been finally elaborated and presented in the previous chapter. Here, they highlight the passage from the model to the design and test approach, in order to question the process and the testing of the Dialogues to understand the impact of the coordination approach proposed.

The experimentations have been an important field test with which to gain insights together with the theoretical reflections, and they act as a first stage of a longer research that will continue after this doctoral dissertation. They are of great importance within the development of the dissertation: the collaboration of research projects and educational activities within my lab (field activities) has nurtured, and has been nurtured by, my own activities, in a fruitful and iterative process of problem framing and lessons learned.

Parts of these sections have been already published in:
- De Rosa, A. (2017). Unconventional spaces for art and design: enabling community synergy. A methodological approach. In B. Camocini & D. Fassi (Eds.), ***In the neighbourhood. Spatial Design and Urban Activation*** (pp. 103–121). Franco Angeli Design International.
- Calvo, M., & De Rosa, A. (2017). Design for social sustainability. A reflection on the role of the physical realm in facilitating community co-design. In ***The Design Journal. Design for next. Proceedings of the 12th European Academy of Design Conference.*** (Vol. 20, pp. S1705–S1724). Taylor & Francis Group.

Chapter 4 reports the design studios and workshops run at the Design Faculty in Ljubljana (Slovenia), at UFRJ in Rio de Janeiro (Brazil) and at Tongji University in Shanghai (China) respectively, describing the theoretical framework behind them and the didactic processes used in terms of phases and tools applied.

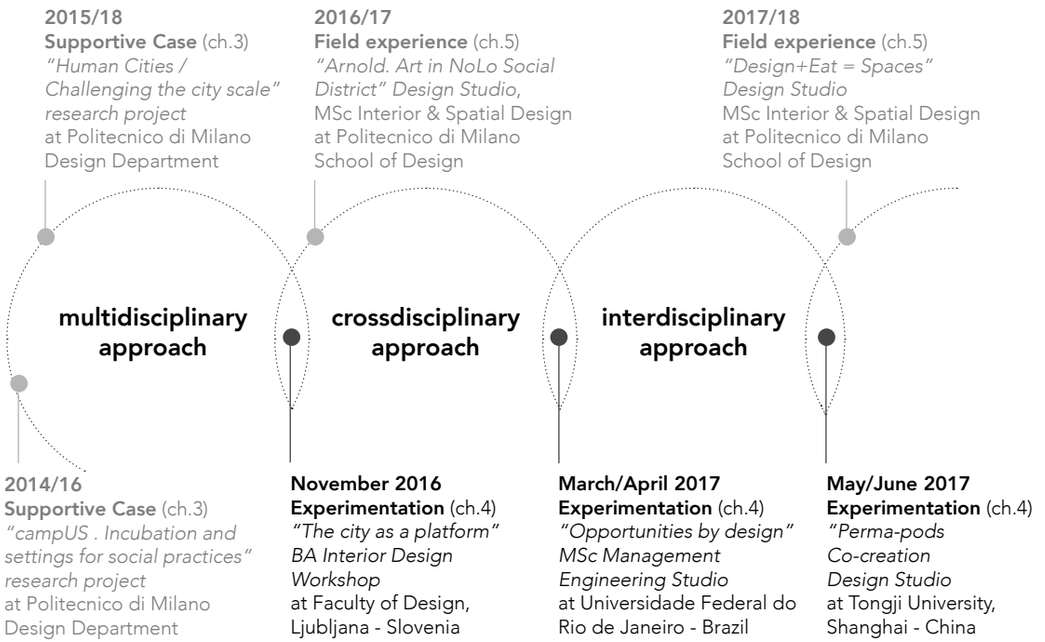


Fig. 20 – Experimental phase: highlight on the three doctoral experimentations presented in this chapter.

4.1 Experimentation 1. Faculty of Design in Ljubljana, Slovenia

Experimentation data:

- Title: **Design of solutions: the contemporary city as a platform for social change**
- Duration: **6 hours (November 14th, 2016)**
- Beneficiaries: **BA Interior Design, first and second year**

In November 14-17, 2016, I had the chance to participate in a workshop at the "4th International Scientific Conference A.L.I.C.E. 2016, GoingGreenGlobal International Design Week, Sustainable Design Paradigms" in Ljubljana (Slovenia), which was organized by the Faculty of Design, an independent higher education institution, and Associate Member of the University of Primorska.
This collaboration came out of the European network "GIDE, the Group for International Design Education". GIDE "is an international consortium of higher education art and design institutions who, since 2003, have collaborated annually to enrich the creative and intercultural design experiences of students, staff and participating institutions". [1]
GIDE consists of six core partner institutions from Belgium, China, Germany, Italy, Portugal, Scotland, Slovenia and Switzerland, and works closely with guest schools from the US and Canada. [2] Established in 2003, GIDE brings academics, researchers, local entities and cultural organizations together to explore ethical issues through creative design thinking within a host city and partner schools.

Thanks to a call for workshops to be set for the students of the organizing university, the activity proposed was the first opportunity for the viewpoint to be tested in definition.

[1] gidegroup.wordpress.com

[2] GIDE members are: Duncan of Jordanstone College of Art & Design [DJCAD] - Dundee - Scotland/UK; School of Design, Politecnico di Milano, Milan - Italy; Faculty of Design, Associate Member of University of Primorska, Ljubljana - Slovenia; University of Applied Sciences of Southern Switzerland (SUPSI), Lugano - Switzerland; Magdeburg-Stendal University of Applied Sciences; Thomas More University College, Mechelen, Magdeburg - Germany; School of Design at Jiangnan University in Wuxi - China; UMA - Art & Design Department of Universidade da Madeira - Portugal.
Guest schools are: UNTexas, College of Visual Arts – USA, and Ryerson, School of Interior Design, Toronto – Canada.

4.1.1 The topic

Addressing the aspect of topic, the activity was set to ask the students to work on their own context, the city of Ljubljana, and through their own eyes as young citizens, in order to push their ongoing training in design to envisage solutions for their environment, and in order to narrow the boundaries of the design action and to focus the students' attention on the design methodology. The students were encouraged to assume a proactive role as contemporary citizens through the development of activities and actions: by the introduction of heterogeneous material objects and artefacts into the urban field of perception, the mission was to reconfigure the urban territory by disruptive uses, perceptions and the impact of the solution proposed.

This approach was based on a process of inquiry into social innovation to be tackled using the design thinking approach and applying a participatory action research methodology. Due to the short duration of the workshop, the PAR component was not highly developed and, for this reason, the students were required to use their own experiences and reflections to build up the design process. In this way, the intention was to develop a sense of commitment to real-world questions in the minds of the design students. The contribution of design methods and design thinking is in fact increasingly recognized as being fundamental in facing social and public policy challenges in the students' capacity to see possibilities, to carry out problem solving, to adapt methods of ethnography and to prototype approaches that allow fast, collaborative creation of systems and services and, therefore, to be strategic.

4.1.2 The theoretical framework

The theoretical framework presented to the students proposed a series of examples through which contemporary urban public spaces are changing towards social cohesion and inclusivity through:

- new or already established forms of mobility: car-pooling, car and bike sharing, free-floating systems;
- new forms of interaction between service and city users through remote encounter, indirect personal encounter or direct personal encounter (Shostack, 1982), with a focus on bottom-up actions: social street phenomenon, [3] participatory models for city development, [4] and community gardens;
- new or already established forms of workplaces: co-working phenomena in general, as well as more specific cases and experimentations. [5]

By focusing on unexpected ways of creating relationships of forms of interactions and generation of meeting areas, cities are recognized as "laboratories for sharing practices with a central role in shaping an entirely new economy" (Smorto, 2016, p. 4) and design artefacts can influence situations of use and be part of a context of experience and action within larger systems, cycles and environments (Buchanan, 1992). Urban territories have thus been defined as **permeable platforms of sets of services to be travelled**, that are:

- user- and community-centred (Meroni, 2007) within the global city (Sassen, 2011),
- co-created in a scenario of temporariness of configurations (Markussen, 2013) and of interrelated actions
- both tangible and intangible within a holistic system of a geography of politics and civics beyond subnational spaces (Sassen, 2004),

which design is facing not only with a programmatic approach but also in supporting located actions. By reconfiguring the contemporary urban territories by design and through new strategies, public spaces are not isolated entities independent of one another but actually constitute an endless urban territory. Furthermore, by modifying the urban experience, design can influence the citizens' everyday life, eliciting social and behavioural change.

Starting from these assumptions, which deal with a wide range of questions, the workshop's goal was to identify citizens' needs to create scenarios of an innovative service in the urban settings, so as to create meaningful solutions.

4.1.3 The methodological process

The methodological process has been structured by providing the group of students with three cards:

- two cards: "spatial elements", with abstract spatial elements and composition associated with a specific urban space in Ljubljana. These have been inspired by the "Elements of Architecture" exhibition by OMA for the Venice Biennale 2014;
- one card: "category of action", proposing a general category of action that could trigger the ideation of a service-oriented solution.

Those cards were already linked in groups of three, with two "space cards" in order to propose more complex spatial compositions:

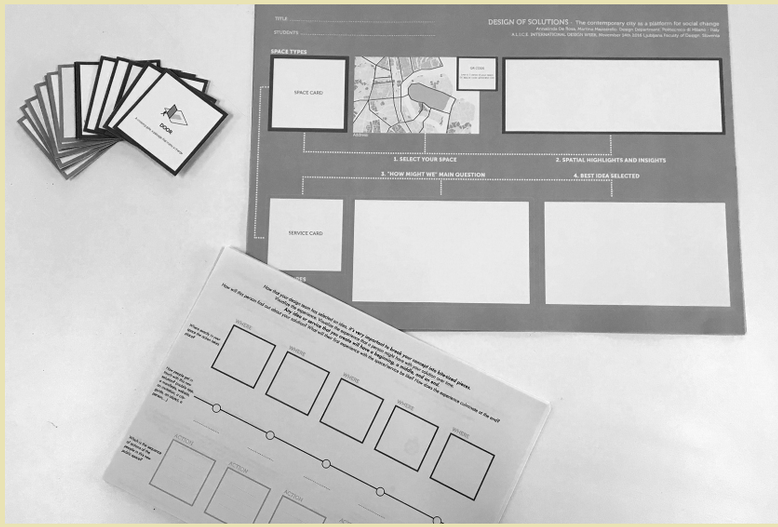


Fig. 21 – The tools for the workshop. November 14th, 2016 - Faculty of Design, Trzin (Slovenia).

[3] The idea of Social Street originates from the case of the Facebook group 'Residents in Fondazza street ', started in September 2013 in the city of Bologna. A resident in Fondazza Street, Federico Bastiani realized he knew few people in his neighbourhood and no one with children to play with his son Matteo. Hence, he decided to open a Facebook group by promoting it with some leaflets along the street. After three months, more than 500 neighbours had joined the Facebook group. This generated bottom-up activities such as community breakfast and dinner, exhibitions, swapping events, exchange of information, news and tools and neEds. Social Street is a spontaneous phenomenon that originated just using social networks, without (apparently) using any kind of design. It is an online to offline encounter process, back and forth from remote to direct. This case has been presented among the case studies within the Work Package 1 – "State of the art/collection of data of "Human Cities / Challenging the city scale" research project (2014-18 - Creative Europe Programme of the European Union) in which I was involved: http://humancities.eu

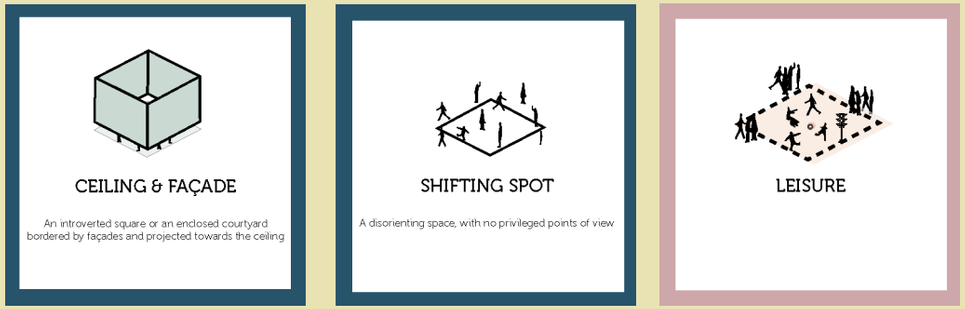
[4] As an example, the participatory model developed by the City of Helsinki - World Design Capital 2012 and UNESCO City of Design in 2014 -, also with the collaboration of the service design agency Hellon under the direction of the Helsinki City Executive Office, to replan the whole city's employees system according to citizens' needs and co-design and co-creation sessions with city employees: https://www.hel.fi/helsinki/en/administration/participate/channels/participation-model/

[5] As an example, the provocative action "Public-Office" by the South African Studio, Shelf in 2013: https://shelf.co.za/spaces-places

[6] http://oma.eu/projects/elements-of-architecture

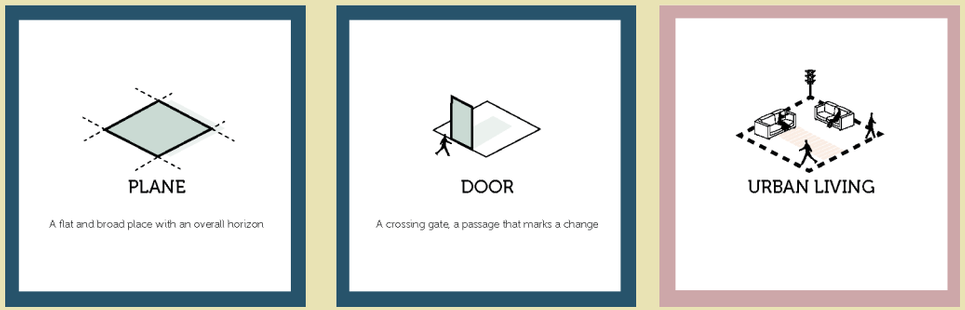
TEAM 1

- ***"spatial elements" card 1:*** "ceiling and façade: an enclosed square or an enclosed courtyard bordered by façades and projected towards the ceiling"
- ***"spatial elements" card 2:*** "shifting spot: a disorienting space, with no privileged points of view"
- ***"category of action" card:*** leisure



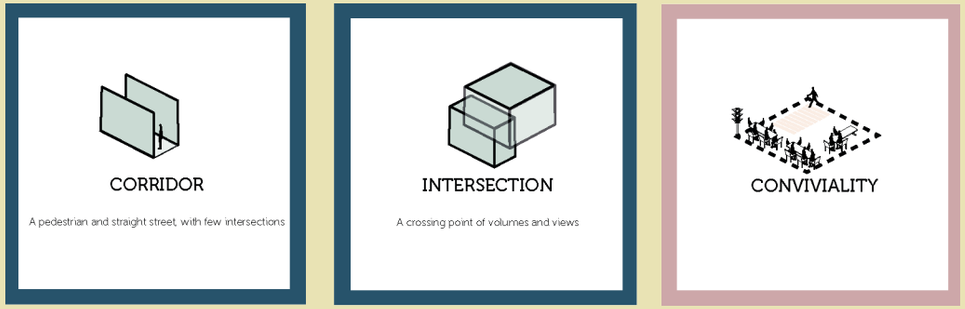
TEAM 2

- ***"spatial elements" card 1:*** "plane: a point of view on the city, a frame"
- ***"spatial elements" card 2:*** "door: a crossing gate, a passage that marks a change"
- ***"category of action" card:*** urban living



TEAM 3

- ***"spatial elements" card 1:*** "corridor: a straight pedestrian street, with few intersections"
- ***"spatial elements" card 2:*** "intersection: a crossing point of volumes and views"
- ***"category of action" card:*** conviviality



TEAM 4

- ***"spatial elements" card 1:*** "window: a point of view on the city, a frame"
- ***"spatial elements" card 2:*** "bridge: a passage from a place to another"
- ***"category of action" card:*** urban market

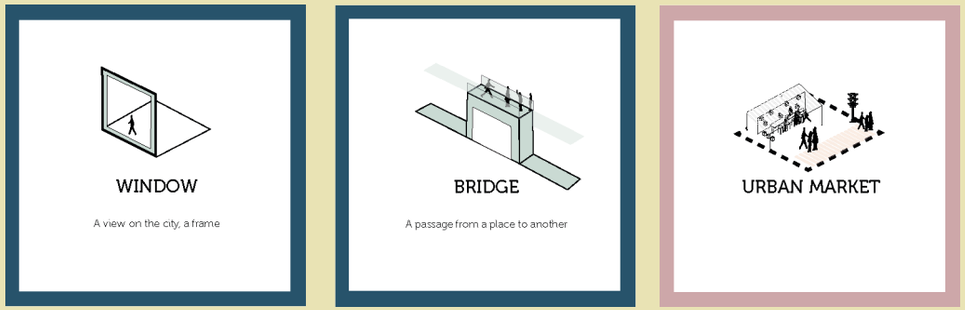


Fig.22 – Cards provided with the "spatial elements" and the "typology of action".

This process invited students to identify familiar spaces through spatial components, in order to reinterpret the physical composition around new ways of inhabiting and understanding the potential mise en scène. The output was a final representation – in the shape of a scenario – of the sequence of actions taking place, in relation to the type of service assigned and the type of space identified.

Fig. 23 – The four combinations provided with two "spatial elements" cards" and one "typology of action" card with inspiration cases.

Students were provided with a design form (Fig. 24) with information, data and the steps to fill in, in order to get a systematic framework of the process to design, and at the end, the final scenario to present.

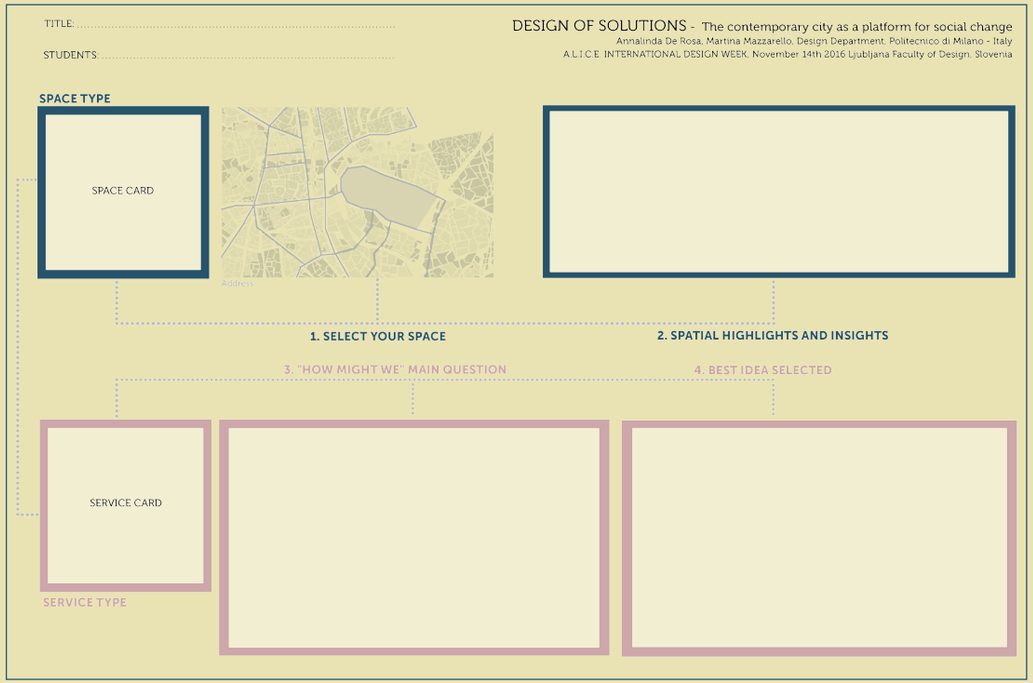


Fig. 24 – The form provided to the students with the systematic framework of the process to design.

• *Phase 1, Spaces and Opportunities: IDENTIFYING PROBLEMS*

1. Select your space in the city of Ljubljana and post three pictures

Starting from the "spatial elements" card, students had to identify a possible space in the city with those perceived characteristics and provide the three best images to communicate it.

2. Spatial highlights and insights

Students were asked to draw and write on the pictures: their observations on the physical appearance; behaviours that were prevented or facilitated; misbehaviours to be limited or prevented; and visual guidelines. To do this, they have been inspired by the work of Gabriele Basilico in *"Lezioni di fotografia"*. [7] In this way, they were required to highlight the **spatial evidences** of the selected space, in order to let the intangible side of it emerge and, therefore, to let possible expectations emerge: How is the space perceived? Which are the problems encountered that allow or don't allow future usages? This step was meant to be a **diagnosis phase.**

3. "How might we" questions: **FROM RESEARCHING TO CREATING**

Thanks to the previous diagnosis, students have been guided into a brainstorming session by answering the questions

> *Which are the people's needs? And their inspirations? Who are you designing for? What is now not working in this place? What is missing? What would people like to do in this place? What can be done? How can this place change thanks to a new solution? How can this place change through the actions of people?*

They were asked to list "problems and opportunities", so as to define one shared "How might we ..?" question, and to transform the problems and issues found in a design opportunity and to express it as an implied suggestion for a change. Multiple solutions were then turned to a single selected one.

[7] Basilico, G. (2012). ***Lezioni di fotografia.*** Rizzoli Edition.

Fig. 25 – Classwork. November 14th, 2016 - Faculty of Design, Trzin (Slovenia).

• *Phase 2, Concept: TESTING TIMING + INTERACTIONS + PLACE*

This step was meant to break the idea into bite-sized pieces in order to visualize the experience that a person might have with the solution over time with a beginning, a middle and an end. The guiding questions were:

> *How will this person find out about your solution? What will their first experience with the space/service be like? How does the experience culminate?*

The **sequencing** was built as a guided and simplified customer journey map for BA interior design students, already implemented for an S+S approach. In fact:

- every **action** *(Which is the sequence of actions of the people in this new public space?)*
- has to be associated with a **spatial visualization**, to highlight the correspondence to the **physical evidences** *(Where exactly in your space does the action takes place?)*
- and to the **touchpoint** *(How do people get in touch with this new solution?).*

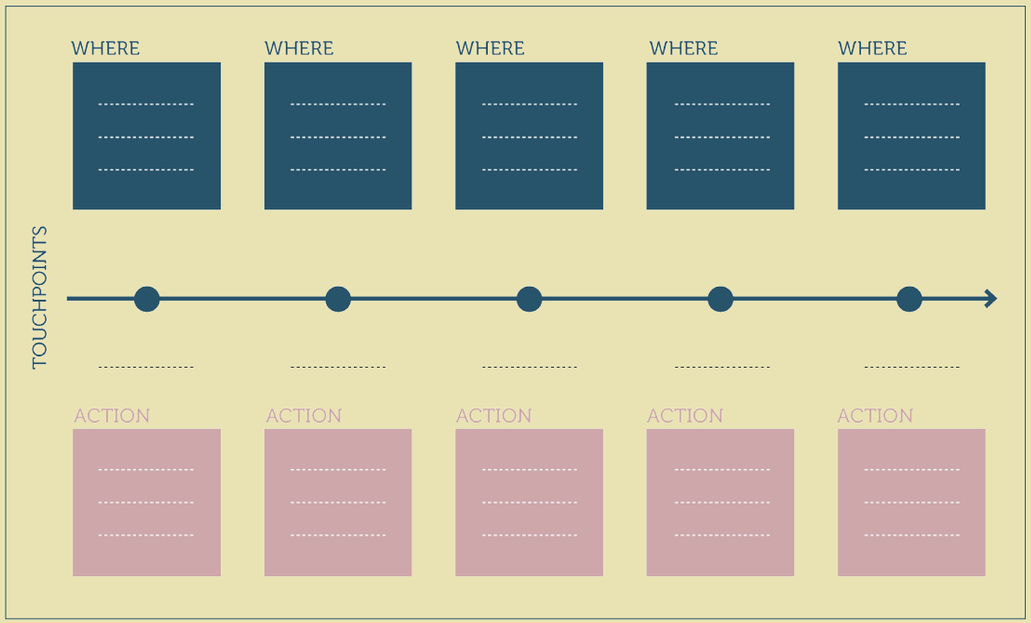


Fig. 26 – The form given to the students to illustrate the sequencing of where, touchpoints and actions.

• *Phase 3, Spatial Storyboard: IMPLEMENTING*

At the end, students were asked to represent the final solution using two tools:

- **scenario**: they had to represent a plausible situation around which the scenario could be based and to convey the key aspect of the service proposed in as straightforward a manner as possible;
- **spatial storyboard**: they had to find a way to encapsulate the experience of people using the **service sequencing approach into the scene of the place.**

Fig. 27 – Final presentation: scenarios disposed in the city map and illustration of a spatial storyboard.

4.1.4 **Discussion**

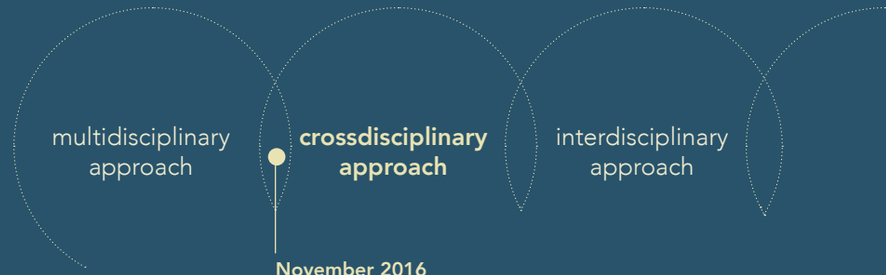
The first experimentation showed the seminal approach that was then exploited in the following ones.
First, it is important to highlight that the duration of the educational activity, the background and the level of students are **relevant factors of the testing environment**. The level of the students - mainly at their first year - required the use of simplified methods and tools.
In this case, the service side of the process was strongly simplified and service tools were implied in it. The duration of the workshop prevented the possibility of providing in-depth insights about the service discipline, but it was a perfect testing environment to verify a first integration of service components within the spatial design process.

The **systematic process** proposed was supported by set formats to be filled in a way that already systematized the data collected and elaborated it so it could then be transformed in the final output.
The "more spatial" contents were organized in a sequence in line with the "more service" ones, to become a synthetic panorama of the work analysis to then nurture the list of problems and opportunities (phase 1: IDENTIFYING PROBLEMS + FROM RESEARCHING TO CREATING). This part acted as a foundation for the TIMING + INTERACTIONS + PLACE (phase 2), which was the first attempt to connect multiple levels of actions/interactions/place as illustrated in the following section.

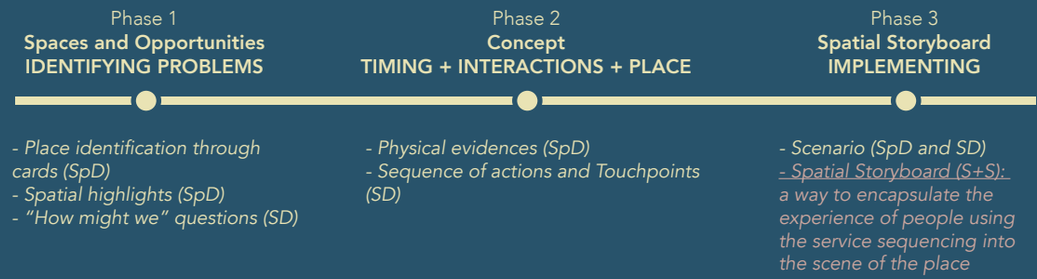
Phases 2 and 3 allowed **the dialogic relationship between the service sequencing and the spatial evidences** tested in the first test of the **spatial storyboard** to emerge.

> ***The testing process has been based on cross-disciplinarity: the service design insights and approach only supported the main framework based on a spatial design approach and within it.***
> ***The design process had a direct cooperation among the disciplines but with a strong polarization towards tools and methods of Spatial Design.***

1.POSITIONING IN THE PROGRESSIVE EVOLUTION OF THE EXPERIMENTAL PHASE:



2.SUMMARY OF THE DESIGN PROCESS *:



(SD and SpD in brackets specify the disciplinary origin of the approach used for that method or tool.)*

3.INSIGHTS:

Students have been conducted in **designing spaces by deconstructing a sequence of interactions unfolding in space and time**.
However, the form provided (fig.24), mainly based on SD tools, was **not enough developed to support students in the definition of a complex design strategy of the place.**

4.2 Experimentation 2. Universidade Federal do Rio de Janeiro, Brazil

Experimentation data:

- Title: **"What if issues turn into opportunities? A workshop for developing solutions by design"**
- Duration: **16 hours (March 23rd – April 13th, 2017)**
- Beneficiaries: **MSc Management Engineering, second year students**

In March/April 2017, I accomplished the first period abroad of my doctoral path at the Universidade Federal do Rio de Janeiro, having been invited by Carla Cipolla, Associate Professor and coordinator of the UFRJ Desis Lab and now international coordinator of the DESIS (Design for Social Innovation and Sustainability) network. In fact, the exchange is also part of the common membership of DESIS (Polimi Desis Lab and UFRJ/Coppe Desis Lab). In the panorama of a network of Design Labs based in design schools and other design-oriented universities, DESIS promotes and supports international exchange among its members for research and academic purposes. The global network fosters possibilities for doing research in diverse settings by taking advantage of a host's local link with academics, communities, enterprises and practitioners. This nurtures research exchange among the DESIS partners worldwide.

The research was carried out as part of the "Product Design" course within the Management Engineering (Engenharia de Produção) programme of the Escola Politécnica - Universidade Federal do Rio de Janeiro, with a specific theoretical and applied teaching activity on the design methodologies of spaces and services.

4.1.1 The topic

Also in this case, the theoretical framework presented to students proposed a series of ways and examples through which contemporary urban public spaces are changing towards social cohesion and inclusivity and the workshop's topic calls for attention towards design for social innovation and design practices for city making. This was done in a more structured way thanks to the longer duration of the trialling and to the higher academic level of the students, even though their background is far from the spatial and service disciplines.
Yet, specific knowledge was needed to tackle the distinct challenges that Rio de Janeiro's public spaces offer to the investigation, and to the specific approach that management engineering students bring to this topic. In fact, the widespread sense of insecurity in Rio has a strong impact not only on newcomers but also on its inhabitants.
Therefore, I set the activity by putting the personal experience of students as citizens of the context in analysis. Students compared observations of their own daily use of public spaces and their personal experience as citizens (both as locals and newcomers) with the experiences of other citizens. Students were encouraged to act as problem-seekers more than problem-solvers when they researched the urban contexts. This fostered their capacity to understand socio-cultural, political and commercial factors when they designed scenarios for brand new interactions in the urban context. Unlike the Ljubljana investigation (see previous paragraph), this choice was not taken because of the short duration of the activity, but because of the complexity of the dynamics of the city of Rio's public space. In this case, it prevents the willingness to explore unknown areas and, indeed, all the groups automatically selected areas in the southern part of the city where the richest and, in some cases, more touristic neighbourhoods are.

4.1.2 **The theoretical framework**

The aim of the experimentation was not only to test **interdisciplinary methods and tools**, but also to go through the comparison between more formally institutionalized areas rich in basic infrastructure and the marginalized or underserved areas affected by social exclusion, informing research in education within design for social innovation thoughts.
The investigation provided interesting insights in understanding the many problems and opportunities of a big city, where the absence of a strong social network and safety issues challenge the students' experiences as citizens.

The topic focused on how people's actions can be the driver of change concerning the transformation of urban public spaces through new forms of mobility (*Airbnb, bike sharing and free-floating systems, Uber, etc.*), new forms of interactions, unexpected forms of interactions, unexpected work places, and unexpected meeting areas. The social context is transforming, due to the active involvement of people in the transformation of their existence, acting in their environment to achieve social change. People are assuming a proactive role, also through the development of bottom-up activities and actions and, on a larger scale, all these complex processes are implicating an awareness of general and specific problems, thus generating a more participatory mind-set. This is design aiming at reconfiguring contemporary urban territories through new strategies. Public spaces are not isolated entities independent of one another, but they actually compose an endless urban territory. The network of spaces exists because an overlapping network of services is able to link them; in fact, spaces are not a system in themselves unless there is a network of fluxes (fluxes of people and goods through infrastructures, of data, of knowledge, of mutual impact and influences). By modifying the urban experience, design can influence the citizens' everyday life, eliciting social and behavioural change.

The strategy of applying an experiential learning method into design education for social innovation processes had a twofold potential outcome: to enrich students' design skills and to trigger their level of engagement, and by leading to new dynamics and opportunities for dialogue. By enacting a "legibility process" on the context, as the perceptual clarity of an urban environment and "the ease with which its parts can be recognized and can be organized into a coherent pattern" (Lynch, 1960, pp. 2–3), the immaterial value of legibility of the city is in relation to the concept of agency by its inhabitants. In this context, the possibility for the design project to find a critical and civic role is formulated through the exploration of an involvement with the social environment. This involvement is concrete in the alteration of the conditions of the urban experience, through interventions on the sensorial material of this experience and re-encounters on the concepts of duration, memory, and registration. Spontaneous or more designed actions modify the urban experience and influence the citizens' everyday life, eliciting social and behavioural change. This is how Markussen (2013) defines design activism as a *disruptive aesthetic practice*, focusing on the impact of design acts on the public sphere as ways to introduce *"heterogeneous material objects and artefacts into the urban field of perception"* (2013, p. 4). The term *disruptive* does not here have a negative sense:

> *"the design act is not a boycott, strike, protest, demonstration, or some other political act, but lends its power of resistance from being precisely a designerly way of intervening into people's lives" (2013, p. 1).*

Here, Markussen introduces the fundamental aspect of design activism of influencing people's behaviour and perceptions, both towards public space and actions in the public sphere (urban experience), considering the constant overlap of configurations and conditions of society and urban space.

> *"In their direct intervention into urban space, artefacts invite active engagement, interaction or simply offer new ways of inhabiting urban space. In so doing, design activism alters the conditions for the urban experience" (2013, p. 4). Therefore, "[...] design activism has the potential to re-negotiate the relationship between people's doing [...] and their feelings about this doing" (2013, p. 6);*

its inner sense is in the ability to interlink people's needs and implied will through various techniques in order to trigger the user to action and to foster new forms of living and new identities: this is the effect, the core of design activism. This reflection is connected to the concept of the urban territory as a permeable denationalized platform, activated by multiple interventions and interrelated actions – already discussed in Chapter 1 of this dissertation. When Sassen (2004) speaks about the *ascendance of sub- and trans-national spaces and actors*, facilitated by the weakening of the restrictive formal power of states over national regions, she frames a geography of local networks activating multiple *micro-spaces of daily life*, and she depicts a holistic system in which even marginal locations can become part of global

networks and spread their influence. Therefore, we are in a dense network of connections that connects local actions and creates a flurry of initiatives and social change processes that designers can support and contribute to. Within this theoretical framework, the educational activity elaborated at the UFRJ university tried to test how this approach can be transferred into design education, within a different context and through the main testing of the interdisciplinary approach object of this dissertation.

4.1.3 The methodological process

The design process was structured in three phases. Each of them lasted one week, divided between classwork – for presentation, feedbacks and exchanges – and homework (desk and field research) (Fig. 28). Students worked in groups of 2 or 3.

• Phase 1/ discovering: LEARN ABOUT THE CONTEXT

This phase required on-site field research, based on observation, interviews and mapping activities. These three directions were meant to build a complete analysis of the selected area in terms of understanding the physical evidences and the social aspects by getting in touch with other citizens from the relevant components that favour misbehaviours, and thus identifying an opportunity for design.

a. Define the area

Students were invited to identify an area of the city that, from their previous direct experience, they could recognize as a potential place as the object of the reflection. As stated before, the level of exploration that could have been required of the students was not as high as in the European contexts, as suggested by the course leader and through other useful exchanges. The closer the place was to their daily life; the more insights would have already been collected unconsciously as citizens to be reframed and nurtured into the design process. The selection of the area was done during the first day, after the kick-off of the course, in order to start with a joint brainstorming and discussion on the topic and related issues. The reasons for the choice were already a way to perceive explicit practical or emotional meanings within the spatial environment, uses and misuses, and variables.

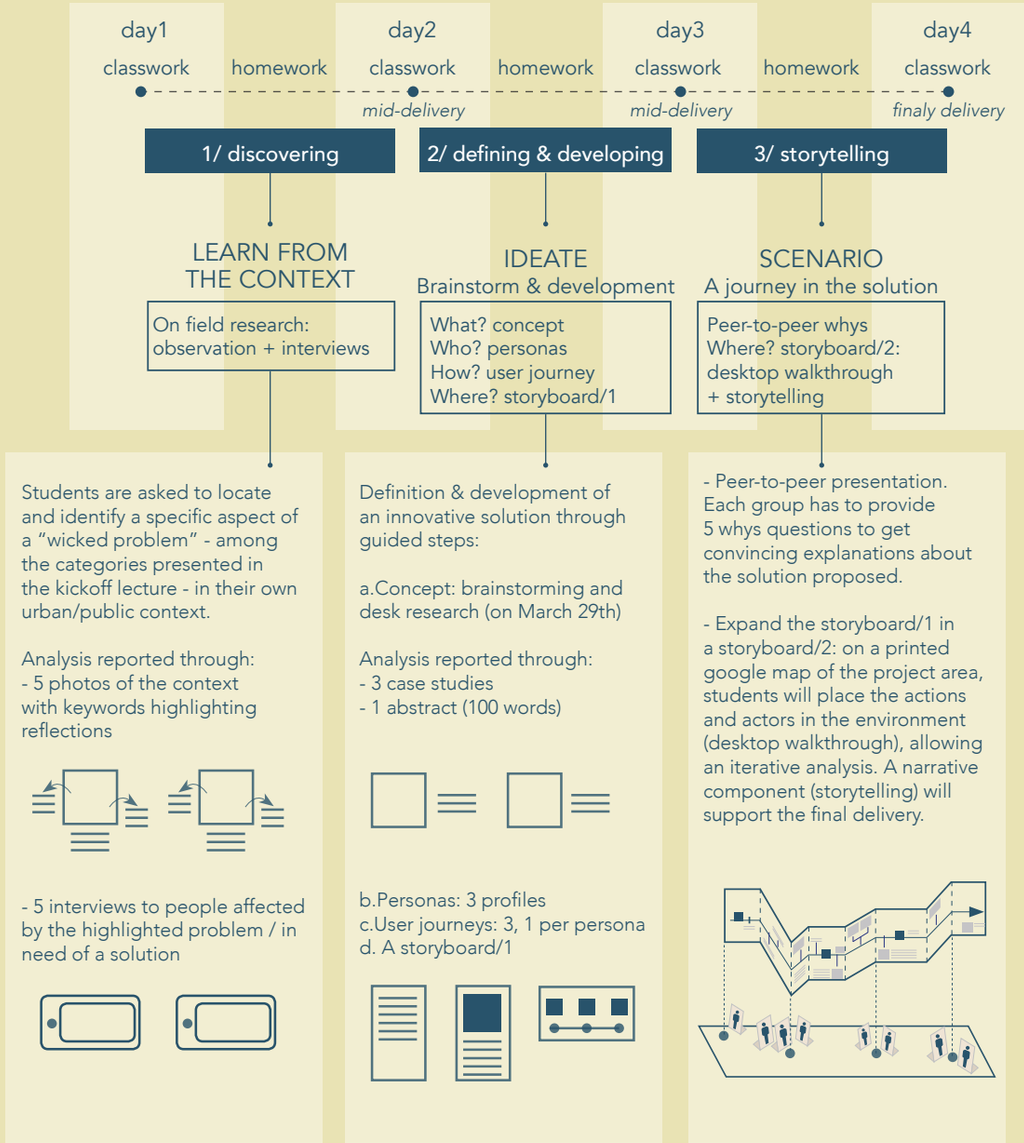


Fig. 28 – Explanation of the design studio process: calendar, phases and focus on tools and methods.

b. Big issue

Students were required to identify one specific aspect of a "big issue" in their chosen area and context. The "big issue" was intended to be a general issue, a so-called "wicked problem" that could be recognized in the specific context in order to frame it in a wider – and not simply local – panorama. By opening up the lens of the ***issue identified***, students were directed to situate the highlighted problem within a panorama of complexity, in order, first, not to embrace the whole complexity and, second, to be aware of this complexity and to immediately downsize it, which means to recognize the peculiarity of the context's issue and to look at it in separate parts.

c. Analysis of the area

This analysis was structured using ***the so-called Lynch approach***, a classification of five types of elements composing the contents of the city's image (Lynch, 1960. *The image of the city*. Vol. 11. MIT Press., pp.99-102). Lynch speaks about the *environmental image* as the strategic link in the process of orientation of human beings,

> *"the generalized mental picture of the exterior physical world that is held by an individual. This image is the product both of immediate sensation and of the memory of past experience, and it is used to interpret information and to guide action. The need to recognize and pattern surroundings is so crucial, and has such long roots in the past, that this image has wide practical and emotional importance to the individual. […] it may serve as a broad frame of reference, an organizer of activity or belief or knowledge" (Lynch, 1960, p. 4).*

The Lynch approach was a way to help students to mentally organize and understand the physical shape of the space and to build a map to build a perceived image between observer and observed. This analysis was done individually by the students, not in groups, so as to develop team work through different perspectives and perceptions.

This approach classifies the physical form of an urban space image into five types of elements: ***path, edges, districts, nodes and landmarks:***

- *Paths: connections and flows.*
  The channels along which the observer customarily, occasionally or potentially moves
- *Edges: lateral references.*
  Natural or human-made boundaries, barriers.
- *Districts: areas, neighbourhoods.*
  Section of the city, recognizable as having some common, identifying character
- *Nodes: meeting or gathering places.*
  A crossing or convergence of paths, concentration of uses, an enclosed square
- *Landmarks: recognizable elements.*
  Physical object (building, sign, store, mountain, monument, etc.).

d. Photos analysis

Students were also required to take pictures to communicate ***spatial highlights and insights*** and to report through the photos themselves and by reporting their observations on: physical appearance; behaviours that were prevented or facilitated; misbehaviours to limit or prevent; and visual guidelines, as in the Ljubljana experimentation (see previous section, phase 1).

e. Interviews of people

Finally, together with the understanding of the structure, composition, perception and meanings of the area, students were asked to interview inhabitants who regularly frequented the place, in order to collect data – on an ***experiential base*** – on uses, perceptions and stories, and to compare them with the highlighted issue.

Students were directed to conduct basic interviews, due to the compressed duration of the course: to organize themselves in their team with a clear role (i.e. interviewer, note-taker, photographer); to prepare a set of questions, starting with broad questions about the person's life, values and habits, before asking more specific questions related directly to their challenge; and to observe the person's body language and surroundings. [8]

• *Phase 2/ defining & developing: IDEATE*

Phase 1 encouraged students to implicitly systematize the data collected in order to get their interpretation of a multifaceted environment: a ***personal exploration***; a ***direct contact with citizens***; and a ***critical understanding of the physical components*** and framework of the local issue in a bigger panorama. Phase 2 required a process of organization of these data in order to brainstorm them. It was organized along three parallel purposes: defining what is the focal point of the design, **who** is the beneficiary of it and **how** it is unfolded in time and space.

[8] From: IDEO.org. (2015). *The Field Guide to Human-Centered Design.*

a. Defining the concept: WHAT?

A first brainstorming step led students to write down the identified *Big Issue* and the Issue in the specific context in the form of a tweet (140 characters), and the identified ***Design challenge*** summarized in a sentence. Students were challenged to focus down the complexity gained in a synthetic, clear and not too broad fashion. Then, they were required to write down the ***key learnings*** from the first phase and to turn them into *"What if…?"* questions: these are useful tools to explore input and suggestions since they suggest that a solution is possible and they offer the chance to answer them in a variety of ways. Although, they don't suggest a particular solution, but they give the perfect frame for innovative thinking: "*What if…?*" questions don't have to be too broad nor too narrow. [9] A final brainstorming was needed to leverage the creative power of the group by engaging with the design team, listening carefully, and building on each other's ideas to encourage them. In order to support it, students were pushed to seek inspiration through ***case studies***, so as to focus on specific aspects to be compared through the different cases. This facilitated the understanding of the design idea, especially for students who were not trained in this kind of processes.

b. Defining personas: WHO?

Personas are a useful method to define and engage the different interest-groups that may exist within their users' panorama, providing a range of different perspectives for a design solution. The personas are archetypes built after an exhaustive observation of the potential users. Each persona is based on a fictional character, developed as a way of representing a particular and existing social group based on their shared interests. In this way, the personas assume the attributes of the groups they represent: from their social and demographic characteristics, to their own needs, desires, habits and cultural backgrounds. The most common way of developing personas is to collate research insights into common interest groupings, which can then be developed into a workable "character". Most personas are developed from shadowing, interviews and other similar techniques. Even though the personas themselves may be fictional, the motivations and reactions they exhibit are real: they embody the ***real-world perceptions***. [10]

c. Customer Journey Maps: HOW?

The Customer Journey Map is a tool generally used in service design and finds its origin in the management and marketing disciplines as a way to describe through a ***chronological sequence of actions*** and through corresponding touchpoints the journey of a user in a service, showing its user's experience. It provides a ***high-level overview of the factors influencing the user experience***, constructed from the user's perspective, and it enables the identification of both problem areas and opportunities for innovation. This structured visual representation makes it possible to compare several experiences in the same visual language, and also facilitates quick and easy comparisons. The touchpoints are the elements of connection between the customer (user) and the service (i.e. if the service is a library, touchpoints are the library website, the service of booking online/asking for new books/giving reviews about, the personal library card, the library personnel and assistants, etc.). [11]

[9] Ibid.

[10] Stickdorn, M., Schneider, J., Andrews, K., & Lawrence, A. (2011). ***This is service design thinking: Basics, tools, cases.*** Wiley Hoboken, NJ.

[11] Ibid.

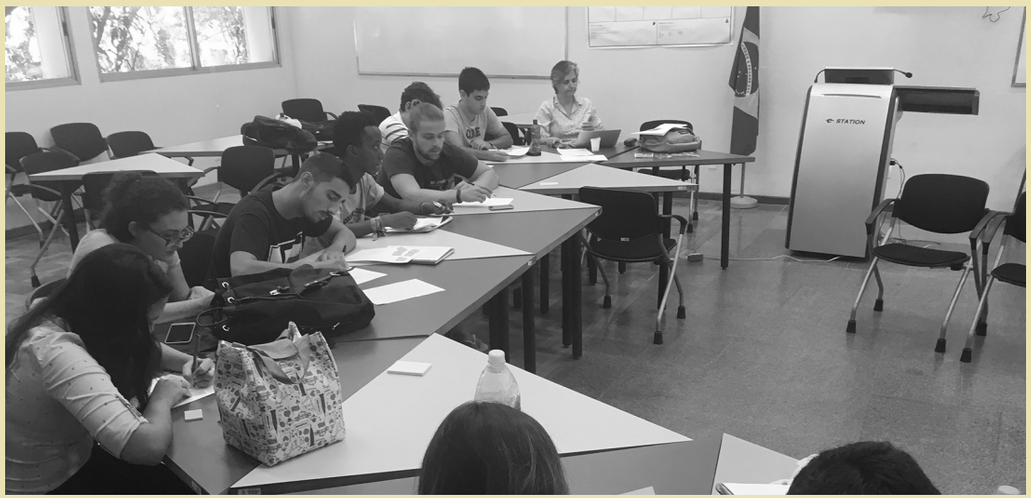


Fig. 29-30 – First presentations and individual step of the brainstorming. April 2017 – UFRJ, Rio de Janeiro.

• Phase 3/ storytelling: TELL YOUR SCENARIO, A journey in the design solution

After the definition of *who*, *what* and *how*, the final phase was dedicated to understanding where the developed idea takes place and how in relation to it. The general goal was to ***tell an innovative spatial story, showing the actions done, the actors involved, the time of the action and the spatial values.*** To do so, the tool tested was the ***"Spatial Storyboard Plus", a mix of existing tools – Desktop walkthrough, Scenario description swimlanes and Storyboard – chosen in order to find ways to express the complexity of multiple factors, its variables and its unfolding in space and time.*** Furthermore, it tries to meet the capacity of management engineering students in some aspect.

As for the previous steps, short descriptions of the tool are provided here:

• ***The Desktop walkthrough*** is a small-scale 3D model of a service environment. Employing simple props, it lets designers bring a situation to life, acting out common scenarios and helping develop the idea. Common situations can then be acted out by moving the characters around the model and simulating the interactions they may have. It allows iterative analysis of the situations depicted. [12]

• ***The Scenario description swimlanes*** are deliverables that visualize the activities of multiple actors in a flow of events and prove that a holistic perspective is greater than the sum of its parts. Scenario description swimlanes can benefit any project where several processes or actors have to come together to shape the outcome of the same flow of events. Its direct, visual nature provides a bird's-eye view of all the moving parts within a story.[13]

• ***The Storyboard*** is a tool derived from the cinematographic tradition; it is the representation of cases through a series of drawings or pictures, put together in a narrative sequence. The service storyboard shows the manifestation of every touchpoint and the relationships between them and the user in the creation of the experience.

As shown, the tools were mainly described from a Service design point of view but, this experimentation has still tested an interdisciplinary approach, since there is no one dominant perspective. Surely, this is an evident transition from crossdisciplinarity to interdisciplinarity.

[11] Ibid.

[12] Stickdorn, M., Schneider, J., Andrews, K., & Lawrence, A. (2011). ***This is service design thinking: Basics, tools, cases.*** Wiley Hoboken, NJ.

[13] Hanington, B., & Martin, B. (2012). ***Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions.*** Beverly, MA: Rockport Publishers.

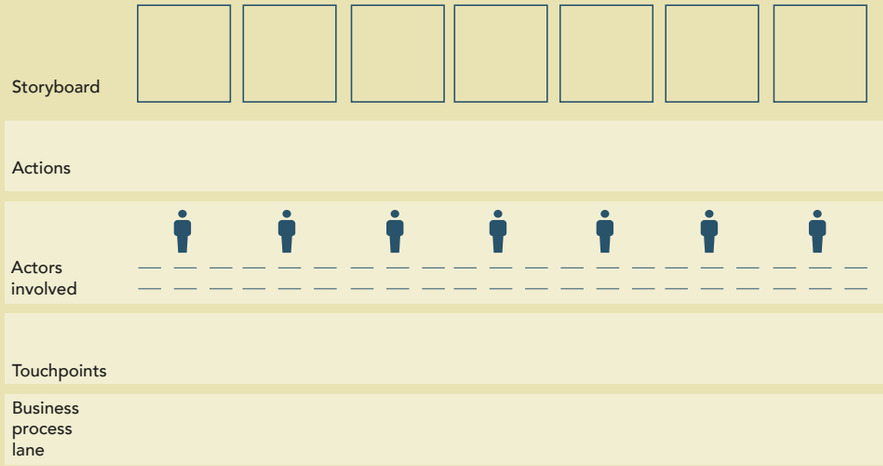


Fig. 31 – The Scenario description swimlanes form provided to the students.

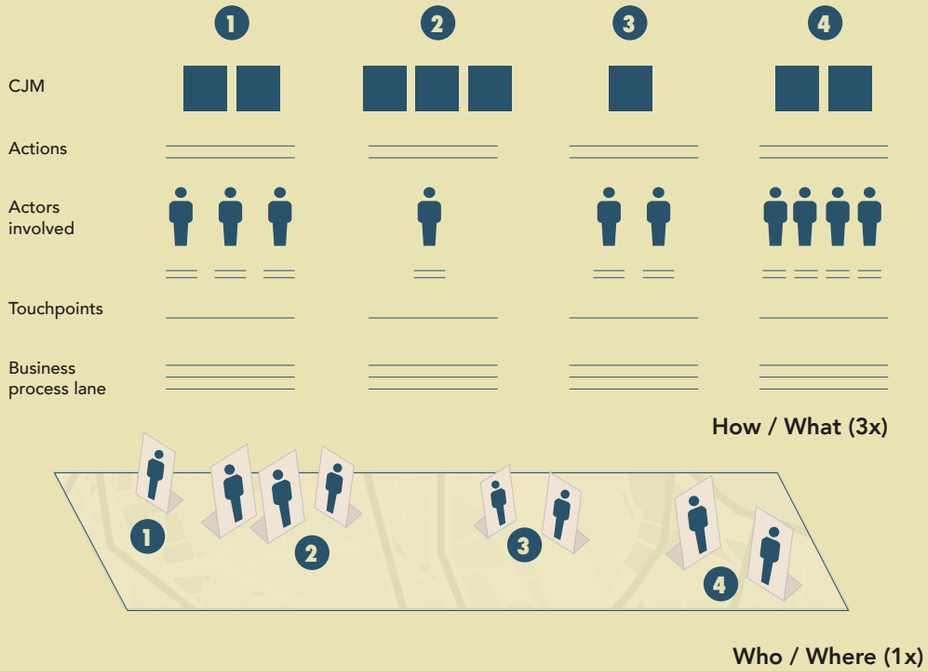


Fig. 32 - The Scenario description swimlanes visually matched with the Desktop walkthrough components.

By matching these tools in the "***Spatial Storyboard Plus", it provided a way to transform the students' final presentation into an acting performance, overlapping its time-component with the unfolding of the actions designed in the space designed.*** This tool was further developed in the following experimentation, providing additional insights.

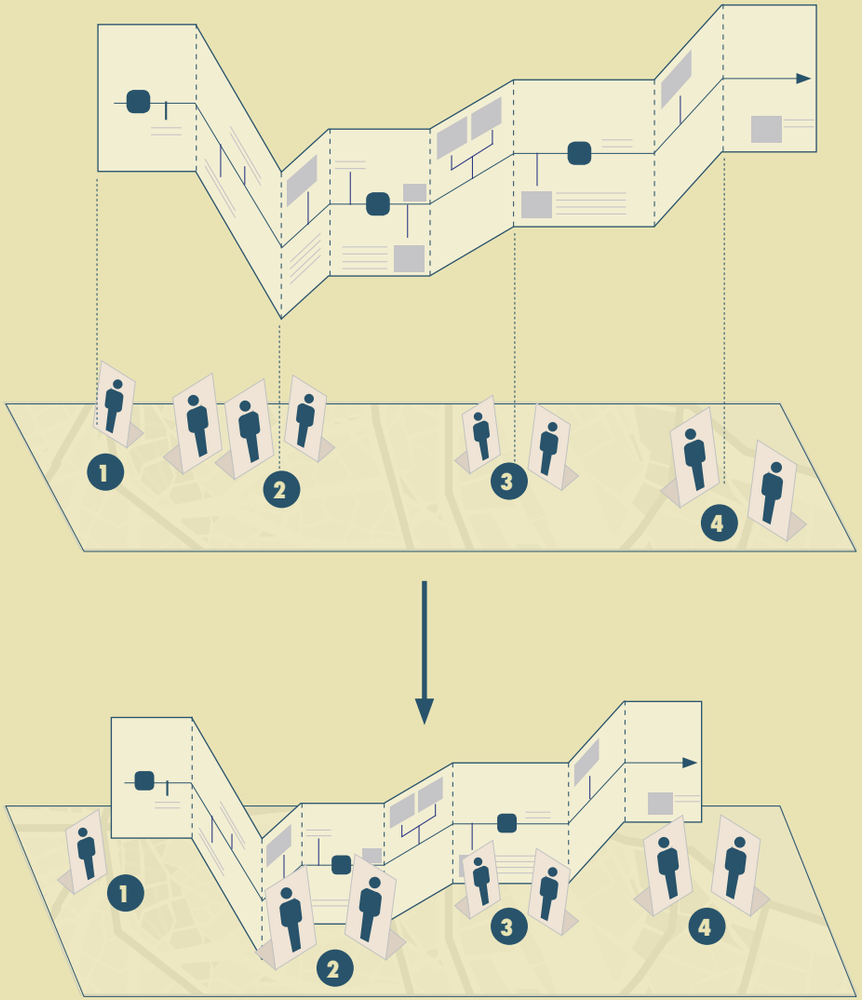


Fig. 33 - The Storyboard integrated and "inhabited" within the Desktop walkthrough.

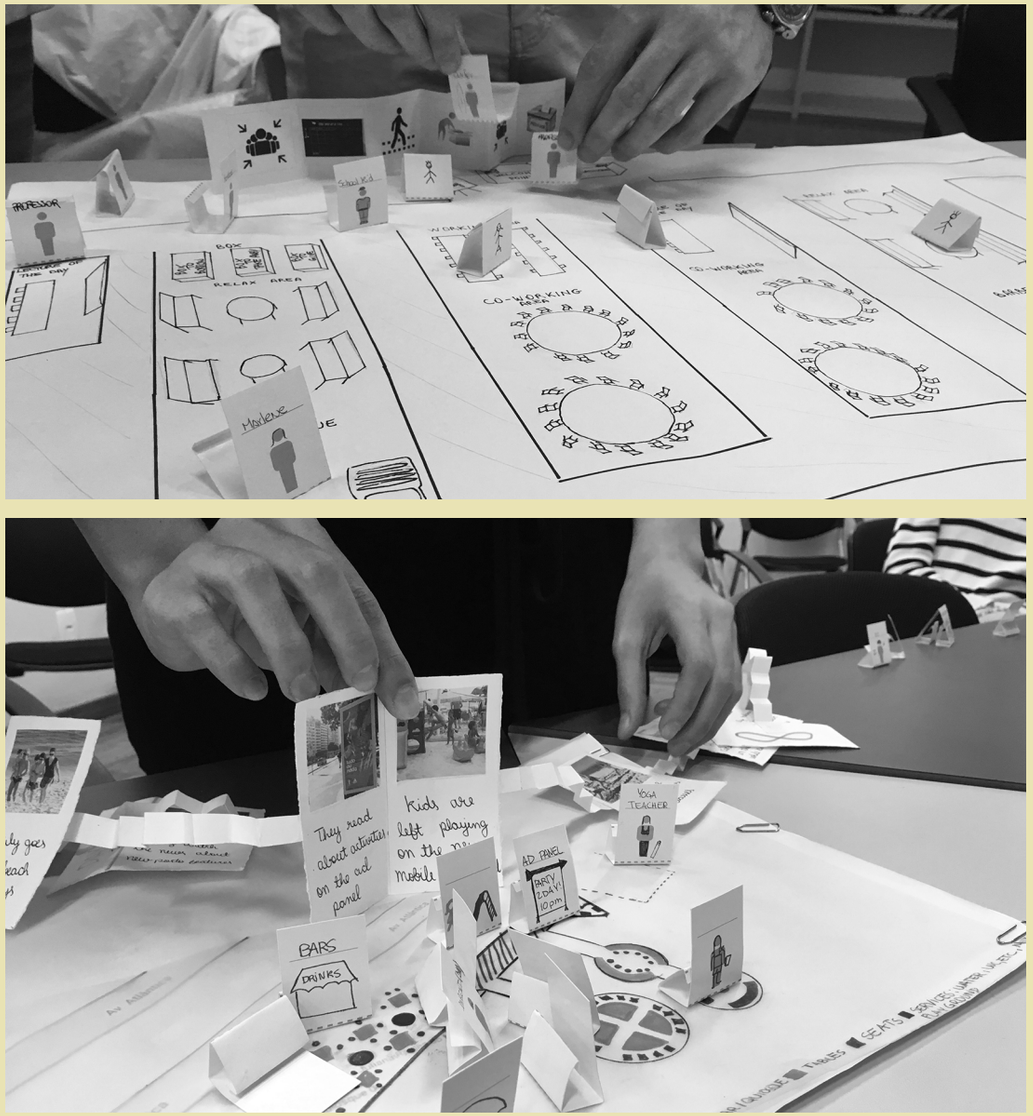


Fig. 34-35 – Final presentation. April 13th, 2017 – UFRJ, Rio de Janeiro.

• ***Individual short paper***

The final presentation was also supported by an individual short paper with theoretical analysis starting with the reflections done for the design project. It provided critical and personal analysis, with the issues related to the chosen area of the city as a starting point for reflections, having the whole city of Rio de Janeiro (other places, other neighbourhoods - optional) as terms of comparison. Different topics were provided to orient the direction of the short papers:

• *TOPIC 1 - ENABLING ENVIRONMENTS*

How does the physical realm enable interactions among people and enhance a sense of shared ownership and engagement among people and their contexts?
How the contexts are similar/different to other areas in Rio de Janeiro, considering: i) formally similar urban places with different uses; ii) institutionalized and rich in basic infrastructure areas vs. marginalized or underserved areas affected by social exclusion; and iii) new forms of living, working, playing, purchasing and learning vs. traditional ones

• *TOPIC 2 - Social inclusion*

The actual social context is characterized by the active involvement of people in the transformation of their existence, acting in their environment to achieve social change. This change is "social" because people are not just asking local authorities or national governments - which are responsible for that change in a top-down model - for economic, political or social transformations in a passive and abstract way, but are assuming a proactive role through the development of bottom-up activities and actions, being involved into local organizations and informal groups or through individual initiatives.
Are their initiatives conceived to intentionally facilitate social inclusion in the area?
What are the situations and initiatives that actually generate social inclusion?
How do the different cultures and communities become integrated or not?
Are the communities living in this area changing? Is there one or more typology(ies) of inhabitants? How do they cohabit (or not) together?

• *TOPIC 3 - History and stories*

What is the history of the district and what is its relation to the history of the whole city? What are the notable stories of the people and the places?
Has it changed through the years?
If it's not changed does it have potentialities not already expressed?
How is the cultural scenario? Are there notable stories?
What are the hot-spots of the social life and the places where people gather?
Do citizens of the area know these stories? Are they a part of them?

Fig. 36 – Peer to peer presentation. April 13th, 2017 – UFRJ, Rio de Janeiro.

Understanding a megacity's stream of problems and opportunities has been a big challenge: it prevents the easy feasibility of interviews and observation in an urban environment in which public spaces are affected by the absence of the basic characteristics a European city possesses. As a matter of fact, in Rio there is an absence of squares as safe public spaces for people to meet: squares are mostly passages but are prevented from having the community value of a "piazza". Public spaces are provided with useful infrastructures (for children, gym for elderly people, dog area) but safety issues define the uses during the day.
The teams of students selected areas that were close to their experience as citizens – both locals and newcomers – of Rio de Janeiro. Few cases are here reported to frame the process.

• Team 1 analysed the use of the green areas between the “blocos” (the blocks of buildings) and the long-covered passage that connects the “blocos” of the Cultura Tecnologica complex of the Universidade. While the covered area of the passage is always crowded, the green areas are empty: the first because of the presence of many food trucks (which prevents the use of tables and chairs unless you are a client); the second because they are poorly equipped, not so well-finished, and they are not perceived as part of the common areas. Inside the buildings, there are some study rooms, but those are “privatized”: an unofficial and unspoken rule is that only students and staff from that school/course/department can use them. The Big Issue highlighted by the students is that “Cities are full of empty spaces which could be turned into something useful”, which turned into the specific design challenge: “How to revitalize the spaces between the blocos into places where students can study, relax and meet other people, generating interaction stimulated by some kind of exchange?”.
Comparing the specific case of these areas of the campus and the wider situation of the city, the students’ reflection turned to questioning how forms of active engagement by specific communities can implement places as well as disadvantaged neighbour’s areas and groups. More specifically, this reflection compared the bottom-up action the students could do to trigger a transformation of those communal areas of the university to the situation of university area as a whole. In fact, the UFRJ is located on the artificial island, Ilha do Fundão, close to the favela Complexo da Maré: what could a university, considered to be the best in the country and the core of the intellectual power - do to support its neighbours?
For the area of analysis, the students designed a series of exchange activities and events to revitalize the area, envisioning a system of knowledge exchange among students and between students and professors.

• Team 2 worked on the large area of Copacabana beach. Because of its great length, Copacabana beach is named in sections called “postos”. Students worked on the place between postos 2 and 3 (Beach Copa and Beach Leme). Even if the place is internationally known, it is not developed and, paradoxically, not safe during the evening and at night. All the furniture and bars are meant to be used during the day for outdoor sports (gym, volleyball/soccer/badminton fields) and for daily walks for locals and tourists. In the night, the beach is now brightly lit with numerous. large street lights: the effect is not authentic and not welcoming, and, ultimately useless without the specific implementation of events, bars, cafes and rest areas that could start to support a renovation of uses and the implementation of a sense of safety.

It has been interesting to compare the different use of beaches in Italy and in Brazil: in Italy, many kilometres of the coast are privatized and equipped with permanent furniture, they are also used during the evening/night for summer events, as rest areas, and connected to bars and cafes; in Brazil, the coast is traditionally free and left natural, mostly used for sports and with bars closed in the evening. In particular, Copacabana can flourish during big events, becoming the main stage of Rio de Janeiro and of all of Brazil, but during everyday life it seems to be switched off.
For the area of analysis, the students designed a fixed area with furniture as a model to start a system of interaction with nearby bars and cafés to make use of it in the evening and revitalize it, being inspired by similar transformations that have already occurred in the Rio neighbourhoods of Lapa and Botafogo.

It was interesting that both groups were made up of a local citizen and an international student; whose different experiences and perceptions were matched with interviews to long-term and short-term inhabitants, newcomers from Europe, and workers of the area living in other neighbourhoods. This variety brought a wide richness of insights.

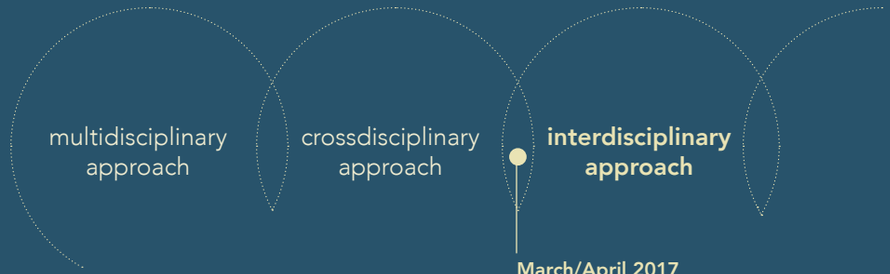
4.2.4 **Discussion**

The expected results were to explore the way in which students approach the problem-seeking instead of the problem-solving process. Since dealing with management engineering students, it was not so evident for them to deal with the unpredictable side of the creative process, in particular to make iteration familiar in a short amount of time. Also for this reason, the process was strongly guided by specific tools and methods, all of which were brand-new ways for them to approach a project.

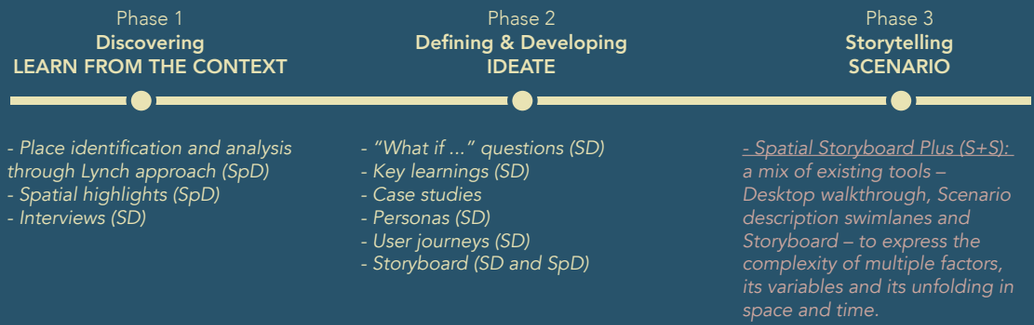
Expanding the understanding of the experimentation within the dissertation focus, the goal has been to provide the environment to test for a deeper hybridization of tools and approaches from Service and Spatial Design. The workshop in Ljubljana was developed at an early stage and lasted one day, while the course in Rio lasted four weeks.

> ***The process tries to turn a cross-disciplinary approach to an inter-disciplinary one by testing an hybridisation of approaches between SD and SpD in both directions.***

1.POSITIONING IN THE PROGRESSIVE EVOLUTION OF THE EXPERIMENTAL PHASE:



2.SUMMARY OF THE DESIGN PROCESS *:



(SD and SpD in brackets specify the disciplinary origin of the approach used for that method or tool.)*

3.INSIGHTS:

The elaboration of the "Spatial Storyboard Plus" tool served to explore **the deconstruction of a sequence of actions (time-component) in a space**, in order to define its uses. However, **the impact on the design of spaces has not been relevant as well as for the representational purposes.**

4.3 Experimentation 3. Tongji University in Shanghai, China

Experimentation data:

- Title: **"Perma-pods"**
- Duration: **50 hours (May 14th to June 16th, 2017)**
- Beneficiaries: **MA Environmental Design, Industrial Design, Service Design and Digital Media, second year of master**

In May/June 2017, I accomplished the second period abroad of my doctoral path at Tongji University in Shanghai (China). I took part in the conception and development of "Studio 2: Co-creation", coordinated by professors Mary Polites - D&I Environmental Design, Assistant Professor at Tongji University - and Davide Fassi - Assistant Professor at Politecnico di Milano and Visiting Professor at Tongji University -, a collaboration between the research teams "BiDL – Biomimetic Design Lab" [14], the "Tongji Desis Lab" [15] and the Polimi Desis Lab to which I belong. This exchange is also part of the international network DESIS, as previously illustrated.

The experimentation was carried out from May 14th to June 16th. The Co-creation course took place within the Environmental Design programme of the D&I – College of Design and Innovation at Tongji University, with a specific theoretical and applied teaching activity on the design methodologies of spaces and services. It is important to underline that in this experimentation my main role was in collaborating with the framework of the methodological process and on guiding the service side of the process. The spatial side was set upon the environmental design specifications of the course programme profile.

In the spring of 2016, the DESIS Lab and BiDL teamed up for a combined approach to garden design in Shanghai. This project allowed for research and a realization of student projects within the context of the Siping community adjacent to the D&I college in Tongji. The work was successful as it generated meaningful proposals which showed how to integrate the intangible aspects of the community with tangible outcomes.

[14] bidl.tongji.edu.cn
In 2012, the BiDL team was started in the College of Design and Innovation (D&I) at TongJi University, Shanghai, with the goal of applying biomimicry in design education, in order to generate more sustainable artefacts and services for human society.

[15] desisnetwork.org/courses/tongji-shanghai-china/

4.3.1 The topic

The topic of the course, in contrast with the other experimentations, was not based on contexts familiar to the students. The continuation of this studio in spring 2017 went on to a similar topic, which required insight on environmental design, service design, and permaculture methods, but was applied to a rural area in the Yunnan region of China. The project Perma-pods looked at methods to develop a concept idea of a systemic service and environment for and with multiple actors, able to activate and support eco-tourism in the Yunnan region, enhancing the traditions of the area while raising living standards and improving infrastructures. Together with the elaboration of a participatory economic system, the creation of contextualized inhabitable structures for local farmers of a permaculture farm was also needed. This complex system is meant to be realized, built and lived in by the farmers who provide beans for Caféchi Green Coffee, a Shanghai based company that sourced the farm based on their sustainable growing methods. The structures have to address local environmental conditions, accessible local materials and simple construction methods that can allow for improved living conditions of the farmers. Currently, the famers' houses are the standard concrete structures that do not promote healthy lifestyles conditions or adequate access to sunlight, ventilation or human comfort. These projects looked to the methods of permaculture as a main generator for developing connections between ways of living, ways of cultivation and ways of materializing liveable forms. The students' work researched techniques, forms and methods that can be quickly constructed and improve the farmers' living conditions.

4.3.2 The theoretical framework

The theoretical framework was based on an approach integrating permaculture logic and methods with notions from the System theory, Service/Strategic/Spatial design for sustainability, situativity theory and contextual design, towards the support of social innovation and community-centred design.

By providing basic notions on *system theory*, where a system may be described as a complex of interacting components together with the relationships among them that permit the identification of a boundary-maintaining entity or process, attention was placed on the subjective aspect of it, as a group of elements chosen by the observer and considered interesting by the observer for the aim of his/her study (Jordan, 1969). Students were encouraged to analyse the reality to make the interpretation of it easier than using traditional methods and to observe and work on some parts of the complex system while always considering the relationships among themselves. This approach was connected to the integrated approach of *product-service system design*, where any design output (graphics, interior, objects, furniture etc.) interact with a service – special artefacts co-created and co-experienced with, by and among the users (Meroni & Sangiorgi, 2011) – within a complex system of interacting components (see Chapter 2). The link with *permaculture* is clearly traceable since it is a method for designing and managing man-made landscapes so that they are able to meet the needs of the population, such as food, fibres and energy and at the same time present the resilience, richness and stability of natural ecosystems. This method was developed in the '70s by the Australian ecologists and agronomists David Holmgren and Bill Mollison. In *Permaculture One* (1978), which defined permaculture as an evolutionary and integrated system of animals and plants useful for human beings, and as a process of designing lands to "copy" schemes and relations among components of the natural system to produce food, fibres and energy to meet local neEds. The link to the design ability is clearly mentioned by Holmgren, stating that permaculture is the ability to use the systemic approach and design principles to define the framework to achieve sustainable human settlements. Another important link is with the environment and space, since it is based on the observation of the natural ecosystem and even on the knowledge of traditional cultivation methods together with modern technologies. The design principles in permaculture are: i) biodiversity and relationships between components; ii) the interdependent positioning of the elements; iii) the elements' multifuntionality; iv) the multiple relationship between functions and elements; v) the use of local resources; and vi) the Boundaries Effect. Furthermore, the design methods in permaculture are: i) tone analysis (proximity and functionality); ii) sector analysis (wind, water, sun, sights ...); iii) elements analysis; iv) spatial and time analysis; v) designing from model to details; and vi) the intensive system on a small scale. The impact on space design is the application of zone theory, which assigns different "functions" (typology of cultivation, use destination) to concentric areas: the further the zone is from the centre, the less care, frequency of use and maintenance is needed. Both permaculture and the PSSD approach are about connecting the dots between components, understanding and designing with a systemic approach.

The specific context was characterized to be an underserved area and low-resource setting, and its factors needed to be holistically approached by the students. That is why a systemic approach encountered situativity theory and contextual design in the framework for this educational activity. Contextual factors need to be deconstructed and understood in their elements: any artefacts need to be designed to be sympathetic (context-based) within the local conditions. As the context is a

> *"set of spatial-temporal elements related to the person or product, […] deconstructing or understanding the context layer is fundamental to the design process to characterize the product-user interactions as a pre-cursor to developing a design solution. The context layer does not describe the technical dimensions of a product, but rather contains ideas, views or other considerations about people, their lives, culture, nature, society and technology" (Aranda Jan et al., 2016, p. 44).*

The complexity to challenge, as stated, was to elaborate a concept idea of a systemic service and environment
for and with multiple actors, able to activate and support eco-tourism in the Yunnan region, enhancing the traditions of the area while raising living standards and improving infrastructures. Three environments had to be taken into account: the natural-physical environment, the human socio-cultural environment and the artefact's techno-physical environment (Rosenman & Gero, 1998), within a users/ interactions/settings triangulation.

The educational activity in the context of the Yunnan region was in line with a national and international focus on sustainable development of the Chinese rural areas, where one person out of seven on the globe is living, thus causing a disproportion in the development of urban areas, the risk for modernization not taking care of what to maintain and how to change, and the impact on global climate change. An example is the EU-China consortium of the research project "SUCCESS – Sustainable Users Concepts for China Engaging for Scientific Scenarios", funded by the European Union between 2003 and 2005, composed by researchers and practitioners from six countries working on models for seven villages in six areas of China on energy systems, future development of villages, raising living standards, improving infrastructures, promoting health systems, providing education and improving a conservative development of traditional process, models and cultures in general. [16]

Considering the specific settlement of the Caféchi Green Coffee sourced farms, the goal was to consider the superposition of the following system layers:

- designing a "dome" system with building techniques considering the climate and environmental components and within a sustainable system for water, energy and waste re-use, while raising living standards >> *landscape quality and environmental sustainability;*
- an economic system not only based on agriculture in its primary role but also as a source for a sustainable tourism, for the valorisation of the traditional methods and techniques and of locally made goods >> *economic sustainability and protection of traditional habits and social systems;*
- designing a joint management of services and goods, improving micro and macro economies, generating interactions and new sustainable and community businesses >> *improvement of community development.*

From one side, an eco-tourism model was needed, in order to deal with macro-economic related issues such as community businesses and an attention towards the typology of interaction between inhabitants and tourists; from the other, micro-economies could also be improved with the development of local services and educational processes supporting local traditions and a back and forth knowledge transfer.

[16] Dumreicher, H. (2008). Chinese villages and their sustainable future: the European Union-China-Research Project "SUCCESS". ***Journal of environmental management,*** *87*(2), 204-215.

Shaw, V. L., Hunter, A. J., & Mortimer, N. D. (2008). Sustainable Energy Development for Rural China. In ***Proceedings of ISES World Congress 2007*** (Vol. I–Vol. V) (pp. 2578-2582). Springer, Berlin, Heidelberg.

4.3.3 The methodological process

To do so, the methodological process was set up by dividing students in a completely way, which took their backgrounds into account:

- 2 groups of students have to deal with the service side of the project
- 1 group has to deal with the spatial side of the project
- 1 group has to deal with the communication side of the project

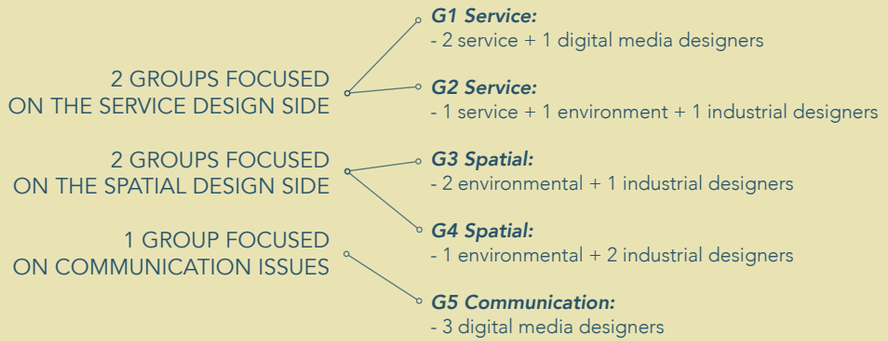


Fig. 37 – Composition of the groups according to the students' backgrounds.

The aim of this form of organization was to focus on the development of the service and of the spatial process in a separated way and to fix three moments of encounter, at the end of the three phases of the course, then to focus on the reciprocal influence for the following step.
The encounters employed the Desktop Walkthrough tool in an innovative way. The Desktop Walkthrough is traditionally a small-scale 3D model of a service environment that, employing simple props, lets designers bring a situation to life, acting out common scenarios and helping the idea to develop. Common situations can then be acted out by moving the characters around the model and simulating the interactions they may have, allowing iterative analysis of the situations depicted (Stickdorn et al., 2011).
For this experimentation, it became a Desktop Walkthrough Encounter: at the end of each phase, the groups of students created their canvas together in class, providing each other with data, needs and hypothesis through

sketches and diagrams on a map of the environment in analysis, from the rough sketches to the more detailed documents at the end of the process.

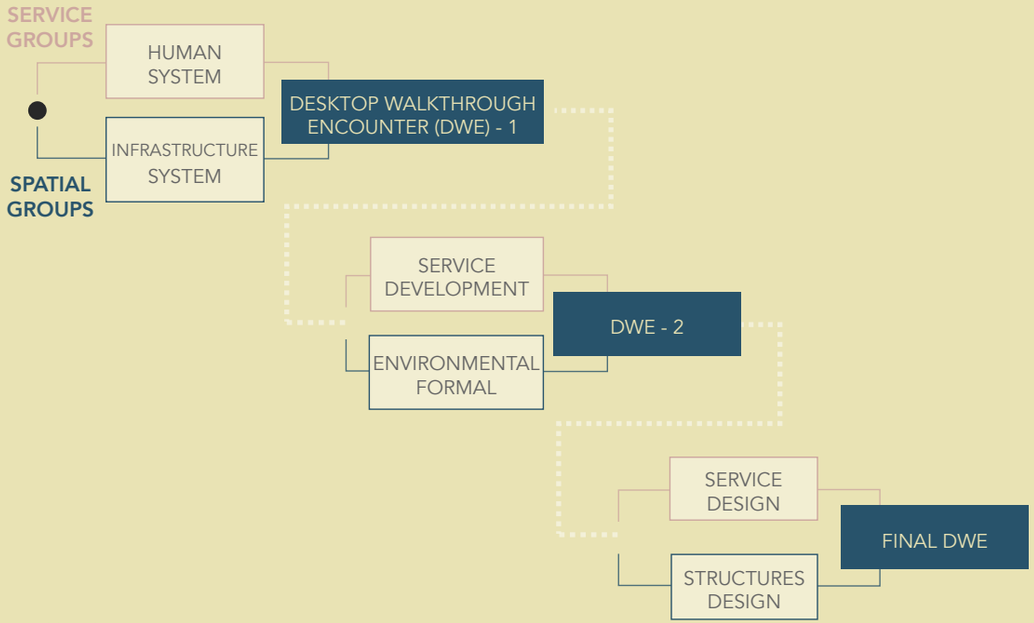


Fig. 38 – The course process.

It is important to specify that, in the end, it was not possible to set visits for ethnographic research and co-design sessions in the Yunnan region, to support the contextual approach applied. To overcome this, students collected a series of questions to put to our partners in the Caféchi company, who are in contact with and have a good knowledge about the area. The questions were focused on social insights, such as equality between men and women or the family system, the role of elderly people in families and in the whole community, the practice of mindfulness in children's education; the qualitative data about what this community can learn – recycling issues, plastic trash, the harmfulness of chemical fertilizers – and what they can teach – the use of natural forest plants, the methods of cultivation, local weaving traditions. Finally, quantitative data were also needed: numbers of families involved in the actual economy, numbers of villagers employed during the harvest period, the yearly calendar (cultivation phases, local festivals and traditions).

All this information was fundamental in order to ***design around an integrated timeline***, systematizing the seasonal impact on climate and cultivation phases and the local festivity calendar with the proposed eco-tourism system that has to consider who is coming, when, for which reason and for how long.

Students were asked to build ***a shared working timeline*** during the research phase, in order to collect data from their different research interests and to take advantage of the different information collected. Those were meant to be shared: one for the first service group and the spatial group and one for the second service group and the same spatial group. The spatial group was encouraged to be able to provide different – or the same – information to the service groups according to their research direction and specific interests, especially during the concept phase.

The communication group, whose process and outcomes are not deepened by the aim of this dissertation, took advantage of both sets of data to build brand communication strategies.

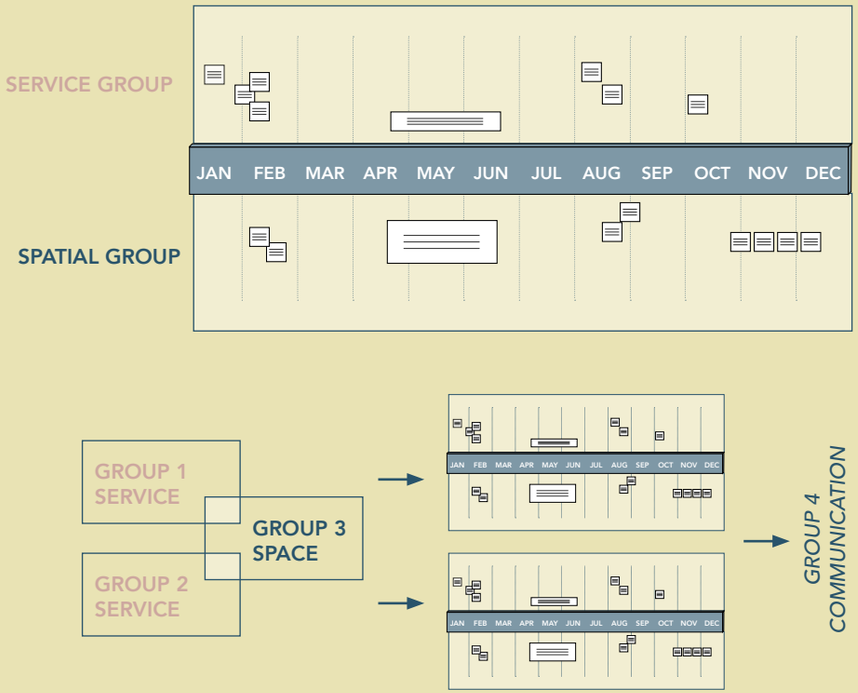


Fig. 39 – The "shared working timeline" and its use within the design process.

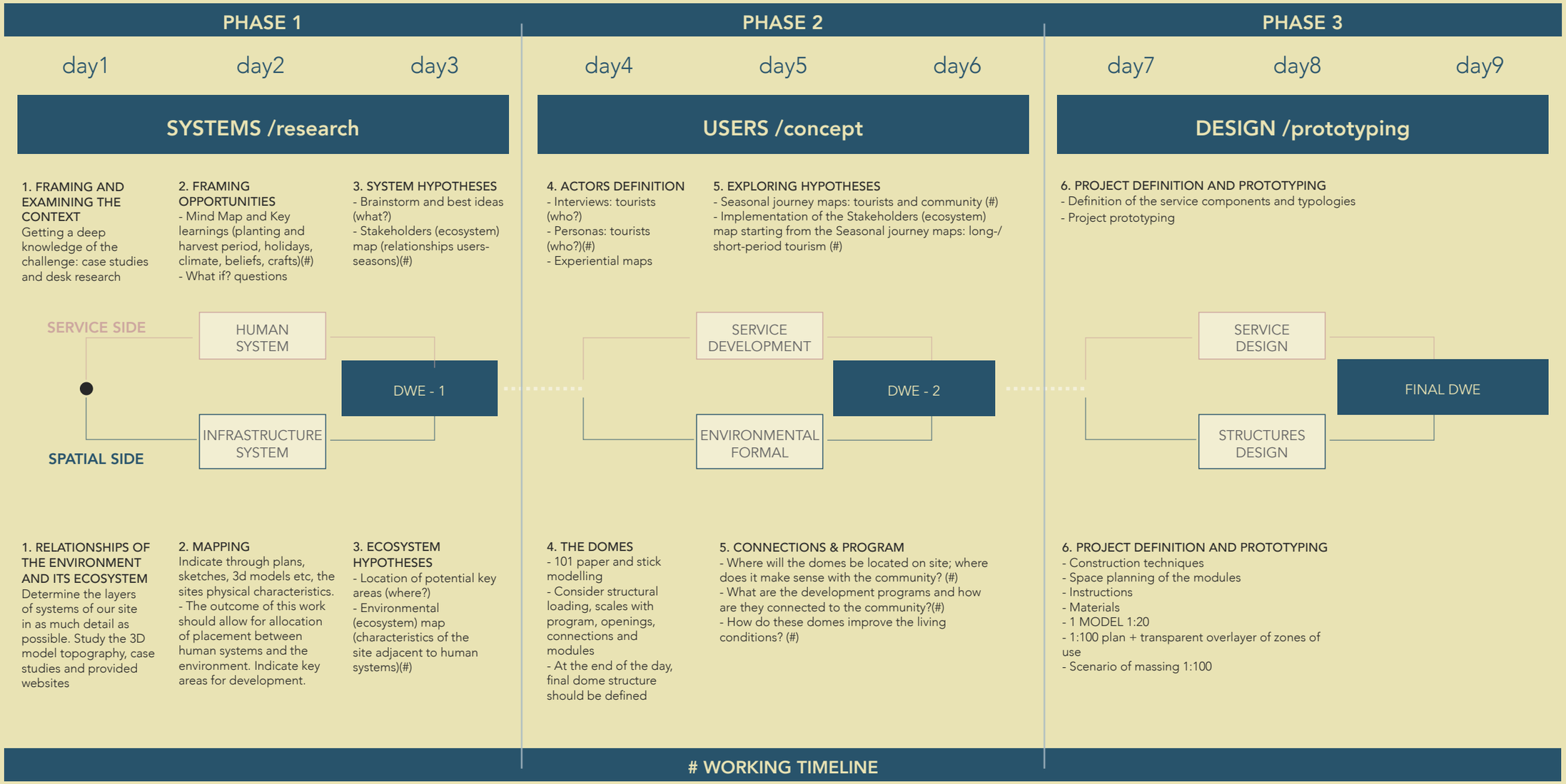


Fig. 40 – Diagram of the course process.

• Phase 1: SYSTEMS /research. The human system and the infrastructure system

Going into the details of the phases and the tools employed, the first phase was focused on a research process on the wider spectrum of the *systemic analysis*, to explore concepts of culture and structures associated with permaculture and farming in order to develop sensitive proposals for eco-tourism.

HUMAN SYSTEM / service side: students analysed the context through desk research and the data provided by Caféchi in order to frame its social system in terms of roles, actors, responsibilities and dynamics related to worker communities as well as data about its traditions. The process was supported by case study research and by the use of these tools: *mind maps*, for the visual delivery of thoughts and associations towards a deeper understanding of the problems and the opportunities related to the subject; a set of key learnings and initial *what if …? questions* to generate ideas; inputs for exploration and to develop concepts; and an initial *ecosystem map* in the shape of an early stage system map. Even if the idea was not already set, this tool was useful to start understanding the complexity of the system of relationships of the actors involved, their mutual links and the flows of materials, energy, information and money through the system (Morelli & Tollestrup, 2009).

INFRASTRUCTURE SYSTEM / spatial side: students explored the relationships of the environment and its ecosystem in order to determine the layers of it in detail to build a *3D model topography* and to present the site's physical characteristics. This part provided useful information on the location of potential key areas, presented through an *environmental map* in order to juxtapose the *"human" system map* with the characteristic of the site.

Through designs that reflect the varied aspects of community along with new structures that promote this connection, the relationship between culture and space started to be framed. The service eco-system map and the environmental eco-system map revealed first reflections to be tested in *the first Desktop Walkthrough Encounter* and the mutual design needs and reflections influenced each other in the following step.

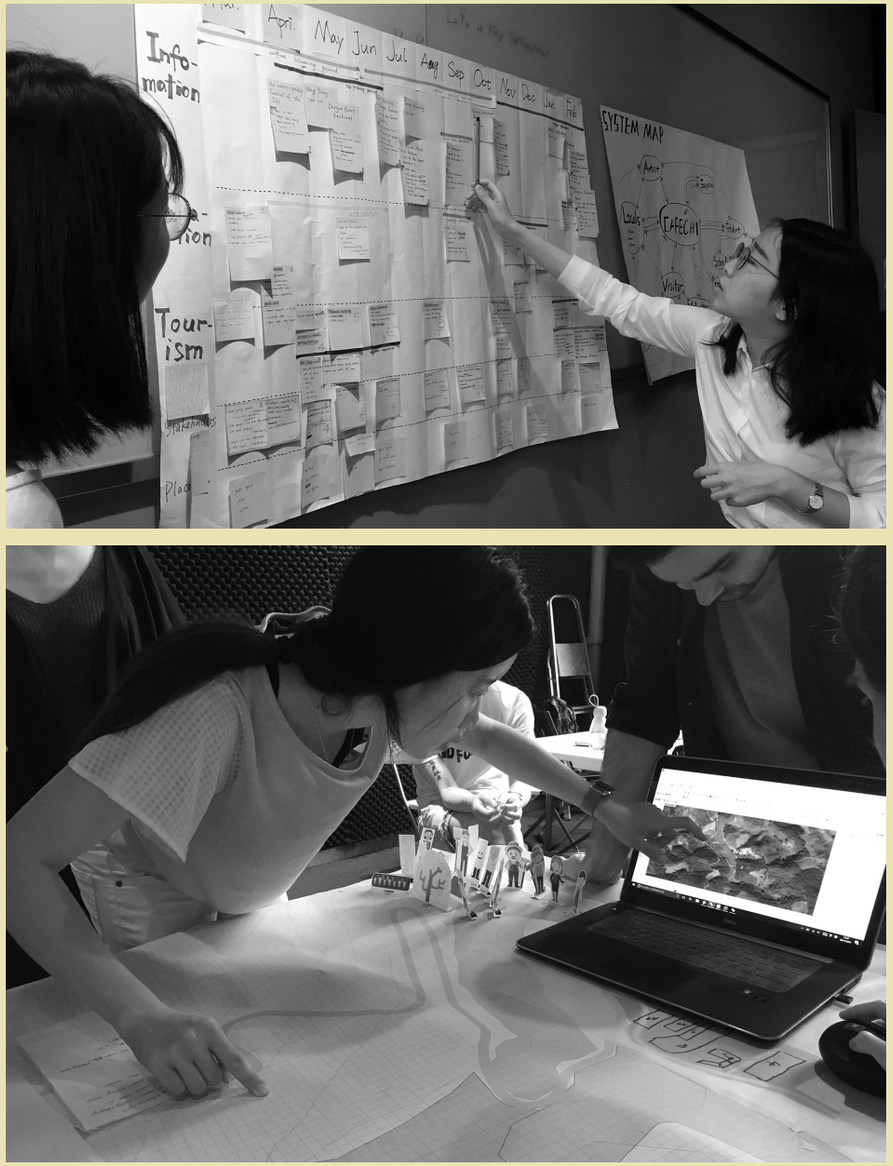


Fig. 41-42 – Shared Working Timeline and first Desktop Walkthrough Encounter.

• Phase 2: USERS /concept. Service development and environmental and formal development

The second phase, dedicated to the development of the concept, focused more on the users, going down to a smaller scale of analysis.

SERVICE DEVELOPMENT / service side: students further analysed the actors involved according to the first hypothesis, both from the tourist and inhabitant sides. As for the first, students conducted *interviews* and created an *expectation map* - with the communication group – to define expectations, needs and wishes, and to chart what "customers" expect when interacting with a service/space. As for the second, they gained further insights from their contact in the Yunnan region and, together with the data collected in the first phase and in the expectation map, they built *persona* profiles of tourists interested in the typology of eco-tourism they were trying to design and of inhabitants engaged in it. The first sequencing of the concept idea was drawn on what was called a ***Seasonal Journey Map***: journey maps exploring the different components and sides of the service proposed connected to the complete time range of the year, in order to integrate all the data from the working timeline within the system of action and interactions of and within the actors identified. Through those tools, students then upgraded the *ecosystem map* created during the first phase to have a complete system view, defining the typologies of tourism proposed, connecting the period of the year to its profile of visiting tourists, for what kind of interests and for short or long periods of vacations and receiving what kind of proposal in terms of activities and experiences in the village. These diagrams provided information about the hierarchies of relationships of the community activities and how they overlap with the touristic and productive systems. These last two were never separated: the tourism experiences through services and spaces was always meant to be an exploitation and a support for the other, towards contextualization and cultural valorisation.

Fig. 43-44 – Second Desktop Walkthrough Encounter.

ENVIRONMENTAL AND FORMAL DEVELOPMENT / spatial side: students scaled down to the first design of the domes, understanding the structural loading, openings, connections, as well as their location on site according to the climate insights collected and to the insights received from the service groups to support the actions and interactions identified in order to spatially makes sense of community and of encounter.
A second Desktop Walkthrough Encounter acted as a validation test, an exchange of information and of influence.

• *Phase 3: DESIGN /prototyping. The service design and the structures design*

The third and final phase was devoted to the design prototyping.

SERVICE DESIGN / service side: students were asked to define the service components, touchpoints, sequencing and offer, and to prototype it through a performative act in the final and shared desktop walkthrough, as illustrated below.

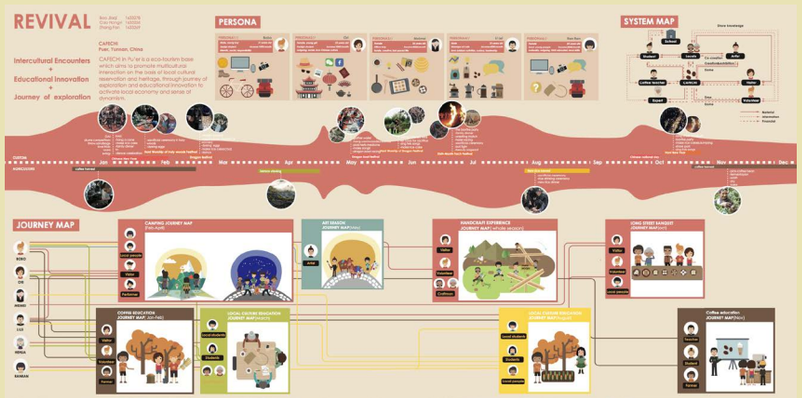


Fig. 45 – Final Seasonal journey map by Bao Jiaqi, Cao Hongyi and Zhang Fan.

STRUCTURES DESIGN / spatial side: students were asked to define the construction techniques, the spatial planning of the modules and the area distribution, to define the materials and to build an instruction diary for it.

The final Desktop Walkthrough Encounter, as stated, was built to collect the two final designs: the service design 1 with the spatial variant 1, and the service design 2 with the spatial variant 2. Actually, the spatial group was able to design specific variations of their project according to the typologies of activities, experiences and services designed.
The final *Desktop Walkthrough Encounter* was built as a shared performative tool, presenting the whole system. It was implemented, progressing the Rio de Janeiro experimentation, with the *Seasonal Journey Maps* to have a final Spatial Storyboard Plus.
It was built as follows:

- The spatial group provided the final plan 1:100 with topography + roads + water + vegetation + catalogue of modules dimensions
- The service groups worked on their graphic refinement and they designed a rehearsal of the final presentation with a full narrative.

Fig. 46 – Final spatial layout: two variants for the two service proposals. By Zhao Yuanxing, Tim Schwarz and Ying Yihan

Fig. 47 – One of the final Desktop Walkthrough Encounters.

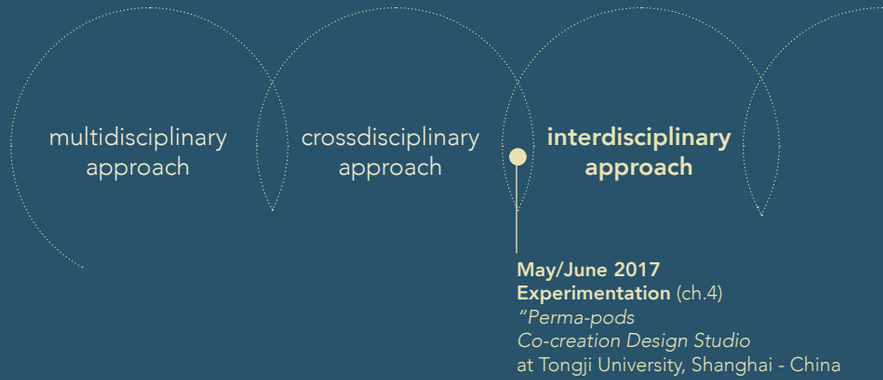
4.3.4 **Discussion**

The ***Desktop Walkthrough Encounter*** acted as:

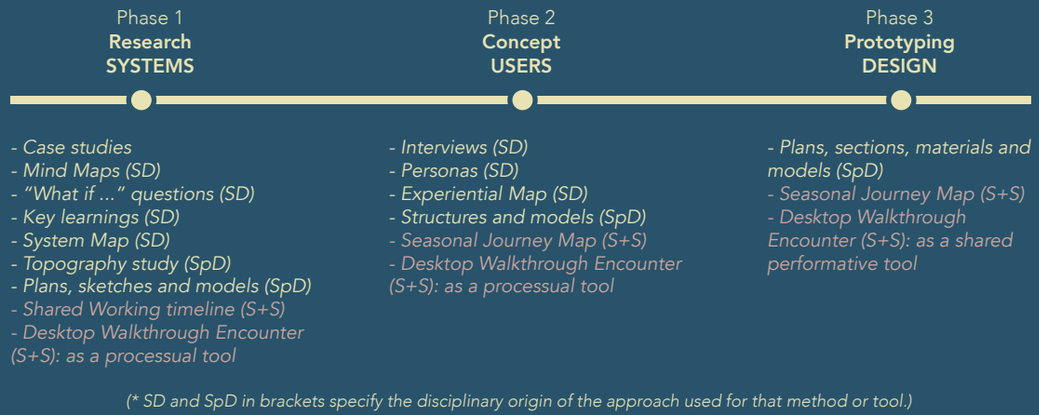
- ***Narrative:*** by performing the social roles and the hierarchies of relationships through the actions and the actors involved in the time-span selected;
- ***Sequencing:*** by narrating all the sequences of the interactions and of the activities in a complex view;
- ***Spatial:*** by placing all the above in their environment, showing the reciprocal interaction and value influence.

> ***Within an implemented processual tool, it has been tested a way to introduce the narrative dimension of spatial design, by performing the social roles and the hierarchies of relationships through the actions and the actors involved in the time-span selected within the connotation of a scenic movement.***

1.POSITIONING IN THE PROGRESSIVE EVOLUTION OF THE EXPERIMENTAL PHASE:



2.SUMMARY OF THE DESIGN PROCESS *:



(SD and SpD in brackets specify the disciplinary origin of the approach used for that method or tool.)*

3.INSIGHTS:

Students have been conducted in designing spaces through the analysis of the actual social dynamics; the **DWE served as a processual tool to visualize the sequencing of the actions in the space and to affect its design**. However, **the semiotic aspect has been weak** since the spatial side has been more focused on the design of structural and infrastructural components.

5.

FIELD EXPERIENCES

Chapter overview

Chapter 5 reports the two field experiences relevant for this dissertation I collaborated for with my research team: Final Design Studios in MSc Spatial and Interior Design course at Politecnico di Milano – School of Design (A.Y. 2016/17 and A.Y. 2017/18). These field activities included and tested the main insights gained from the experimentations presented above, and their analysis and comparison are scientifically interesting and valuable since they were developed in the same design university, in the same design area and addressed to students with the same background. Thus, this chapter provides a structured comparison, thanks to the similar conditions of application.

The first took place during the elaboration of the Ljubljana research and before Rio de Janeiro and Shanghai, while the second took place after all three. A comparative analysis of these two is scientifically valuable since they were developed in the same design university, in the same design area and involved students with the same background. Thus, this paragraph provides a structured comparison, thanks to the similar conditions of application.

Fig. 48 – Experimental phase: highlight on the two field experiences presented in this chapter.

Parts of these sections have been already published in:
- De Rosa, A. (2017). Unconventional spaces for art and design: enabling community synergy. A methodological approach. In B. Camocini & D. Fassi (Eds.), ***In the neighbourhood. Spatial Design and Urban Activation*** (pp. 103–121). Franco Angeli Design International.

5.1 Field experiences

Field experiences data:

- Title: **"Arnold – Art in NoLo Social District"**
- Duration: **180 hours (October 2016 - January 2017)**
- Beneficiaries: **MSc Interior Design, second year students**

- Title: **"Design+Eat=Spaces"**
- Duration: **180 hours (September – December 2017)**
- Beneficiaries: **MSc Interior Design, second year students**

The two relevant field activities that are part of this dissertation took place in the in the academic years 2016/17 and 2017/18.
They are both Final Design Studios in the MSc Interior and Spatial Design at the School of Design, Politecnico di Milano.
The first was held by Davide Fassi, Laura Galluzzo, Anna Meroni and Xiaocun Zhu; the second, by Davide Fassi, Laura Galluzzo and Anna Meroni.
The academic staff is part of the Polimi DESIS Lab (see Introduction).

5.1 The methodological approach

In the methodological process of the studios there was the possibility to integrate interior design, urban space design and service design, by having the chance to approach the projects in a holistic way and by nurturing the design steps with key aspects borrowed from social science methodologies and interlacing them with specific approaches and design tools to develop an educational process based on a contextual design approach. Key concepts from Ethnography, Grounded Theory and Participatory Action Research have been reframed into interior and service design approaches and tools: from the needs of the research to the design opportunities; from the preliminary proposals to the technical executive ones; from the understanding of the "personas" to their involvement in the prototyping activities; and from concept to the final settings. During the research, the continuous relationship with the stakeholders and the citizens has been maintained through on-site co-design processes, by the integration of the service perspective and by prototyping the ideas. The output can be linked to the discipline of landscape design, intended as design of complex urban landscapes where design for social innovation and participatory design play a crucial role.

These theoretical notions have been reframed into interior and service design tools through desk and field analysis. The design outputs required and the tools provided aimed at supporting a data collection that varied according to the approach to the context (desk and field-based) and for the typologies of midway assessment; students were encouraged to implicitly systematize the data during the collection, to help their interpretation of a multifaceted environment and to validate the data themselves from the source's point of view thanks to a human-centred design approach and qualitative inquiries. The design process has been based on contextual factors, not only in the research phase but also during development and prototyping. The human, social and cultural environment has been deconstructed and understood in order to develop context-based design solutions (interactions between users and environment), with input from the local stakeholders and inhabitants who have provided data, creativity and suggestions.

Grounded Theory is a strategy of inquiry for qualitative research and consists

> *"of systematic inductive guidelines for collecting and analysing data to build middle-range theoretical frameworks that explain the collected data" (Charmaz, 2005, p. 509).*

It relies on two main principles: a context is not static but continually changing in response to prevailing conditions; and the responses to these contextual factors depend on people, who have the means to be influenced by them and to influence them (Corbin & Strauss, 1990, p. 419). For that, the approach is far from formulaic; instead, it is sequential and flexible since it is framed through the flow of data, it is durable since it accounts for variation and it is open to refinement. With a constructivist approach, the strategy

> *"assumes the relativism of multiple social realities, recognizes the mutual creation of knowledge by the viewer and the viewed, and aims toward interpretative understanding of subjects' meanings" (both respondents' and researchers' meanings) (Charmaz, 2005, p. 510).*

An **ethnographic approach** has also been fundamental to an in-depth study about groups of people by observing uses and habits and with fieldwork research that gave students the possibility to understand the social environment and the interactions taking place, engaging with the community and identifying key informants through semi-structured interviews, focus groups – in some cases – and structured oral history interviews.

Co-design and co-creation processes have been fundamental components of the courses, which have sought to design spatial solutions considering the users and their interactions in the spaces with a holistic and systemic approach. The courses were characterized by a continuous relationship with the stakeholders and the citizens, achieved via on-site co-design processes, the integration of the service perspective and a hands-on approach to prototyping. The theoretical notions from the previously presented Grounded Theory and Ethnography have nurtured these field activities, from the preliminary preparation, the planning and the execution to the conclusion.

Thus, the **contextual factors** referred to three environments to be taken into account within a *users/interactions/settings* triangulation: the natural-physical environment, the human socio-cultural environment – concerning two specific communities (local artists and shop owners in one case and the Public Market shop owners in the other, and a wider one of the neighbourhood inhabitants) – and the artefact's techno-physical environment, where the design is a considered process in which the socio-cultural and natural environments are translated into a techno-physical environment (Rosenman & Gero, 1998).

As reported in Fig. 48 at the beginning of this chapter, the *"Arnold"* field experience is positioned in the crossdisciplinary area, close to the turning point into interdisciplinary. In fact, the Spatial design approach is predominant both in the process as well in the outcomes. This is not due to the fact that the course is part of the MSc programme in Interior Design; it is partially but, this is not the case of the *"Design+Eat=Spaces"* field experience where the methodological process was based on interdisciplinarity between Spatial and Service design, building a more structured coordination between them.

The relationship between theory and practice was explored on two levels: at the researchers' level by avoiding an arbitrary division between research and didactics, which becomes a field of experimentation for topics and methodologies in design education, and which nourishes the very development of theoretical research; and at the didactics level itself, where the link between theory, research and practice is taught. The design education approach employed between the university environment and the societal one is a strategy that enables community synergies. By breaking the silos of design approaches and connecting through the use of all the tools presented "what people say and do" (contextual design) and "what people make" (participatory research, co-design and event design), this diversity adds perspective and a cross-pollination and communication among different fields of study.

The systemic approach has been essential in the two processes as well as in the final design output. The studio process supported the idea through an interdisciplinary and qualitative approach to a design project, which is not unsystematic compared to more traditional and quantitative methods; indeed, it is a structured foundation for integrated solutions, which require multiple and associated inputs and a systemic view.

A description of the two processes is developed below.

5.2 The common context and the topics

The contexts of analysis and application of the courses were similar: the neighbourhood recently named as NoLo (North of Loreto) is an area, north of Piazzale Loreto in the city of Milan that includes the districts of Pasteur and Rovereto on the east side, and extends as far as the Central Station on the west. This acronym was created by chance at the beginning of 2016, when the advertising agency La Tigre pinpointed a portion of urban space that still had a weak identity and was affected by the nearby area of via Padova. In 2016, the "D - la Repubblica" magazine published an article on NoLo, highlighting the phenomenon of urban transformation happening in the area. NoLo is characterized by the existence of many associations and a social district, which was a social street that became extended to a larger portion of territory. Social streets have become a consolidated reality in the city of Milan and are recognized and registered by the municipality. The changes include not only the opening of several art galleries and the conversion of the Public Market into a food court, but also the spontaneous gathering of the inhabitants around online and offline processes: "NoLo Social district", the Crespi District Committee, YoLo in NoLo, NoLo, the Città del Sole Association for the valorisation of the Trotter Park, etc. The attention of the national media was accompanied by intense activity among the inhabitants, focused on collaboration and meetings: the picnic in the park at via Sammartini; brunches at the Trotter Park; Saturday morning breakfasts on the sidewalks of via delle Leghe; the "pizzica" in piazza Morbegno; and the film club at Cinema Beltrade, to mention a few.

The two design processes focused on public spaces, both indoor and outdoor, by establishing connections and relationships with the local citizens – connected to shops, associations, informal groups and neighbourhood committees. The first course dealt with the whole neighbourhood dimension and with a specific local community composed of contemporary artists who own their art gallery, exhibition and work spaces in the Milan NoLo District; the second was focused on the Public Market of NoLo and its surroundings with the communities of users and shopkeepers.

Food and art were the axes on which to identify actors, places and cultural aspects to be explored and implemented through an integrated service, systemic and spatial design approach. The focus of the studios resonates with the most advanced fields of research and experimentation the European Commission is now fostering through research and innovation programmes. More specifically: 1) how "public spaces" both shape, and are shaped, by cultural activity, including food and art, and how this can bring about integration of people, including at the political and economic levels; and 2) how the co-creation of public goods (services, spaces and strategies) can actually become a way to engage citizens and stakeholders of all kinds in shaping the European identity.

The connection between large cultural elements and the bottom-up transformations of urban spaces has a multi-faceted role in establishing brand new social innovations and place-making processes. The key point of this shift is the active engagement of local actors; the studios enhanced this concept in their process.

The topic of Arnold, Art in NoLo Social District

The course dealt with the whole neighbourhood dimension and with a specific local community composed by contemporary artists who own their art gallery, exhibition and work spaces in the Milan NoLo District. The main goal was to (co)design spatial solutions for exhibitions of local artists in unconventional spaces for art. Each design team was teamed with two artists and two locations. Twenty-two unconventional places (piano shop, butcher's shop, cinema, co-working space, tavern, etc.) and their owners and twenty-two local artists were introduced by the research team leaders to work and co-design the spatial solutions with the Master's students.

The topic of Design+Eat=Spaces

This course was focused on the indoor public space of the Public Market in the NoLo neighbourhood, a commercial gallery used as a municipal market. It was designed by the engineers L. Secchi and L. Massari, built in 1933 by the Municipality of Milan. At the time of construction, its surface covered 1322 square metres. The building is one of the first covered markets created in the city, which until then had only temporary and small local markets. It is constructed entirely of concrete, with a rectangular shape and consisting of a single floor. The vaulting in the ceiling is very interesting because it brings to mind the large metal roofs of the 19th-century railway stations. The space inside was not divided into separate stalls; it was originally conceived as an "open space". The current false ceiling was installed in the 1960s, which means that the beautiful vaulted ceiling is no longer visible. The market could accommodate 140 linear metres of stalls, and was designed in such a way

that, with small structural changes, it could be transformed into a public car park or an entertainment space.

Students were required to develop seven visions for the future of the Public Market: the main topic of the course is Food & Design, using food as a means to connect the different cultures within the (migrant + local) communities living in the area, and as a way to activate co-designed activities for spatial solutions. The studio investigated, imagined, experimented and prototyped innovative spatial solutions for market stalls, street food structures and temporary stalls in connection with the Public Market. By designing an innovative scenario for the Public Market, the course used the urban spaces as experimental hubs for social interactions by making the spaces the central focus of a neighbourhood community built around food. Food was therefore at the centre of a set of scalable and systemic activities and related spaces, bringing together multiple stakeholders.

5.3 "Arnold – Art in NoLo Social District": the methodological process

The design process of *"Arnold – Art in NoLo Social District"* was structured in three phases:

- ***Investigation:*** it embraced notions of Constructivist Grounded Theory as a qualitative strategy of inquiry together with an in- the-field approach. A dialectic in the data collection was effective in opening a range of design possibilities;
- ***Designing Concept:*** it was based on Participatory Action Research and Co-design tools to iterate the design process;
- ***Prototyping:*** it saw a cross-pollination and communication among different fields of design for the project definition and final event.

• *Phase 1: INVESTIGATION, a contextual design*

The exploration of the context is fundamental during the design process because it inspires and informs the creative team. The context awareness doesn't only concern the designer (i.e. the students), but contributes to the growing awareness in the local inhabitants of specific problems. Notably, the methods applied in this phase required the students to immediately interact with the physical and human-socio-cultural environment: contextual factors need to be holistically explored by designers in the front-end of any design. At this stage, a collection and simultaneous analysis of data was essential for the students to lay the foundations for a comparative investigation of concepts.

This phase aimed to allow the students to become familiar with the area through field research so as to map out the existing system of indoor and outdoor art-related spaces within an understanding of the neighbourhood through:

a. Spatial representation

Freehand drawings event during a one-day flash mob action, a *"Sketchmob"*; [1]

b. Experiential maps

A personal and physical exploration of the district without any particular goal or time constriction to deconstruct and communicate the inner perception of it through a map of experiences: *Experiential maps* (related to the Situationist approach). It is a way *"to study the precise effects of the geographical environment, consciously or not provided, which acts directly on the affective behaviour of individuals"*. [2] This exploration enhances the correlations between psyche and environment, contrasted with classical geography, putting at the heart of its purposes the re-creative definitions of urban spaces;

c. Video-interviews [3]

A first direct contact with the local inhabitants is a way to deeply engage with and learn from people to get a rich understanding of their thoughts and behaviours through a scheduled meeting. The video-interview tool is a reprocessing of on-the-spot filming and interviews to present an initial vision of selected interpretations of the social environment and in which most of the concepts are gathered and elaborated during the collection itself. In fact, the filming needs to be designed: the physical and conceptual point of view; the video frames; the location atmosphere; the questions and ways to enrich the conversation. [4] Then, after the post-production process, the final output is a sort of recreation and communication of an experience to enable reflections, and to present research questions, topics and findings to be explored in later design phases. The videos were not only a description of the artists' works and approaches, but they disclosed their reflections and thoughts towards their relationship with the workspace and with the city as a source of

[1] In collaboration with www.sketchmob.it
A sketchmob is an informal meeting of 2/3 hours between people (architects, designers, artists, students, design enthusiasts in general) who gather in a special place to draw. The sketch is a tool to look at, understand and (re)discover the space around.

[2] First issue of International Situationist bulletin, 1958.

[3] In collaboration with ImagisLab, Design Department, Politecnico di Milano. imagislab.it

[4] See also: IDEO (2015). ***The field guide to human-centered design: Design kit.*** San Francisco. p.39.

inspiration.

d. Critical essay
Analysing the district around some given topi¬¬cs (such as commerce, associations and third-sector organizations, social inclusion, cultural life, newcomers, sharing economy, etc.) and having the whole city of Milan as a point of comparison.

These first outputs required a conceptual analysis to generate ideas and the comparison of the data collected, which is a way for students to sample and refine the emerging theoretical ideas step by step. Through these context-based tools, the students have been able to explore a set of spatial-temporal elements related to the physical area and the human interaction with it, in order to get inspiration in the early phases of the design.

> *"Deconstructing or understanding the context layer is fundamental to the design process to characterise the product-user interactions as a pre-cursor to developing a design solution. The context layer does not describe the technical dimensions of a product, but rather contains ideas, views or other considerations about people, their lives, culture, nature, society and technology" (Aranda Jan et al., 2016, p. 44).*

Thus, users have been involved with an increased level of connection since the beginning in the process.

> *"Studying the context of product use helps designers to gain empathy with users, to avoid fixation on pre-set assumptions about the user or the product, and to create innovative concepts on how a product can be experienced" (Visser et al., 2005, p. 121).*

• Phase 2: DESIGNING CONCEPT, co-design
Students were required to do:
a. Spatial diagrams
A background analysis of the spaces through diagrams (2D/3D/models), study of spatial flows, dimensional drawings, space visualizations and mock-ups;

b. Co-creation and co-design
A *"getting to know"* process through video-interviews of owners and artists and co-design activities with artists, owners and communities.

c. Concept definition
A consequential concept definition of the exhibition through diagrams (2D/3D/models), study of spatial flows, dimensional drawings, space visualizations, mood board /colour board /material board /tech board and mock-ups.

In the designing phase, the idea generation occurred as well with a methodological dialectic: the findings of the investigation phase informed first the objective spatial analysis, then the critical representation of the spaces with interpretive diagrams, expanded by the spatial experience with the owners and the artists. All of this was supported by the design of co-design activities based on Participatory Design (PD): direct involvement during the design process of the users, i.e. those who will be affected by the design output. PD is a qualitative research method aiming at contributing to the practical concerns of people in an immediate problematic situation: it studies a system and concurrently it collaborates with members of the system in changing it in what is together regarded as a desirable direction (Gilmore et al., 1986, p. 161). The students hoped to make contact with users and other stakeholders by setting co-design activities, a design process within the iterative design cycle leading to getting insights, to revealing needs and to building awareness and capacities in the participants by making them *"agents" of the change*. Sanders and Stappers (2008, p. 6) define co-design as *"to refer to the creativity of designers and people not trained in design working together in the design development process"*. It aims at including users-citizens in the design process, because they are *"experts of their experiences"* and therefore they can be part of the solution. Co-design activities are planned meetings in which the designer uses open-ended artefacts (such as issue cards, scenarios, brainstorming games, conceptual mock-ups) to represent, visualize and focus on a specific topic or challenge. These then allow for reflections and idea exchanges. The collected outcomes are then conceptualized and reported through photos, diagrams or videos that inform the conceptual definition of the spatial solution. Users are therefore fundamental resources in the design process and co-design activities trigger a growing awareness of specific problems in the citizens. Thus, this methodology, together with the dialectic data collection of the investigation phase, expanded the generation of ideas throughout the process, avoiding preconceptions and embracing iteration and self-correction.

Interior design students tackled the project by taking into account the soft, strategic and systemic components of service, event and communication design. The aim was to come up with outputs to prototype and to test solutions intended to be hybrid artefacts, *"made up of things, places, systems of communication and interactions, human beings and their organizations"* (Manzini in Meroni & Sangiorgi, 2011, p. 1). Thus, they are flexible and open-ended, and with a focus on a service design approach for spatial design. These components are the guidelines for a systemic and integrated approach, which is essential for the final course phase.

• *Phase 3: PROTOTYPING, event design*

Being systemic means having a complex vision of interacting components, put together in a structured way and influencing each other. During the whole course, students observed, interacted and became inspired with and by a complex system – the human-socio-cultural environment of the district – approaching step by step many of its parts, so as to define a design solution fully integrated with its hard and soft components.

In the prototyping phase, students were asked to start approaching the event from the vision/perspective of the district, which was to be developed after the course. The last phase was to design the final event of the course: a travelling exhibition for all the district's inhabitants and stakeholders to explore the twenty-two projects through drawings, visualizations, diagrams and mock-ups displayed in their twenty-two locations. Students were asked to design the set- up itself, and the interactions with the visitors through the space experience and specific activities to get to know the project and the wayfinding system throughout the district.
The didactic outputs also included:

- the definition of a general concept of the event;
- the definition of the *"offering map"* (a visual tool representing what the service offers to the users), *"personas"* (the archetypes built from the very close observation of the actual potential users) and the user experience (a journey of the user across the service);
- the definition of the timeline of the set-up and dismantling of the event;
- the design of an info-point and of the so-called *"totem"* (a display system to advertise the exhibition on the front of the locations).

Students were asked to concentrate specifically on the following aspects:

- components (*What are the elements of the activity? Do they have a cost? How to store them during the activity?*);
- timing (*How long does it take to prototype the idea? How long are people engaged in the activity?*);
- number of elements (*How many people are supposed to be involved? How many pieces are prototyped?*).

The final event was a way to prototype some components of the designed project, and to test its interaction with the space in a real-life situation.

5.4 **"Design+Eat=Spaces": the methodological process**

The design process of *"Design+Eat=Spaces"* was structured in three phases:

- ***The market scale, research and analysis:*** the goal was getting to know the area through site visits, interviews and through desk research on communal markets. Students were required to *do functional diagrams and visualizations of spatial interactions; spatial and service maps* of the characteristics of the market; investigation about food shop typologies (market stalls, street food devices and temporary food shops).
- ***The market scale, co-design and concept generation:*** development of the *overall strategy* for the spatial concept of the project together with specific insights from the service design discipline, strengthening the systemic view of the food network and system hosted in the Public Market space.
- ***The booth scale, project development:*** managing the exchange with local actors through presentations and co-design activities; concept validation; detailed definition and final exhibition.

• *Phase 1: THE MARKET SCALE, research and analysis*

The guiding question of this phase was:

Do human behaviours shape the environment or does the environment constrain human actions and interactions?

By focusing directly on this question, the aim was to put spaces and uses in relation to see spatial interactions, problems and opportunities: ***who (action) is involved, when (time) and where (space)***. This phase was based on a fast-ethnographic research, in order to guide students to gather insights into how people live, what people do, how they use things, and what they need in their everyday or professional lives. This methodology was matched with co-design as a source of these insights: inputs from the users and interactions with the users in a bounded context, in a short time and with a selected group of people is a fast way to conduct a fast-ethnography and to become immersed in the context. [5]

The analysis of multiple levels of space – action – time was developed as follows:

- *People + time:* observation of what people do and how they interact in the market;
- *Actions + time:* observation of the logistics and position of goods– variety, storage in the single stand according to the interaction with clients to critically analyse how the space is used (both for storage and interactions with the client);
- *Space + people:* understanding of the social insights related to the place such as people's stories, expectations and needs

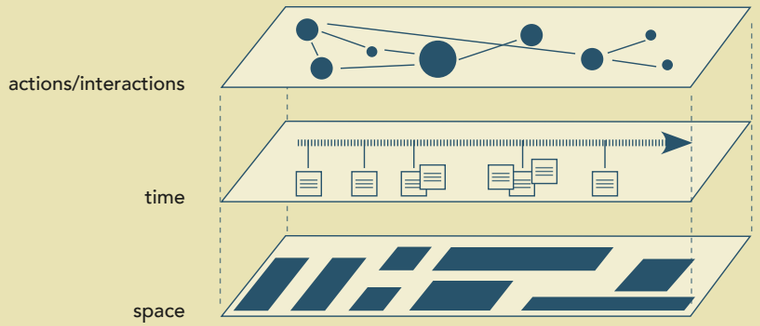


Fig. 49 – Scope of Phase 1. Diagram of the analysis on multiple levels: space – action – time.

To achieve this, students were required to develop diagrams reporting and analysing space + service insights:

- 2D and 3D survey
- spatial analysis: context, building, exterior, entrances, interiors, details, food flows
- people flows: shop-owners, clients (time and fruition typology), food suppliers
- video-interviews about the shopkeepers' stories (see previous paragraph)
- photography, interviews, current mood board

In the *"Arnold"* field experience, Phase 1 required the students to get in touch with the physical and human-socio-cultural environment immediately and to collect simultaneous analysis of qualitative data to lay the foundations for a comparative investigation of concepts. The exploration of the spatial-temporal elements related to the physical area and the human interaction with it, however, was done by setting a coordination of investigation and data gathering in both directions between the disciplinary methods and tools

[5] The co-design activities are not presented and analysed in-depth for the purpose of this dissertation.

employed. In *"Design+Eat=Spaces"*, by never isolating the observation of the complementary environments to be explored, transferred an integrative method from the only data comparison to the data gathering itself, trying to test how the theoretical exploration of breaking silos between disciplines could be put in place already in the on-site research and not only in the merging of design tools by the educators. This shift was fundamental, because the attention was focused more on the complex nature of the process than on the construction of the tools to simply observe the final results. Furthermore, it transferred the reflection on the *potentiality of structures* owned by the nature of a service (Shostack, 1982) into the preliminary research process of the spatial potentialities.

• *Phase 2: THE MARKET SCALE, concept generation and co-design*

The guiding question of this phase was: *What is your systemic view of the design of a food network and system hosted in the Public Market space?* with the aim of developing the spatial concept of the market. In this phase, students were provided with specific insights from the service design discipline and guidelines to act as co-design activities to exchange with local actors. The process was set with parallel actions, to make visible the coordination of the components for the design development.

After the systematization of the inputs gathered from the Phase 1, design tools were matched around the multiple levels **space – action – time** for the concept generation and adding the visuals of service and of space for the concept representation. Even if some tools were more suitable for the initial stage of concept generation and others for an advanced stage of it, they were intentionally provided in terms of theoretical explanation and of outcomes required at the same moment, to allow students to build their process-sequencing by understanding step by step what data and research actions were needed to go further.

a. Who?

The levels of action – time have been isolated and added along with the interaction component. The tools employed were:

• ***System map:*** a visual description of the service technical organization was necessary to define the different actors involved, their mutual links and the flows of materials, energy, information and money through the system;

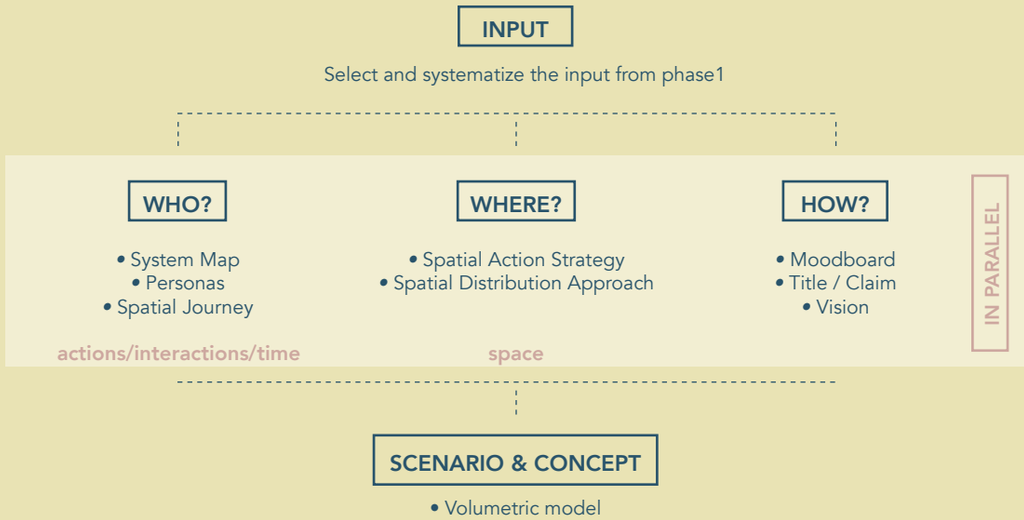


Fig. 50 – Process of Phase 2. Coordination of the multiple levels space – action – time for the concept generation.

• ***Personas***: building archetypes of the potential users after previous observations helped to focus on particular and existing social groups based on their shared interests.

• ***Spatial Journey Map***: while in the previous experimentations, the *Spatial Storyboard Plus* tool was tested for the final representation of the design process (to provide an overall vision of the project combining the narrative of the performance, the sequencing of interactions and the spatiality of the place), in this last experimentation the tool was reset to be ***more process-oriented and less representation-oriented***. To do so, it was implemented with components from the customer journey map, the touchpoints, from the disciplined method of the scenario and by also adapting the sequencing, typical of service, to spaces.

The Spatial Journey Map was defined as the journey (experience) of a user in a service and developed in a space, described through a chronological sequence of actions and through corresponding spatial touchpoints.
The spatial touchpoint is the way in which the user interacts with the space and how (s)he perceives it, since the space influences human actions and interactions. It is the spatial interface of a product, a service or a brand. It enables the identification of both problem areas and opportunities for innovation and the focus on specific touchpoints allows the experience to be broken down into individual stages for further analysis. The aim of creating and testing this tool was to process in the same moment the actions, who makes them and where they happen.

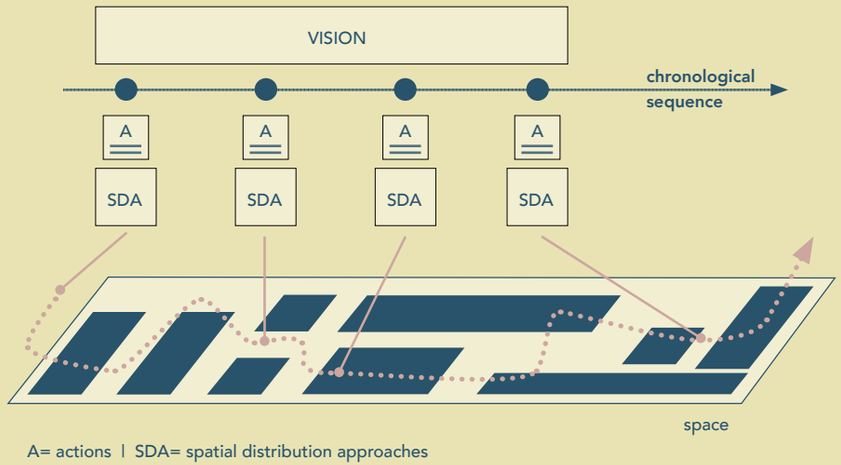


Fig. 51 – The Spatial Journey Map process.

This process helps the definition of the spaces through the typology of actions. The definition of the space, in fact, has been paired with a chronological sequence of the actions of the service outlined. Starting with the *"spatial elements"* cards tested during the Ljubljana experimentation (see Section 4.1.3), these have been reframed to build a toolset defined as **Spatial Action strategy** with **Spatial Distribution approaches**, which has been systematized in the *Where?* parallel section.

b. Where?
Here, students were required to understand their spatial strategy of the Public Market space. At first, they had to fix their overall spatial strategy around two general possibilities:
1. doing a *tabula rasa* of the existing physical elements;
2. keeping (almost) all and operating a more adaptive design.
Then, the first level of categories proposed three kinds of approaches to deal with the general distribution: these were hierarchical (with a central focal point), distributed (with a grid composition), or based on a perimetral distribution and a centre.

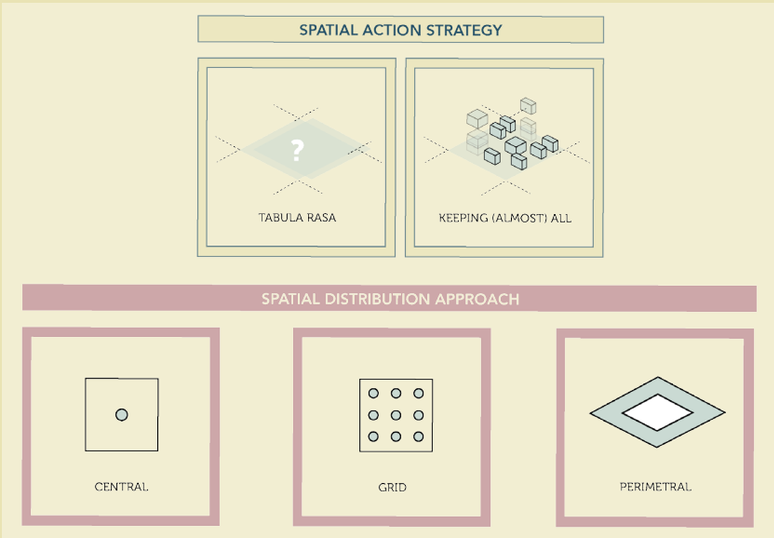


Fig. 52 – First step of the Spatial distribution approach: understanding the spatial action strategy and the general approach.

Then, students had to operate one stage at a time, defining how the space is, according to actors, actions and perceptions. The other levels could have been applied to parts of the space, where some actions and functions would have been located. These were organized into four levels: *elements* – attention on the visible and invisible planes; development – the unfolding of the elements and their density; *crossing* – the way in which all the single space components are crossed; and *observation* – the way in which all the single space components are perceived.
All these levels were translated into three main coordinates – *horizontal, vertical and multiple:*

- ***element / horizontal: plane.*** A portion of the space read as a flat surface, more in its bi-dimensional aspect: this space is inhabited in a way to highlight this characteristic; i.e. to be read as a square
- ***element / vertical: multilevel.*** A portion of the space read as a superposition of surfaces
- ***element / multiple: wall, partition.*** A portion of the space where the horizontal and the vertical components have the same level of importance.
- ***development / horizontal: courtyard.*** The unfolding of a space around a primary, or secondary, flat area with a different function or purpose.
- ***development / vertical: monolith.*** The unfolding of a space around a denser component.
- ***development / multiple: combined.*** A combined development around bi- and tri-dimensional primary components.
- ***crossing / horizontal: height difference***. It stresses the attention on different and flat passages.
- ***crossing / vertical: ramp, stairs.*** It stresses the attention on ramps and stairs as passages.
- ***crossing / multiple: corridor, door.*** It stresses the attention on the corridor dimension of a physical or a visual passage, creating a more focal movement.
- ***observation / horizontal: frontal.*** When a component is perceived from the ground as a display, a façade, a scene.
- ***observation / vertical: from the top to the bottom and vice-versa.*** When a component is perceived on the vertical axis, generating a bijective hierarchical relationship.
- ***observation / multiple: through an opening.*** When a component is perceived through a frame.

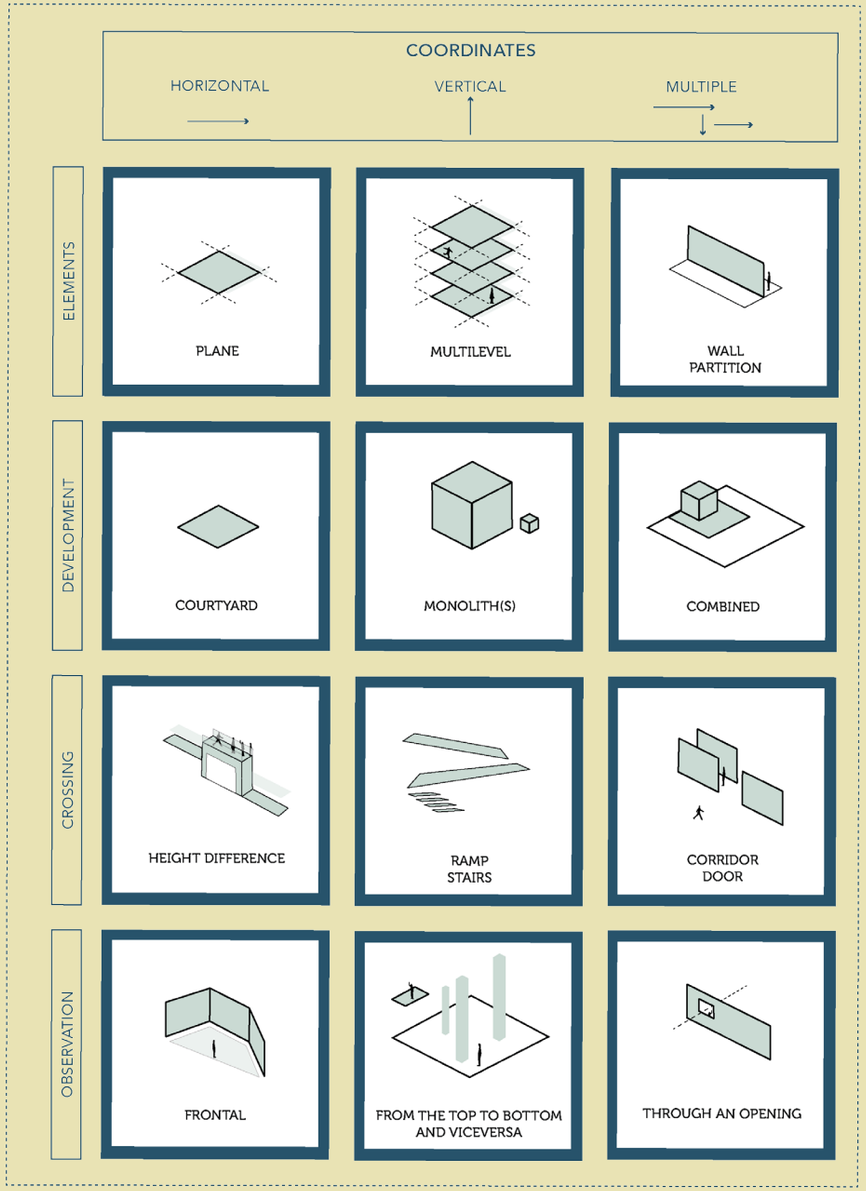


Fig. 53 – Second step of the Spatial distribution approach: understanding the spatial coordinate levels.

Each level determines a consequential impact on, and need for, the following one in terms of design decision.
It is important to underline that these cards were not meant to actually set the interior design with fixed categories, but to investigate the space understanding, definition and design according to the service understanding, definition and design with abstract categories. This tool guided students in breaking down the space into pieces, into smaller components, to design the specific spatial requirements in terms of a human-centric view according to physical components, service requirements and values of perceptions, by always having the big picture as a reference.

c. How?
Students were also required to start defining how these actions, interactions and spaces would have been in terms of mood board, with a title and a claim. A *vision* would have suggested the visual and poetic ideas of the spatial and chronological sequencing designed and then turned into an overall scenario of the possible future imagined and a volumetric model.

• *Phase 3: THE BOOTH SCALE, project development*
The final phase was devoted to the project development through the detailed definition of the spatial journey map, of the material- and tech-boards, the drawing of plans and elevations, and the realization of physical models on different scales. This phase no longer required a processual methodology to be presented and explored.

Some of the final outcomes are presented here to document the design results but, in reality, it was especially through the students' oral presentation that the integration of the process was also evident in the results.

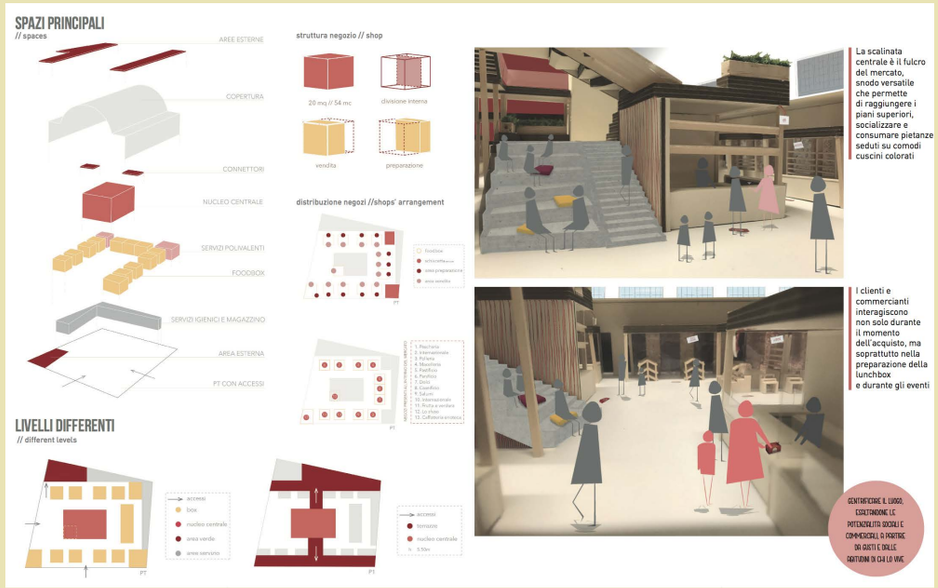


Fig. 54 – "Schisciamo" spatial strategy. Project by Ambra Borin, Michela Funari, Laura Marien, Margherita Rasio.

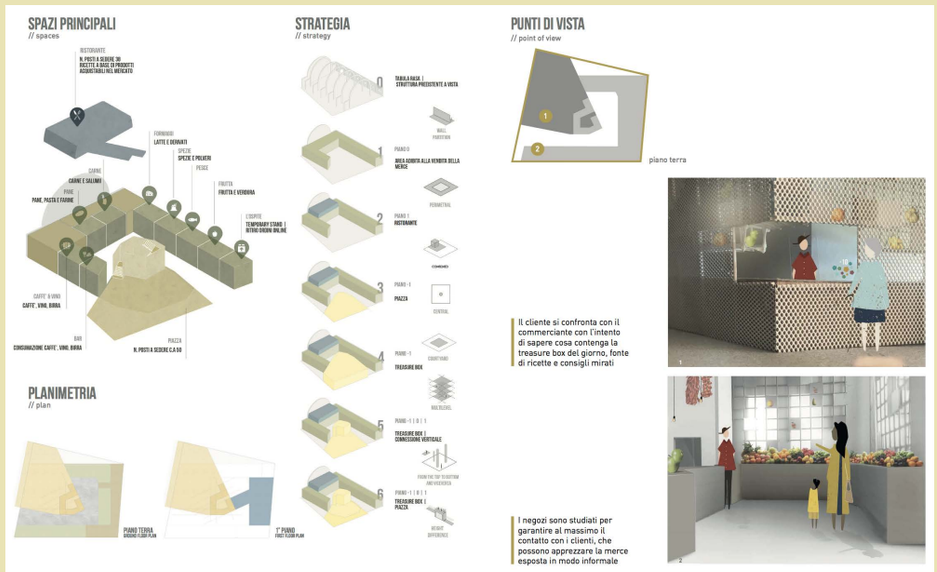


Fig. 54 – "Inshide" spatial strategy. Project by Celina Broekmans, Davide Rizzetto, Salomeeh Kataee Tabrizi, Alessandra Troisi, Marco Zucchelli.

4.5 **Discussion**

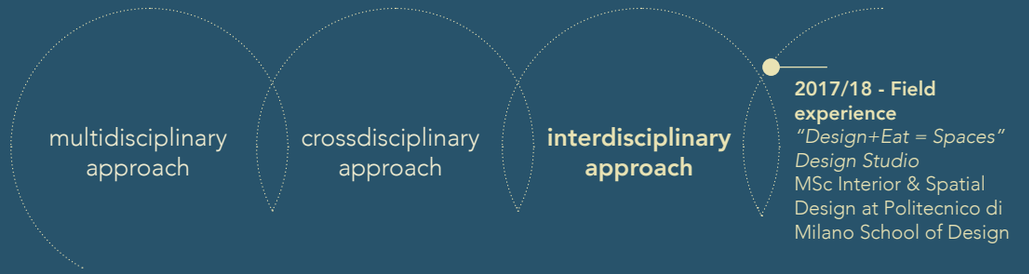
The "Arnold" field experience has had a strong polarization with regard to the Spatial design side, and is only supported by the Service design side, which is predominant both in the process as well as in the outcomes.

It has been therefore positioned as a crossdisciplinary test, where it is evident that the seminal shift into a more interdisciplinary one in the final phase is devoted to the event design, where the 1:1 scale prototyping of the set-up faced the timing and the interactive part of the action. The service has not yet been a focal interest, either in the goals to be achieved, or in the main tools employed, but it has informed the educational process and enabled the context-based process. In fact, starting from the two basic meanings of "service" researched in Elena Pacenti's doctoral dissertation (1998, p. 6), i.e. service as the nature of the final design object and service as the characteristics of the work, while *Arnold*'s methodology tried to isolate one side of the service nature, the attention to the process, *"Design+Eat=Spaces"* also included the other side, the attention to the final result and to the performance.

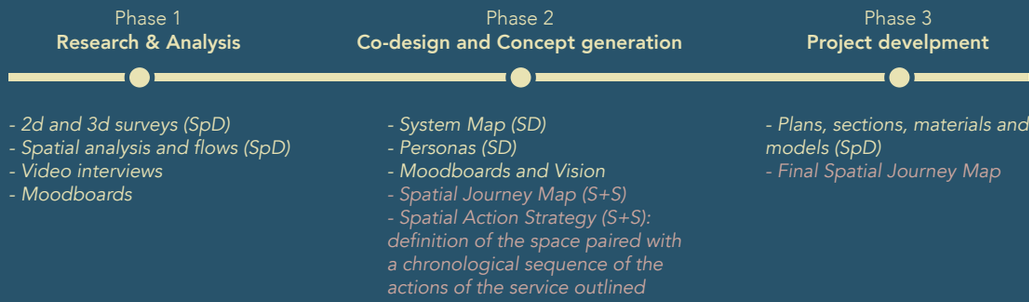
The educational process of "Design+Eat=Spaces" combined in all the steps the narrative of the performance, the sequencing of interactions and the spatiality of the place, testing tools not in a representation-oriented way but in a process-oriented one, always merging the spatial-temporal elements of the design with the human-socio-cultural dimension of the context of research.

Anyway, the boundaries of the two disciplines were still evident.

1.POSITIONING IN THE PROGRESSIVE EVOLUTION OF THE EXPERIMENTAL PHASE:



2.SUMMARY OF THE DESIGN PROCESS *:



(SD and SpD in brackets specify the disciplinary origin of the approach used for that method or tool.)*

3.INSIGHTS:

Students have been conducted in **designing spaces while designing the plot of the interaction scene**. The physical evidence, constituted by the scenography and the props, is seen as one possible mises en scène, integrated in the narration of the journey [percorrenza] into spaces. Despite intentions, the "Spatial Journey Map" was used more as a representational tool than as a processual one. For this reason, the analysis of its effectiveness failed. However, it pushed the students' attention towards a more integrated approach between environmental, temporal and social aspects for the design of innovative spaces.

LEGACY AND CONCLUSIONS

Lesson learnt: the Instructor Principles for future developments

In the actual research and in the field experiences presented here, it appears that new needs have been detected to approach the design of spatial environments and, therefore, that new approaches and new tools have become necessary in the design process to process and elaborate them.

Disregarding the specific issue of the design action, the design of a physical environment is inextricably linked to the complexity of the human and social environments, whose superposition, reciprocal influence and impact must be taken into account when dealing with the understanding and design interventions. A contextual-based approach is not a plus, but it is also an undeniable part of the research and practice. The phenomenological nature of design is not only a matter of its final output relationships with any kind of environment, but it is involved as a factor from the beginning of the process. That is why the applicative phase of the dissertation has increased the focus of the disciplinary integration in the process. That is, the attempt to answer the third research question:

RQ 3: How to validate the proposed transdisciplinary viewpoint

Thanks to the progressive experimentation path, the weaknesses of an unintegrated design has been demonstrated as along with the way in which the two disciplines can connect to build a dialogue within design education.

Representational and generative tools from Spatial and Service design have been explored as possible complementary approaches, to include the physical evidence, the aesthetics of the relationship and the sequencing within the time-span: thus, **by putting the visual of service into the visual of space.**

- **Criticalities on the environmental dimension**:
  The materiality of the relational value of services is unfolded in a dialectic with spaces; further exploration is needed to understand how to match the dialectic between human beings and places with the design of innovative services.

The need to represent the service material, its impact on the performance of spaces and on the human experience resulted in looking for visual tools and methods able to implement the very limited visual evidence of services into the essential visual evidence of spaces. The tested tools had the aim of making visible the material impact of the service while being defined in parallel with the spatial design (Spatial Journey Map), or the aim of highlighting the service needs and requirements impacting in the spatial human dimension and for its validation (Desktop Walkthrough Encounter), or the aim of expressing the complexity of multiple factors, its variables and its unfolding in space and time (Spatial Storyboard Plus).
> Thus, an approach of the "visual" issue through these tools allowed the spatial dimension of human relations in their environment, their value influence and their reciprocal interaction to emerge. Furthermore, it reconsiders the tangibility of services through the spatial design perspective.

- **Criticalities on the temporal dimension:**
  The immateriality of spaces is co-produced; further exploration is needed to understand the impact of participatory design in designing spaces through the analysis of the actual social dynamics to integrate the narrative components.

The design of spaces has been explored and supported with the structured enhancement of its human-centred side by taking advantage of the consolidated methodological discourse of Service design on co-design and co-production processes. Through the added value of an ethnographic approach, of situativity and grounded theory, co-design actions have been tested in the co-creation as well as in the prototyping actions for the design of spaces, introducing the idea of a co-production of spaces, meaning that

the people engagement in the design process and the designer's direct immersion and exchange with social context. This co-production takes place in the data collection, in the intellectual participation for the generation of information and in the emotional participation of the stakeholders. The performative dimension is part of the co-design activities and of the prototyping (final event) activities as well as of the Desktop Walkthrough Encounter and Spatial Storyboard Plus actions.

> Thus, a way was tested to converge the endless relationships of human actions with spaces with the sequencing dimension of the performance. By overlapping its time-component with the unfolding of the actions designed in the space, and by narrating all the sequences of the interactions and of the activities in a complex view, spaces have been co-produced.

- **Criticalities on the social dimension:**
  The design of contextualized services can contribute to the narrative of social roles in a scenic movement connotation of places; further exploration is needed in designing spaces while designing the plot of the interaction scene.

By focusing on the impact of service features in the physical dimension, attention has been given to design of services that have a direct relationship with the user. What has been demonstrated is that the spatial dimension is not only the place of the mise en scène, with its static connotation, but also of the narration, with the connotation of a scenic movement. This expansion of meaning concerned with the Spatial design discipline creates an analogy with the seminal work of Pacenti (1998), which leaned towards an approach that put the service aside as only an organizational and management structure towards the themes of the cultural qualities of design, which was a shift developed and understood with the added involvement of the temporal dimension through the concepts borrowed from interaction design and the design of the interfaces and the language of the performance [1] (ndr. linguaggio dello spettacolo).

> Thus, by matching design tools features in an implemented processual tool, it tested a way to introduce the narrative dimension of spatial design, by performing the social roles and the hierarchies of relationships through the actions and the actors involved in the time-span selected within the connotation of a scenic movement.

In conclusion, the Experimentations and the Field Experiences used as critical case studies for the Explanatory Framework demonstrated that an integrated design avoids Spatial Design development being merely a frame for Service Design. Moreover, through the experimentations it has progressively attempted to go beyond the use of tools from one discipline into the other, to get through the isolation of their fundamental interpretative structures. These have merged into the theoretical framework of the experimentations, into the methodological process and have been tested, combining tools for the specific purpose, in order to validate a strategic coordination and cooperation among the disciplines. By putting the visual of service into the visual of space it has explored the way in which the materiality of the relational value of services is unfolded in a dialectic with spaces; the way in which the immateriality of spaces is co-produced; and the way in which the design of contextualized services can contribute to the narrative of social roles in a scenic movement connotation of places.

I believe that future explorations should however go in direction set, that of pushing for a more and more integrated approach between environmental, temporal and social aspects for the design of innovative spaces.

[1] In the '90s, Pacenti's work introduced and expanded the design culture dimension of Service Design further than its simply organizational and management structures. The language borrowed from design of performance that highlighted the temporal and interactive dimensions of services was strongly connected to the work of Giovanni Anceschi, especially in: Anceschi, G. (1992). *Choreographia universalis. L'oggetto della raffigurazione*, ETAS Libri, Milano.

Conclusions and criticalities

In the actual research and in the field experiences presented here, it appears that new needs have been detected to approach the design of spatial environments and, therefore, that new approaches and new tools have become necessary in the design process to process and elaborate them.
In the last three years, I have focused on investigating and strengthening the theoretical implications in design research and education in the field of S+S, researching a specific and unexplored gateway into SD, that of SpD.
The thesis is a brand-new cross reading of SD and SpD.

First of all, the research found a way to set this comparison, and the two frameworks by Edeholt & Löwgren (2003) and Holmlid (2009) served as a model to frame it and supported the understanding of how the two disciplines could connect.
Then, the theoretical exploration and the taxonomy proposed must be intended as a first step to start a S+S discussion.
The complementarity indicator for a S+S transdisciplinary approach are:

- The structured methodology of the design process of SD can **expand** the operational capacity of the one of SpD in light of the understanding of the common ground they share.
- If spaces are relational phenomena and are permeable platforms offering the material support for social practices that operate through flows, this permeable platform is indissolubly a complex network of relationships and interactions; this exists thanks to an overlapping network of services able to **link** them and, equally, thanks to spaces that are **enablers** of the service network.
- Time sequencing and spatial aesthetics should merge in a complementary orientation towards an aesthetics of the relationship, including the spatial dimension and its symbolic values as well as the time of the interaction, of the engagement and of the participation. This leads to an integrated design of spaces taking into account the **narration of flows** passing through it.
- Co-design practices should enter into the SpD towards the **co-creation of spaces**. Since processes of space ownership are constructed by the human action of dwelling and spaces are enactive of interaction, spaces enter with full rights in the reflection of design and democracy through agonism and infrastructuring notions.

Considering the disciplinary level of analysis of SpD and SD, and the fact that the experimentations were a parallel test field for the ongoing theoretical reflections along the doctoral path, these lasts as to be considered more as **a supporting process** than a scientific endorsement, acting as an iterative process within the ethnography of the research.

From the experimentations, it emerged that:

- the deconstructed and sequential approach of SD methods and tools could be applied to methods and tools for the design of spaces but, actually, **this is not enough to support the definition of a complex design strategy of a place**;
- the experimentations **have not provided a clear idea on the effective value of hybrid tools**: the tested approaches had, unfortunately, a more relevant impact for representational purposes than for processual ones. The same happened in the bigger impact those tools had in the design of structural and infrastructural components, not balanced with the same impact on added identity values for the places designed.

These conclusions are valid if we consider the outcomes point of view. In fact, the following paragraph aims at highlighting the theoretical insights that can be a starting point for future explorations.

The scope of framing the fundamentals of a transdisciplinary approach has meant drawing one of the infinite number of possible frameworks for a comparison of disciplines. The one emerged that explores the findings developed by the established *Dialogues*, and it aimed to highlight the areas in which each discipline expresses its contribution to the wider reflection on design research, where disciplinary coordination and cooperation should be further explored.

The current landscape of design related to the issue explored has been framed within the changes concerning the contemporary world. This has been useful in illustrating the widespread, multi-faceted subject matter of the design discipline, fundamental to frame not only the shifting from fixed and defined entities (technology-centred) to processes and complex living entities (human-centred), but also to frame the topics of the teaching experimentations, in order to connect the complexity of the *object* to the higher complexity of the *process* needed, in parallel to the Dialogues' discussions. In fact, *"design today is no longer about designing objects, visuals, or spaces; it is about designing systems, strategies, and experiences"* (Muratovski, 2016, p. 138); that is why speaking about the main issues of the contemporary shifts has been considered here as a major point in framing the emerging S+S design approach.

The definition process of the Qualitative Comparison and the experimental research arrived at these overall conclusions for the dissertation:

- Service Design and Spatial Design share the development of the design culture towards a direct and integrated cooperation between disciplines and towards a balance between socio-cultural and techno-physical environments;
- Adding the Service components to Spatial Design means expanding the systemic view, while Spatial Design contributes to design contextualized services;
- With an S+S approach, the service designer receives contributions to the materiality of the relational value of services, and the spatial designer makes contributions to the co-production of the immateriality of spaces, within a coordinated narration of actions and interactions in places considering both the abstract and the sequential timespan;
- The research identifies that an integrated design of all components avoids Spatial Design development being merely a frame for Service Design but being an integrated part of it, only if a transdisciplinary dialogue overcomes the conceptual distances.

These are based on the confrontation with the stronger challenge for a transdisciplinary dialogue: **the translation of frameworks, concepts, logics, terminologies, levels of analysis and tools from a research field to another to overcome the conceptual and methodological boundaries from different ontological stances** (Gustafsson et al., 2016, p. 6). For this reason, the Dialogues have been built upon abstract concepts and notions: in order to identify parallelism, comparisons and possible complementary areas to attempt a first joint research not yet explored.

This research fits into a "return of attention" towards the tangibility of services artefacts, which are no more dominant but worthy to be reconsidered in light of the ongoing evolutions and in light of a cultural discourse on research in design.

The scope of the research was certainly determined by a **lack of specific literature on the topic**, that necessitated the search for fundamentals. An adoption of this approach requires a better understanding of its practices and of methods to assess values and evaluate processes of the added diverse perspective, since the separation and distance in the terminology and in the community of reference by the two disciplines have entailed few exchanges so far for supportive structures.

*Why a transdisciplinary **approach** and not a transdisciplinary **method**?*

> *"If we understand approach as both the way of gaining access to a goal, such as the solution of a problem, and the process of getting closer to a destination, then approach may involve a whole set of techniques and methods plus the rules of how to use them. That is why, from a phenomenological perspective, approach, which always includes the approaching agent, that is, the researcher, may be taken as a more comprehensive term than method. It covers the whole rule-guided process of getting close to the solution of a problem, from the definition of the point of departure and viewpoint (perspective), to the proper way of asking meaningful questions, through the consideration of the relevant context, to the (experientially) faithful description of the phenomenon under study" (Graumann in Bechtel & Churchman, 2003, p. 95).*

This citation is useful in the explication of why this dissertation has been structured towards the **outline of an approach, rather than of a set of methods and tools, or to design guidelines.** The Service Design discipline, with its recognized and shared toolsets, demonstrates that a proliferation of tools produces an outstanding number of variations with a loss of the overall design methodology and strategy. Even in this case, the hybridized tools developed within the experimentations were intended to be testing environments for the claims, systematized for the specific teaching contexts and not highlighted as the core contribution of the thesis itself. **The scope has not been to propose a new linear thinking, but to attempt a seminal work towards an approach that enables the evolution of complex skills that are capable of adapting to dynamic contexts.**

The overall methodology of the thesis connected the specific approaches and methods of the disciplines for collecting empirical materials. These comprise the connection between the approach of the research (based on grounded theory), the approach in the experimentation (based on participatory action research), and the cross-pollination of design fields in the experimentations.

By establishing a cooperation between the endless memories of spaces, tracing the rituals and symbolic relationships of human actions, with the sequencing breakdown of actions and interactions in a designed environment, the design of spaces can be explored and supported with the structured enhancement of its human-centred side. The sequencing dimension of the performance, overlapping its time-component with the unfolding of the actions designed in the space, can inform the design of spaces by narrating all the sequences of the interactions and of the activities in a complex view. The design of spaces can mutually inform the service's design with its invisible values since SpD explores the user experience in spaces.

KEY DIMENSIONS	SPATIAL DESIGN	SERVICE DESIGN
TEMPORAL DIMENSION	***abstract*** ***(endless time of the memory)*** *Spatial Design designs places with a timeless component*	***sequential*** ***(limited time of the use)*** *Service Design designs relationships with a defined duration (hic et nunc)*

>>

The immateriality of spaces is co-produced; further exploration is needed to understand the impact of participatory design in designing spaces through the analysis of the actual social dynamics to integrate the narrative components.

By establishing a cooperation between the deconstructed plot of the interaction scene with the design of the physical evidence constituted by the scenography and the props, spaces can be seen as possible mises en scène integrated in the narration of the journey [percorrenza] into spaces, possessing a multilevel dialectic with the designed environment.

KEY DIMENSIONS	SPATIAL DESIGN	SERVICE DESIGN
ENVIRONMENTAL DIMENSION	***dialectical*** *Spatial design designs places with the added symbolic component*	***unfolded*** *Service design designs service evidences with the sequential added component*

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The materiality of the relational value of services is unfolded in a dialectic with spaces; further exploration is needed to understand how to match the dialectic between human beings and places with the design of innovative services.

By setting a cooperation between the figurative act that embodies the wicked problems of the contemporary condition with the relational focus of the experiential act, in the wider spectrum of SD, it introduced an added value of the narrative dimension of SpD, the one that underlines the performing of social roles and the hierarchies of relationships through the actions and the actors involved in a time-span.

KEY DIMENSIONS	SPATIAL DESIGN	SERVICE DESIGN
SOCIAL DIMENSION	***semiotic*** *Spatial Design designs social identities through a figurative act*	***relational*** *Service Design designs relational entities through an experiential act*

>>

The design of contextualized services can contribute to the narrative of social roles in a scenic movement connotation of places; further exploration is needed in designing spaces while designing the plot of the interaction scene.

GLOSSARY OF KEY TERMS

For the purpose of this research, the following terms are defined as:

Dialogue

This term is used to strengthen the main attempt of this dissertation, that of the absence of a coordinated design culture and the lack in a theoretical development in the research in design of a disciplinary connection between SpD and SD, despite the large debates on the relationship between SD and other subject matters. For this reason, the *Dialogues* act as converging areas of discussion.
Therefore, the *Dialogues* here explore this relationship through a discussion on an identified common ground of the two disciplines in order to explore areas of differentiation and of balance. They focus on a mutual and reciprocal theorizing across the disciplines; however, they are only a beginning of reflection in the direction of the foundational act towards transdisciplinarity between SpD and SD.

Key dimensions

They are wide dimensions, serving to synthetize the gaps identified between the two disciplines. These gaps are opportunities to discover where SD and SpD could be complementary to each other (and contains the relevant macro-areas of investigation of the reference frameworks).
They are not descriptive classification, such as the dimensions of the reference frameworks (cf. chapter 1). They attempt to evidence one aspect for the two disciplines, analysed in order to highlight the most relevant contribution for each.

Complementarity Indicators

They have the scope of describing the core evidences of the disciplinary dialogue towards transdisciplinarity, developed as a way to "connect the dots" within the critical work on the literature review and to build the perspective for the proposed *Qualitative Comparison*.

Supportive structures

With this, the aim is to express the theoretical interpretation given by the dissertation for the S+S relationship, meaning disclosing the fundamentals.

Design orders

In Buchanan, R. (2001). *Design research and the new learning. Design Issues*, 17(4), 3–23, he explores the changing conception of the *"product"* of design, not in the sense of the physical object of course, but as orders that are *"a place for rethinking and reconceiving the nature of design [where] "places" [are meant] in the sense of topics for discovery, rather than categories of fixed meaning"* (2001, p. 10).
Holmlid (2009, p. 7) describes the Buchanan's orders as a *"partial model, […] valuable to interpret the design disciplines as integrative disciplines or as boundary openers of the model"* itself. This observation is important: from one side, because it underlines the impossibility to strictly categorize established design disciplines, but is useful to orient their initial conception; from the other, it supports the outreach of the design disciplines towards a transdisciplinary cooperation.

Design object

The *design object* is not an object, a visual or a space; in fact, it has definitely shifted from defined categories to a complex system the experience of the human beings depends. It is a solution for the physical world as well as the added cultural value it carries in the socio-cultural world (Manzini, 2016, p. 55).
Therefore, it is also shifting away from fixed and defined entities (technology-centred) to processes and complex living entities (human-centred), i.e. to a systemic view and impact on the cultural, social, economic and physical dimensions (Buchanan, 1992), (Krippendorff, 2005), (Brown, 2009), (Ezio Manzini, 2015). This change has an impact on design research and practice on different levels: *"design today is […] about designing systems, strategies, and experiences."* (Muratovski, 2016, p. 138)

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Other activities

The following educational and research activities conducted during the doctoral path have not been part of the dissertation's methodology.
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June, 2018 | "PhD Special Seminar" curator and manager at ServDes.2018 Conference. ***Design Department, Politecnico di Milano (Italy).***

May, 2018 | Workshop Lecturer: "S+S - Spatial and Service design for a better living". ***University of the Aegean, Department of Product and Systems Design Engineering, Syros (Greece), with Davide Fassi and Spyros Bofylatos.***

February and March 2017 | Teaching assistant for BA Interior Architecture Studio. ***Middlesex University, London (UK), with Francesca Murialdo and Laura Galluzzo.***

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