DoCS4Design

Doctoral Courses System for Design

PhD in Design
REPRESENTATIONS

PhD in Design - REPRESENTATIONS

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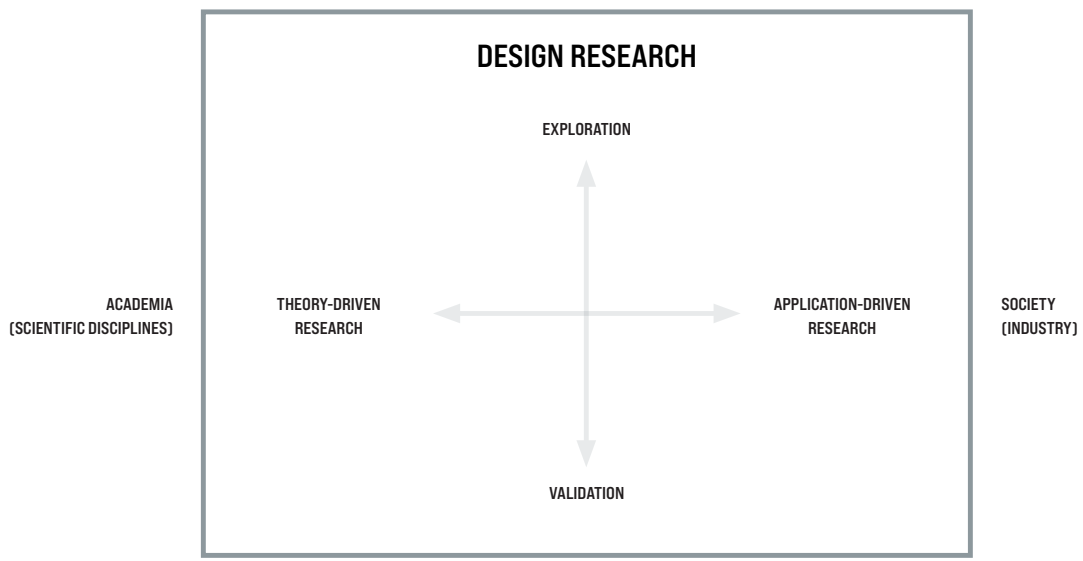


Figure 1 - The landscape of research approaches in a PhD in Design

PhD in Design REPRESENTATIONS

The PhD in Design Representations helps candidates, advisors, and program developers to discuss the approach and outcome of a PhD in Design trajectory.

Why?

The PhD in Design is a relatively young branch of the PhD tree that has various manifestations, depending on the design institute, research questions, and research culture. Design research has been adopting approaches from other disciplines (e.g. psychology, anthropology, sociology, engineering, management, history, philosophy etc.), and has been pioneering new research methods and directions. Topics and methods vary, even within design institutes. This great variation raises the need of candidates and institutions to position themselves. The PhD in Design REPRESENTATIONS aims to raise awareness and support discussions, both about the individual candidate's research, and about what programs can do/do/should do to support them.

What?

The PhD in Design REPRESENTATIONS consists of (1) a matrix to map PhD projects, see figure 1; (2) six typical instantiations of design research based on both their research approach and outcome, called representations, see figure 2; (3) a vigniette template, see figure 3; (4) a representation template to record and discuss examples, see figure 4; (5) examples that illustrate the representations according to the format.

Theory driven *Impact driven*

*Regarding **Approach and Method***		
1. **In control**, the result is scientific knowledge, a result from a systematic approach that focuses on validation of a hypothesis.	2. **Learning through design**, the researcher follows a Research through Design approach and the result consists of one or more demonstrators (designed artefacts) that lead to insights.	3. **Experience matters**, the researcher uses his/her own working experiences and the result is based on case studies that are developed over a long period of time.
*Regarding **Aimed outcome***		
4. **Free as a bird**, the result is a product, service or other designed result that is exhibited in a final and public exhibition.	5. **Supporting designers**, the result contributes to the process of design (designing), for example a new method, tool or technique, or a reflection on a methodology.	6. **Making a difference**, the result is a design that contributes to societal issues and is recognized by the public opinion.

Figure 2 - Six representations for the PhD in Design

Mindset & context

Diversity and further development is key. The representations have been developed in the context of an exchange of PhD in Design programs of six institutes (DoCS4Design 2020-2023), four in Europe and two in the United States of America. The intention was to offer a way to start a grounded conversation. We did not strive for completeness or to give a generally accepted answer on the question what a PhD in Design is.

When?

This tool can be used in different situations, e.g.: to explain to both an early-stage candidate and to colleagues from other disciplines how a design thesis looks like; to have a starting point for starting an informed discussion with PhD candidates and co-advisors; to show how boundaries can be set in a PhD in Design; to understand what kind of infrastructure is needed; kind of expertise for advisors, courses, facilities; to understand what is required more, for example, for a PhD in Design that aims to have societal impact on a short term.

'.. if you look at each of them in detail, you find that they are not fixed and there are many overlapping. But still these representations are a perfect starting point for starting an informed discussion with PhD candidates and co-advisors.'

'A PhD can be a combination of different representations. At least, this was my personal experience at the time I did my PhD. Nothing is missing in the present description of representations.'

'..it would be very useful to have tools or strategies helping us advisors in guiding PhD candidates towards 'unexplored territories'. Some of them are very good at doing it, but others are very conservative.'

Quotes from educators and researchers in DoCS4Design training workshop (TUDelft, October 2021)

How?

The PhD in Design REPRESENTATIONS can, for example, be used in an online Design Research course with PhD candidates from different institutes, with the aim to find common ground and/or position themselves in relation to others.

A possible procedure is the following:

10 min. Presentation and instruction by facilitator, e.g. a PhD advisor.

10 min. Review of the Representations matrix and examples (or a selection). Participants choose one or two representations that are close to their interests.

40 min. Discussion of the chosen Representations:
To what extent do you recognize the example? In what way? Something missing?
From your own perspective, what do you think makes a PhD in Design?
When it comes to the support of PhD candidates: What is challenging, and what can advisors do to support you (better)?

10 min. Summary of insights for the plenary session (in the online platform).

10 min. Plenary sharing of findings and wrap up.

Tips & Concerns

- A participant may be confused about the categories, and therefore discussion with advisers is recommended. At the same time, it is useful to remember that advisors are part of a research culture and not always familiar with or open to other research approaches.
- All examples are based on individual PhD trajectories; an example of group work could be added.
- Use vignettes to get to exchange PhD backgrounds, see figure 4 for an example.
- Fill in the template for the PhD in Design for your own project.
- An example of group work could be added.

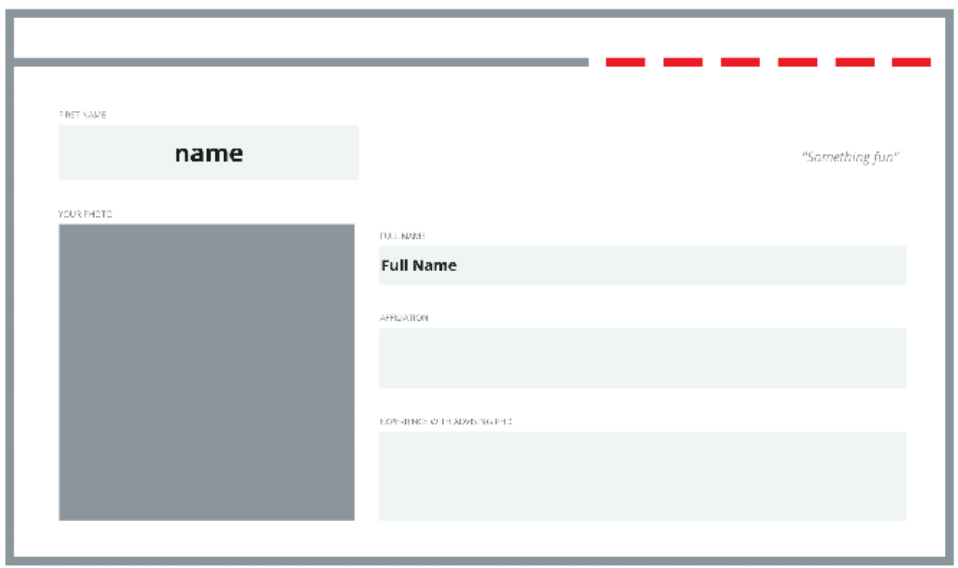


Figure 3 - Example of a vignette that can be used to get to know each other, especially useful in online situations.

Limitations

The six Representations may change over time regarding both content and number.

The examples were created at a specific moment in time (2021); it is recommended to add new examples, e.g., to include current relevant research domains (e.g., health), approaches, and outcomes or topics (e.g., Artificial Intelligence).

The examples are from individual PhD candidates and do not include group work (which may be the case in transdisciplinary research projects).

REFERENCES & FURTHER READING

Stappers, P.J. & van Boeijen, A.G.C. (Eds.) (2022). *PhD in Design, a Map & Glossary.* TU Delft, Politecnico Milano, Aalto University, Imperial College, IIT, Carnegie Mellon.

DoCS4Design (2022) Doctoral Courses System for Design Retrieved on November 2023 from https://www.docs4design.eu.

Representation <number>: <name>

1. *Title and Author of the work*

2. *Place and year*

3. *Research aim* - Describe in a few sentences.

4. *Research questions* - Give the main question(s).

5. *Approach* - A short description of the overall approach.

6. *Results* - A short paragraph.

7 *Illustrations* - Diagram, photos, other.. And link to the work

8. *Why is this an example for this category?* - Two perspectives

Background

Content

DoCS4Design

Doctoral Courses System for Design

PhD in Design

REPRESENTATIONS

EXAMPLES

Representation 1: In control

The result is scientific knowledge, a result from a systematic approach that focuses on validation of a hypothesis.

TU Delft

1. *Title and Author of the work*

The beauty of unity-in-variety: Studies on the multisensory aesthetic appreciation of product design by Ruben Post

2. *Place and year*

TUD 2016

3. *Research aim* - *Describe in a few sentences.*

To demonstrate how unity and variety relate to each other and to aesthetic appreciation.

4. *Research questions* - *Give the main question(s).*

How can the principle of Unity in Variety explain how and why we aesthetically appreciate perceiving product designs by vision and touch?

5. *Approach* - *A short description of the overall approach.*

The Unity in Variety principle was empirically investigated through twelve studies and multiple pilot studies, mostly quantitative in nature.

6. *Results* - *A short paragraph.*

The result is a validated hypothesis, that is that unity and variety, despite being negatively correlated, positively influence aesthetic appreciation of product designs with 'unity' as the dominant factor.

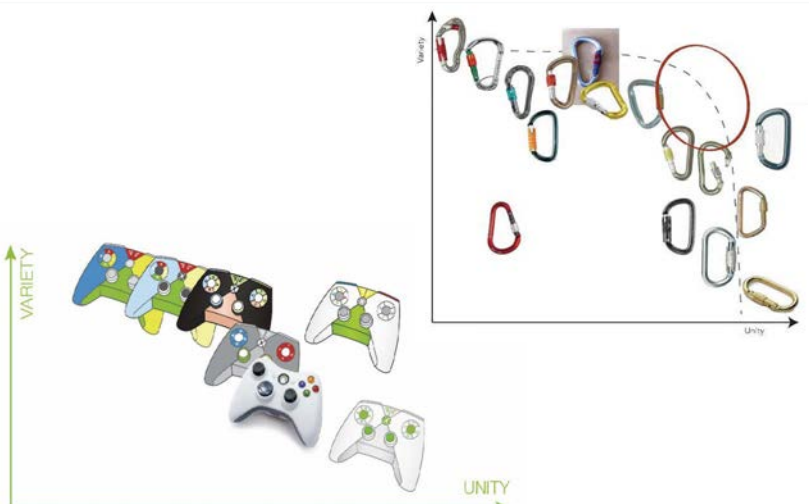
Some publications:

Post, R.A.G., Blijlevens, J. Hekkert, P. (2014). Aesthetic appreciation of Tactile Unity-in-Variety in Product Designs. In Proceedings of the 23rd Biennial Congress of the International Association of Empirical Aesthetics (pp. 358-360), New York, United States of America, 22-24 August 2014.

Post, R. A. G., Blijlevens, J., Hekkert, P. (2013). The influence of unity-in-variety on aesthetic appreciation of car interiors. In Proceedings of the 5th International IASDR Conference (pp. 2942-2947). Tokyo, Japan, 26-30 August 2013. http://design-cu.jp/iasdr2013/papers/1630-1b.pdf

Post, R. A. G., Blijlevens, J., Hekkert, P. (2013). Unity-in-variety in product design aesthetics, In Proceedings of TeaP 2013, Pabst science publishers, pp 217.

7 *Illustrations* - *Diagram, photos, other.. And link to the work*



Examples made by students to illustrate how products can be mapped within their category according to their unity and variety balance.' (Post, 2016, p.167)

8. *Why is this an example for this category?* - *Two perspectives*

Background PhD student	*Content*
The PhD candidate started his PhD just after successfully finishing a master in Cognitive Neuroscience at an Institute for Interdisciplinary Studies.	The project is clearly based on the hypothesis that there is a relationship between the unity in variety balance and aesthetic appreciation.

Representation 2: Learning through Design

The researcher follows a Research through Design approach and the result consists of one or more demonstrators (designed artefacts) that lead to insights.

POLITECNICO MILANO 1863
DIPARTIMENTO DI DESIGN

1. Title and Author of the work

HUMAN RESOURCE DESIGN.
Steering human-centred innovation within private organisations. by Martina Rossi

2. Place and year

Polimi 2020

3. Research aim - Describe in a few sentences.

To offer a guiding design framework for academics and practitioners who want to develop projects in the field of human resource management and organisational transformation.

4. Research questions - Give the main question(s).

- How can service design support and enhance effective collaborative practices aimed at organisational change within private companies?
- How these collaborative design practices should be articulated and conducted?
- To which extent the role of the service designer is meaningful and relevant to collaborative design practices within private organisations? Within this context, what are the skills and attributes needed for this professional figure?

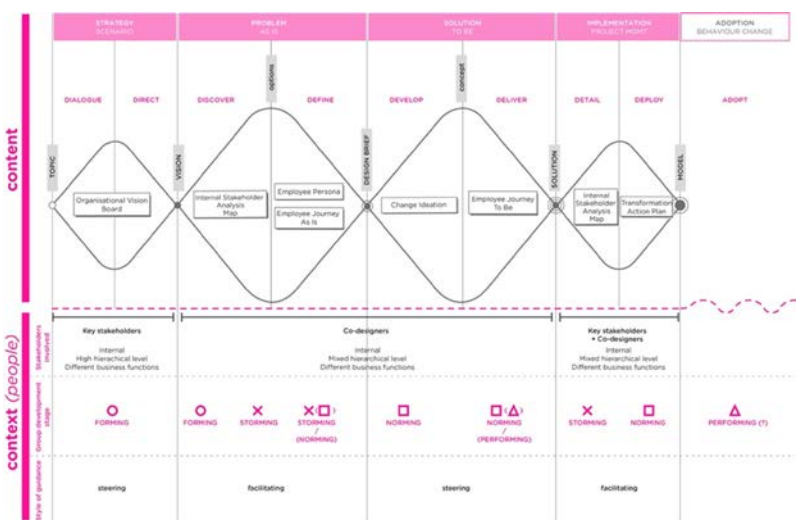
5. Approach - A short description of the overall approach.

Findings were mainly derived from field testing of various components of the framework.
Specifically, the framework was applied and tested within three representative projects.

6. Results - A short paragraph.

A framework, guidelines and a set of tools addressed to both content level (the topic of the project) and context level (team development and dynamics).
Publications: a book edited by Springer Nature, a chapter in a book edited by Franco Angeli and an article on Strategic Design Research Journal. Several publications in conference proceedings.
The framework is also being adapted to the educational field and it's actually under testing in the Master of Product Service System Design of the School of Design of Politecnico di Milano.

7 Illustrations - Diagram, photos, other.. And link to the work



8. Why is this an example for this category? - Two perspectives

Background PhD student	*Content*
The student is a trained service designer and she applied her design skills to learn through the research. She also took advantage of her professional experience to find suitable projects for her experiments.	Insights are generated through the making.

Representation 2: Learning through Design

The researcher follows a Research through Design approach and the result consists of one or more demonstrators (designed artefacts) that lead to insights.

TU Delft

1. ***Title and Author of the work***

For Inspiration Only by Ianus Keller

2. ***Place and year***

TUD 2005

3. ***Research aim*** *- Describe in a few sentences.*

To support designers with collage making.

4. ***Research questions*** *- Give the main question(s).*

- How do designers interact with their collections of visual material?
- How can new tools support this interaction?

5. ***Approach*** *- A short description of the overall approach.*

Answers were found through the design of a product (Cabinet) and two case studies in which the product has been used by design practitioners.

6. ***Results*** *- A short paragraph.*

Cabinet is a tool that helps designers collect and organize the visual material for inspiration. It does this by making the interaction with digital material more physical (designers can drag digital images on a table as if they are real objects) and by offering a fluent way to add physical material to the digital collection (anything placed on the table is digitized and projected in place, and can be added to the collection).

The result is knowledge about how designers use visuals in their daily work.
Journal publications (Design Studies, Codesign, Int J. Design Computation).
Demonstrations of prototypes at HCI conferences and education.

7 ***Illustrations*** *- Diagram, photos, other.. And link to the work*

For more information visit the **Cabinet website at the ID-StudioLab**

8. ***Why is this an example for this category?*** *- Two perspectives*

Background PhD student	*Content*
The student was educated as a designer (at TUDelft) and used his own design skills and experiences to learn through designing.	Insights are generated through the making.

Representation 2: Learning through Design

The researcher follows a Research through Design approach and the result consists of one or more demonstrators (designed artefacts) that lead to insights.

Aalto University
School of Arts, Design and Architecture

1. *Title and Author of the work*

Making Sense Through Hands. Design and Craft Practice Analysed as Embodied Cognition by Camilla Groth

2. *Place and year*

Aalto University, Espoo, Finland, 2017

3. *Research aim - Describe in a few sentences.*

To examine what embodied cognition theory could mean for design and craft practice through empirically-based research and practice. The thesis was part of the Handling Mind project conducted with other Finnish universities to connect areas of neuroscience, psychology, design and educational research.

4. *Research questions - Give the main question(s).*

Main question: How do design and craft practitioners think through their hands?
Sub-questions:

- How do experts in tactile knowing use their enhanced tactile sense in a making situation?
- What methods may be used in the study of embodied and experiential knowledge in crafts?
- What is the role of emotions in connection to tactile experiences in a craft practice? How do design students use embodied knowing in material exploration?

5. *Approach - A short description of the overall approach.*

Through three case studies, notions of body-based knowing, especially related to haptic experiences were studied. The first case involved ceramic workshops with deafblind makers, conducted at the IIRIS Service and Activity Centre for the visually impaired in Helsinki and the Tampere Resource Centre for the Deaf-blind. The second case involved a practice-led self-study on tactile augmentation in ceramic craft practice. The third case examined Masters' students' use of their embodied knowing during a design and material exploration process.

6. *Results - A short paragraph.*

Theoretical and practical implications:
1) Embodied cognition theory lends itself well to informing design and craft related practice.
2) Design processes include embodied knowledge even in the cognitive and immaterial stage of creating mental images of the intended physical designs.
3) Making may be seen as a way of negotiating meaning through interaction between the embodied mind and the material environment, thus it may affect intrapersonal growth and provide a useful platform in educational settings.
4) Design and craft research benefit from a combination of research approaches that aid in investigating both representational and non-representational aspects of the practice.

The practice-led research setting was found to be an efficient way of studying experiential knowledge as it includes the practitioner's perspective, thus allowing for sensory experiences and emotions to be studied in action. The use of video documentation was found to be especially useful in both the effective study and dissemination of experiential data and research results due to its multimodal potential.

7 *Illustrations - Diagram, photos, other.. And link to the work*

https://aaltodoc.aalto.fi/handle/123456789/24839

8. *Why is this an example for this category? - Two perspectives*

Background PhD student	*Content*
Groth has a BA and MA in ceramics and glass, and worked for many years creating ceramics for projects with industry and cultural organizations. At Aalto, Groth was part of the Empirica research group which emphasises practice-based research through art, design and craft.	Groth conducted a series of practice-led experiments through workshops and seminars about making ceramics. One was self-guided/ auto-biographical and two were with groups of other makers. The emphasis was on the process rather than the designed artefacts.

Representation 3: Experience Matters

The researcher uses his/her own working experiences and the result is based on case studies that are developed over a long period of time.

POLITECNICO MILANO 1863
DIPARTIMENTO DI DESIGN

1. *Title and Author of the work*

The Design of Data Sonification.
Design processes, protocols and tools grounded in anomaly detection.

2. *Place and year*

Polimi 2021

3. *Research aim - Describe in a few sentences.*

To introduce a designerly approach to the field of data sonification i.e. the representation of data through sound. The field is traditionally the domain of computer science, from one side, and art, from the other side, which has historically created a tension between different approaches that might have contributed to the scarce success of this data representation method. The author investigates how design can bridge between the different approaches and contribute to the transition of data sonification from a niche field to a widely adopted method to represent, understand and communicate complex phenomena.

4. *Research questions - Give the main question(s).*

- Why is sonification, despite gaining momentum, not yet widely adopted as a data representation method?
- Can a designerly approach to sonification make the difference? How can we evaluate if this approach helps create 'better' (more effective and engaging) sonification?
- Can we frame a design methodology to approach sonification from prototype to testing?

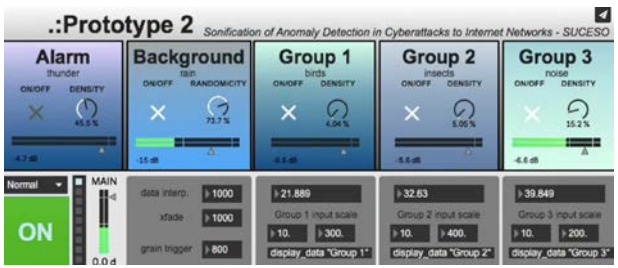
5. *Approach - A short description of the overall approach.*

The answers to the research questions were found through interviews with sonification experts, workshops with designers expert in data visualization, and the design and development, over a two-year period, of two 'design actions': two sonification applications for the real-time monitoring of cyber-attacks in the context of digital and digital-physical networks.

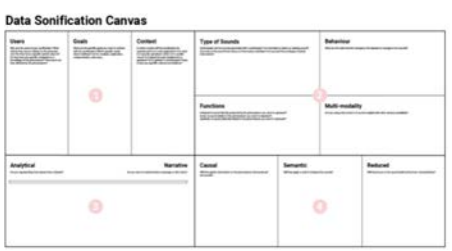
6. *Results - A short paragraph.*

- Interviews to experts and workshops with designers lead to the formalisation of a design tool, the "Data Sonification Canvas", which is meant to support designers in integrating sound to their data visualisation methods
- From the two Design Actions, a fully working prototype ('Datascapes') for the real-time monitoring of cyber-attacks to digital and physical infrastructure was designed, and it is currently being developed as a potential commercial application.
- A web project, the Data Sonification Archive, was launched as an online observatory on data sonification projects in order to gather insights on the long term on how sonification is used, by whom, and with which goals.

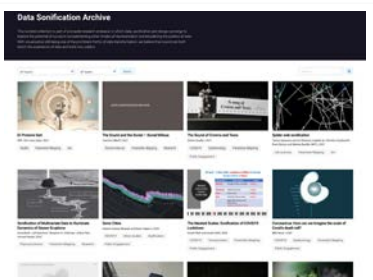
7 *Illustrations - Diagram, photos, other.. And link to the work*



1. Datascapes



2. Data Sonification Canvas



3. Data Sonification Archive

8. *Why is this an example for this category? - Two perspectives*

Background PhD student	*Content*
The PhD candidate is a professional sound designer who worked for more than a decade in the sound branding and sonic interaction design industry.	Results are obtained through the conceptualisation, design and development of a real-world application of sonification, and tested with real domain experts in a real work environment.

Representation 5: Supporting Designers

IIT Institute of Design

The result contributes to the process of design (designing), for example a new method, tool or technique, or a reflection on a methodology.

1. *Title and Author of the work*

Anatomy of Infrastructure
Authors: Andre Nogueira, Carlos Teixeira, Weslynne Ashton

2. *Place and year*

IIT Institute of Design
2017-19

3. *Research aim - Describe in a few sentences.*

TDesigners are known for their abilities to create interventions (products, services, infrastructures and systems) with product-technology features capable of promoting new experiences among actors. While these interventions are often oriented towards impacting social systems, they embed new affordances into the socio-ecological context, and generate new interactions not only among humans, but also between humans and non-humans' actors. As the field increasingly engages in complex socio-ecological challenges, new methodologies are required to incorporate considerations of the dynamic, non-linear interactions among actors shaping these challenges.

4. *Research questions - Give the main question(s).*

We explored novel approaches to ethnography and prototyping of infrastructures in order to (1) uncover the logics shaping these interactions, and (2) iterate interventions to increase the fitness in socio-ecological systems. We assumed design practices as iterative processes in which participants continuously gathered information about context through prototyping.

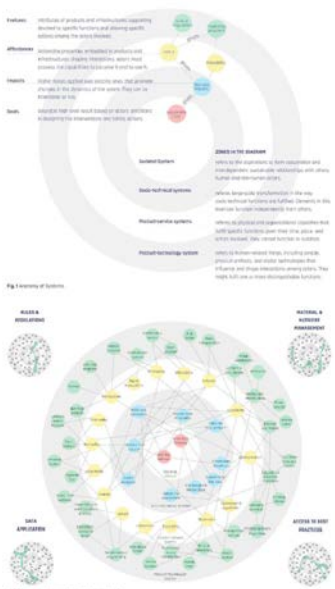
5. *Approach - A short description of the overall approach.*

We applied some tools of this new methodology in 'The Future of Farmers Market' project, a partnership between IIT-Institute of Design, a graduate design school in Chicago, and the Plant Chicago, a non-profit organization located on the south side of Chicago with a mission to cultivate local circular economies through education, research, and incubation. Plant Chicago recently began working to develop collective activities with co-located businesses at The Plant, an industrial facility on the south side of Chicago that serves as a community building space for local food and beverage businesses. The project focused on multi-systems integration as a strategy for developing circular economies, and considered farmers' markets as critical paths for advancing transitions in the local context.

6. *Results - A short paragraph.*

By applying new tools, participants uncovered four main challenges among farmers' markets: data application, access to best practices, materials & nutrient management, and rules & regulations. Once these patterns were situated within the system's anatomy, participants were able agree on four actionable properties that market managers should intervene to advance local circular economy practices in Chicago: collaboration, education, facilitation, coordination.
The framework developed during this project was presented as a poster in conferences and incorporated into course work at the master design program, and used in research for industry sponsored projects.

7 *Illustrations - Diagram, photos, other.. And link to the work*



8. *Why is this an example for this category? - Two perspectives*

Background PhD student	*Content*
The PhD Student worked with two of his advisors during a period of 3 years to develop and test a new framework.	The framework was developed to interpret products and services as infrastructures in large, complex, and dynamic socio-ecological-technical systems.

Representation 5: Supporting Designers

The result contributes to the process of design (designing), for example a new method, tool or technique, or a reflection on a methodology.

POLITECNICO MILANO 1863
DIPARTIMENTO DI DESIGN

1. *Title and Author of the work*

Creativity 4.0. A method to explore the influences of the digital transition on human creativity within the design process by Carmen Bruno

2. *Place and year*

Polimi 2020

3. *Research aim - Describe in a few sentences.*

Explore Digital Creativity domain to identify the main positive and negative influences that the current scenario of digital transition is bringing on human creativity to inform and thus empower the creative design process for innovation.

4. *Research questions - Give the main question(s).*

- What are the ingredients that influence the human creative abilities?
- What are the positive and negative influences of the digital transition on the human creative abilities?
- How is the creativity within the design process influenced?

5. *Approach - A short description of the overall approach.*

Mainly transdisciplinary literature analysis (design, psychology, sociology and computer science), case-based analysis, qualitative expert interviews through card sort method in the context of digital creativity

6. *Results - A short paragraph.*

Creativity 4.0 Model (Fig. 1): the theoretical model explains the complex and multidimensional nature of creativity in the digital transition. It allows to identify digital influences on the human creative abilities.
Creativity 4.0 Framework (Fig. 2) the framework deconstructs the design process in step, activities and factors of creativity (cognitive, emotional, motivational, social). It allows to map digital influences to provide a deep understanding of the changes on creativity within the design process. The framework allows also to make a wiser and consciously use of the digital opportunities addressed to human creative enhancement for innovation.

The research path contributes to formalize a human-centred method (Fig. 3), where the Creativity 4.0 Model and Framework become the fundamental tools to continuously identify digital influences on creativity and map them on the creative design process.

Dissemination: 5 Conference presentation, 2 journal publication, 1 book chapter, 1 book.

The model and framework has been adopted as a theoretical core knowledge of an Erasmus+ proposal "Digital Creativity for Developing Digital Maturity Future skills" that has been selected for fund (started in Sept. 2020).

7 *Illustrations - Diagram, photos, other.. And link to the work*

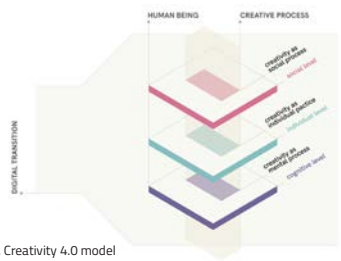
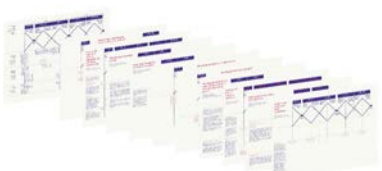


Fig 1. Creativity 4.0 model



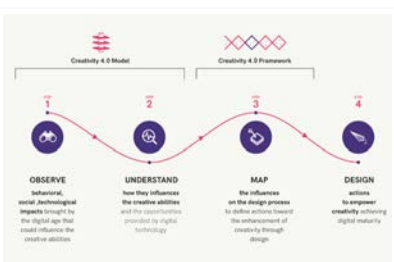


Fig 3. Creativity 4.0 human centred method

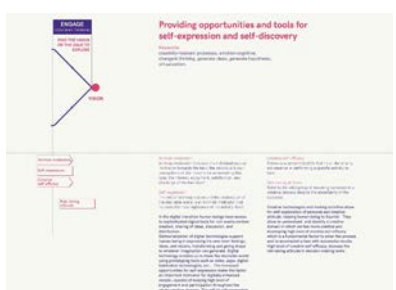


Fig 2. Creativity 4.0 Framework

8. *Why is this an example for this category? - Two perspectives*

Background PhD student	*Content*
Product designer educated in Polimi, the research topic stems from her experience and interest in developing methods and tools for empowering the creative process for innovation in different fields.	The framework can be adopted to i) design new tools to augment creativity (also digitally) in the steps of the design process ii) design training activities for empowering the factors of creativity in the design process iii) to study the influences of a specific digital technology on creativity within the design process

Representation 6: Making a difference

IIT Institute of Design

The result is a design that contributes to societal issues and is recognized by the public opinion.

1. Title and Author of the work

The Future of Farmers Markets: Advancing the local circular economy.
Author: Andre Nogueira

2. Place and year

IIT Institute of Design
April 2018

3. Research aim - Describe in a few sentences.

To experiment with codesign practices and prototype interventions that advance the development of local circular economies.

4. Research questions - Give the main question(s).

What are the barriers to, and opportunities for, implementing codesign practices to advance the circular economy

5. Approach - A short description of the overall approach.

The researcher visited different farmers' markets, grocery stores,restaurants, urban farms, community center and research institutions, and engaged with local vendors, farmers market managers, customers, and peer organizations to conduct the research. Then interviewed participants about their personal and professional experiences in farmers' markets, and the infrastructure supporting their activities. Next, utilized well-known design methods such as POEMS (people, objects, environment, messages and services), the five stages of human experiences (entice, enter, engage, exit, extend), user journey maps, value webs, and activity systems, as tools to ground our research in the context, and structure our findings. Lastly, hosted a workshop with farmers' market managers and other representatives of circulareconomy initiatives to validate some of the interpretations being made, as well as to explore potential principles that could informalternative paths to increase impact.

6. Results - A short paragraph.

When situating codesign and prototyping practices in a specific context it enables the understanding and redesign of the infrastructural elements that conditions the performance and impact of such choices. By using case studies the researcher developed generalizable findings applicable to codesign practices. The study was part of a larger research project involving a total of 3 case studies, each study involving different levels of complexities.

7 Illustrations - Diagram, photos, other.. And link to the work

8. Why is this an example for this category? - Two perspectives

Background PhD student	*Content*
The PhD student was in his second year and applied and received a grant for advancing practices of local circular economies.	The PhD Student used this grant for developing a case study for experimenting with codesign methods for system transformation using participatory action research methods.

Representation 6: Making a difference

The result is a design that contributes to societal issues and is recognized by the public opinion.

Aalto University
School of Arts, Design and Architecture

1. Title and Author of the work

Making Sustainability. How Fab Labs Address Environmental Issues
Cindy Kohtala

2. Place and year

Aalto University,
Espoo, Finland, 2017

3. Research aim - Describe in a few sentences.

To examine the environmental sustainability issues in peer production and how they are addressed in Fab Labs.

4. Research questions - Give the main question(s).

- How do actors in the social world of a Fab Lab address environmental sustainability, in their future-oriented vision and strategy work and in their everyday operations?
- What are the environmental (often socio-environmental) issues in the maker movement and distributed production, and how are they discussed and tackled in Fab Labs?

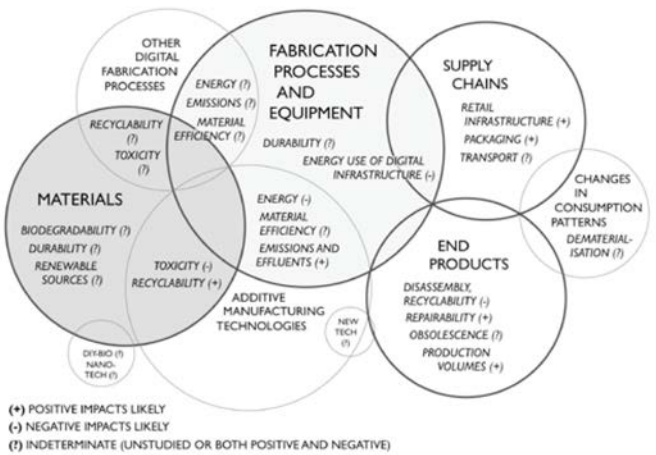
5. Approach - A short description of the overall approach.

- Primarily through ethnographic research methods and Symbolic Interactionist analysis, the thesis examines daily practices and discourses in selected Fab Labs and how sustainability is represented in these communities.
- Informed by STS, Design Research and the field of Design-for-Sustainability

6. Results - A short paragraph.

- Key finding: conflict actors encounter between setting ambitions, promoting particular ideologies and espousing sustainability-oriented values, and realizing and enacting these values in the mundane and constraining routines of everyday practice.
- Details the current landscape of research literature on distributed production, who is studying these environmental issues and how, and the potential opportunities and threats in this new mode of production.
- Contributes to research on peer production communities, social shaping of technology and sustainable design.
- Wider implications may indicate how increasing digitalization and citizen involvement in production will transform design and production and the sustainability implications therein

7 Illustrations - Diagram, photos, other.. And link to the work



https://aaltodoc.aalto.fi/handle/123456789/21755

8. Why is this an example for this category? - Two perspectives

Background PhD student	*Content*
Kohtala has a BA and MA in design. She is active in various maker communities and urban activism projects.	Project contributes knowledge about current maker practices and their sustainability implications, which has value for the peer communities studied as well as technology developers and policy makers.

DoCS4Design

Doctoral Courses System for Design