Hélène Day-Fraser, Emily Carr University of Art + Design, Canada
“Revolution - what goes around comes around? Design as needed provocateur and catalyst. Seeking contributions that address our relations and open up new alternatives. How do we reconfigure the assumptions that trap us? What does it mean to confront our disquiet with the world-as-it-is?”

Alastair Fuad-Luke, Free University of Bozen-Bolzano, Italy
“Design activism constitutes specific design actions that critically transform raising awareness and vigilance of our societal condition into socio-political actions, individually and collectively.”

Stefano Maffei, Polytechnic University of Milan, Italy
“Complexity is change. Design has to deal with the transformation of the species, of the environments, and the societies. A new posthuman design perspective is needed. The future is unwritten.”

Betti Marenko, Central Saint Martins, University of the Arts London, United Kingdom
“How do we design critical interventions that resist capture, propose alternatives, activate change? By design as a problem-finding, world-making, terra-forming, future-crafting strategy that acts in the present to shape tomorrows”
Alternative narratives
data visualization archive

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Abstract Nowadays non-expert groups use data to collaboratively create alternative narratives that challenge those imposed by power institutions. Data visualization is an adversarial tool for bottom-up counter communication. This paper offers reflections on bottom-up practices around the creation of alternative narratives that use data visualization. It is based on the preliminary results of a research project that aims to create an online archive of digital projects dealing with data visualization for alternative narratives. The collection of projects allows for an overview of the diversity of actors involved, the issues addressed, the aesthetic characteristics of the visualizations, and the characteristics of the data practices and sources. The re-appropriation of digital languages, platforms, and formats emerge together with diverse visualization techniques as new proposals to counteract information hegemony. While most projects follow the open-source ethic, greater openness in working with data for alternative narratives from bottom-up needs to be promoted.

KEYWORDS | DATA VISUALIZATION, ALTERNATIVE NARRATIVES, ARCHIVE, DATA ACTIVISM
1. Introduction

This paper provides a reflection on bottom-up practices of data-driven alternative narrative. It draws on the preliminary results of a research project aimed at creating an archive of online projects dealing with data visualization for alternative narratives. Data-driven alternative narratives shape the facts that take place in a story not told by the dominant power, with the aim of making visible and evident issues for the audience to reflect over and continue questioning it (Briones, 2019). The archive is proposed as a way of approaching three relevant aspects in the context of data design: 1) promote critical thinking by designers and “consumers” (Tufte, 2006) of data visualizations; 2) raise knowledge and awareness about the type of projects and who mobilizes them, the issues they address, and the ways in which they work with the data; 3) promote the use of data for activism in the design and related communities, serving as a source of inspiration and dissemination. The archive provides an overview of the state of data visualizations used for alternative narratives, revealing aesthetic aspects characteristic of this type of data-driven counter-narratives that are different from other types of data-driven narratives. Presented in the context of a master’s degree course in communication design, the archive is an educational and reference-consulting tool for students.

1.1 Emerging technologies and bottom-up data practices with visualizations

The digital sphere has profoundly changed the way people access and share information. In the last 15 years, the production of data has been exponentially increasing. Emerging technologies present new opportunities as well as new challenges. The informational power relationship of governments and corporations that provide homogeneous and opaque methods of access, manipulation, and communication of data, and the increasing cost entailed in personal data (i.e. surveillance and profiling) are two of the many reasons why it is critical to decentralize the ability to produce data-driven narratives. Modes of access and tools to manipulate data have brought marginalized actors to collaboratively create alternative narratives to those delivered by dominant power structures. Non-profit organizations and activist groups increasingly base their campaigns on data, using visualization as an agency tool for change.

Within the network society (Castells, 1997) citizens are now abler than ever to access information and know how public institutions exercise their power. Skepticism towards the dominant power has been installed as a verifiable possibility. On the other hand, individuals and networked communities are seeking to counteract online mainstream information channels, creating new sources and tools of information, often generating alternative channels (e.g. Mastodon platform (https://mastodon.social/about), OpenPod (https://openpod.abbiamoundominio.org/). These practices resonate with the concept of technopolitics, which refers to "the articulation between the strategic use of communication technologies for action and collective organization" (Toret, 2015, p. 51). Bottom-up technopolitical practices show how the use of technologies and data is promoting social change,
opening spaces for the creation of new narratives. This article understands that data visualization is a tool and a techno-political bottom-up practice when framing alternative narratives.

The repertoires of action in the uses of data are increasingly amplified due to the access to tools for extraction, analysis and communication of data to lay people; and are "constituted from a group of people articulated together through a diverse set of social and technical means" (Sack, 2011) self-organizing and gathering hybrid profiles that produce new visions of the world. The many online tools for data extraction, manipulation, analysis, and visualization allow one to work with data from the beginning to its communication. Working with data is no longer only for data experts but for a mixture of profiles from different disciplines and skills. The diversity of perspectives and situated knowledge of those who are working with data as a techno-political bottom-up practice is precisely one of the richest bases of the process and result of data visualizations for alternative narratives and that dissociates them from traditional data visualizations.

Although the expertise needed to work with data is no longer the domain of experts alone, there is still a great lack of data literacy among individuals in the datafied society. Designers who work with data visualization, among other profiles such as hackers, are data intermediaries (Baack, 2015) who do the work of bringing data closer to people's experiences (Mauri & al, 2019). In this sense, the communication designer who works with data assumes an active and political role in the information society.

The appropriation and détournement of digital tools and platforms is another aspect of data practices around alternative narratives. As referred to in section 3 of this article, it is remarkable how several of the projects collected in the archive show a disruptive approach to reusing visual and interactive resources to present data visualizations in alternative narratives.

1.2 Data activism and adversarial design

Data activism is a type of activism that takes a critical approach to practices around data and technologies (extraction, production, collection, analysis, communication among others) for challenging existing power relations seeking for social change.

“It involves a series of practices at the intersection of the social and the technological dimension of human action, with two aims: either resisting massive data collection or actively pursuing the exploitation of available data for social change.” (Milan and Gutiérrez, 2015, p. 122).

Data activism builds on the work of subcultures that precede it, taking main inspiration from hacker ethics and open-source movement that has emphasized the use of data in activism by opening, sharing and modifying them, generating knowledge to seek social change (ibid.). One of the main objectives of data activism is to remove individuals from passivity in the face of data. In this way, data activism will seek to inform how the mechanisms by which
power institutions control individual’s data. It will also seek to open up knowledge about technical and ethical practices with data, promoting training instances. Data activism finds a close relationship with communication design with data through design activism and in particular with adversarial design. Design activism is described as “design thinking, imagination and practice applied knowingly or unknowingly to create a counter-narrative aimed at generating and balancing positive social, institutional, environmental and/or economic change” (Fuad-Luke, 2009, p 27).

On the other hand, adversarial design is a type of political design whose emphasis lies on the agonizing qualities by provoking conditions of disagreement and confrontation. “adversarial design does the work of agonism means that designed objects can function to prompt recognition of political issues and relations, express dissensus, and enable contestational claims and arguments” (DiSalvo, 2012, p 12).

Design activism directly seeks to empower people to take action in the ongoing processes of social change, while adversarial design seeks to be a proxy for this action. In other words, it is the understanding of conflict that mobilizes action, not the action itself. Although both concepts point to the active and critical action of individuals seeking to promote change in relationships with dominant power, a closer relationship is identified between adversarial design and data activism. The latter seeks to challenge hegemonic power by pushing society to be actively critical of data and technology and their implications. The above concepts resonate with the role of data visualization as a decisive adversarial tool (DiSalvo, 2012) for data activism. Translating data into visual representations for alternative narratives is an activist practice that requires a critical approach to data to make a political position evident and coherent.

2. The alternative narratives visualization archive

The Alternative Narratives Visualization Archive is an open, ongoing, and collaborative archive that collects and maintains over time digital online projects which use data visualization as a tool to support alternative narratives to the ones from dominant power. The archive aims to raise knowledge and gather the design expertise on the relevant task of portraying evidence to not visible or alternative social issues that aren’t been told by the main power institutions. It seeks to encourage the creation of other narratives to those that dominate and to promote discussion of existing ones. At the same time, the archive aims to bring to the fore discussion and awareness on the political role of designers when designing with data. Three main tasks that the archive performs in terms of knowledge construction around data-driven alternative narratives are: the need to create new ways of telling alternative narratives; the bottom-up approach of data to people’s experiences around social issues; and the preservation in time of the cases collected.
Narration is part of human self-creation. To create alternative realities, it is necessary to tell stories that subvert the imposed ones and that above all represent the multiple possible worlds. The projects collected through the archive are examples of how these narratives can be addressed through data bringing new ways of engaging with social issues, and at the same time bringing data closer to people's experience. The archive is intended to be a source of inspiration for those seeking to imagine ways of telling alternative narratives with data. On the other hand, many of the projects collected online are outdated and have been lost over time. The archive seeks to preserve the fragile digital material for future research.

The archive currently boasts a collection of 65 projects, most of which are still online. Each project is categorised according to the way in which the data was acquired, the topic covered, and the type of project based on the purpose of each project. The definition of these categories was based on the project's information generally provided in the "about" or "methodology" section. However, this information is not always present in the projects of the collection, making necessary deeper research on the actors behind and over the situated context of each topic.

The archive is part of an academic research being presented in various didactic experiences in the context of a master's degree course in communication design at the university. During the course experience students are asked to design alternative data-based narratives, designing communication artifacts that invite the public to reflect over social issues. Throughout the research and design process, students consult the archive and use the collection of cases as references for their projects. In this way, the archive turns out to be a tool that inspires the students' project work, while promoting a critical look at the relationship of the themes of the archive projects and the work with data. Therefore, the archive is a didactic tool for the teacher who makes the spectrum of the projects known, and
for the students who consult it looking for references. The filters proposed in the archive conduct the consultation promoting a critical look at the work with data that each project circumscribes.

The archive has also been presented to diverse activists in informal and non-academic contexts, receiving recognition particularly in two respects: 1) exposing the potential that exists in the work between communication designers and activists; 2) and showing a variety of designerly means - which are not always easily imaginable by activists - when envisioning the possibilities of communicating with data. However, it remains to be systematically observed how the archive is an inspirational tool for activists.

Some ways to observe the success or appropriateness of the archive approach might be through interviews with activists who use the data in communications projects. Also, follow up on collaborative work between designers and activists who create alternative data-driven narratives by observing how they consult the archive and practice critical approaches to working with data such as those in the archive.

3. An overview of data-driven alternatives narratives with visualizations

Data-based narratives that use visualizations are the result of a series of practices mediated by various data structures and which need closer observation. To this end, we provide an overview of the projects based on the information that was possible to collect. Following a feminist approach to data visualization (D'Ignazio & Klein, 2016), the project collection is analyzed in four aspects: Who are the people behind the projects? What are the themes they propose? What kind of data sources and data structures do they work with? What are the aesthetic practices that they try to engage audiences with through the data? These questions are more concerned with practices associated with bottom-up production than with data or visualization itself.

3.1 Actors and topics addressed

The collected cases include projects that have to do with social objectives that seek to engage audiences through the communication of alternative visions of the world using data in digital platforms. All projects were developed by independent and mainly bottom-up organizations such as self-organized citizen groups, NGOs, independent civil society organizations, researchers. They are non-profit, not private or business sector-oriented. Each project focuses on a particular topic. Topics were manually classified by defining a macro topic and related sub-topics. The five major topics are: Policymaking, Transparency and accountability, Human rights, Memory and archives, and Surveillance. The following diagram maps according to your topics, subtopics as well as representing the number and type of organization involved in each project. observed how the subtopics overlap and cross
Alternative narratives data visualization archive.

one topic with another. This classification seeks to give more entry points to the reading of the projects and how they represent conflicts.

3.2 Data sources and data practices

Assuming that the visualization of data for alternative narratives should promote a critical reflection on the data, it is relevant to observe what practices are embedded in the “social context where data are produced, consumed and circulated” (Gutiérrez & Milan, 2019). Of course, not all practices are visible in the visualizations, but it is possible to deduce the origin of the data (from official sources, collectively elaborated, among others) or the publication of the methodology and the database used.

The archive emphasizes observing how visualization projects for alternative narratives work with the data. There are several questions that can be asked, from do they contain a methodology section that explains how you worked with the data? Do we know who created that data and how? This classification deals with understanding and showing how the data was acquired in each project. Based on the Mirén Gutiérrez classification published in his research Data Activism and Social Change (2018), the following categorization is proposed:

- **Appropriate data**: it’s about grabbing existing data from other platforms from which there is no access. Scraping is one of the most used techniques.
- **Own research**: from research results that can be measured in data. For this, they use all the creativity in using and creating forms of measurements and measuring devices such as self-built sensors, homemade photo balloons, etc.
- **Existing sources**: produce new analysis from available, but unrelated and unexplored, datasets.
- **Collaboration with other organizations**: collectives, foundations, organizations among others.
- **Crowdsourced**: generate the means to crowdsource citizen-contributed data.
- **Whistle-blowers**: organizations or individuals are recipients of data via whistle-blowers such as leaks.
- **Governmental data but not public**: data delivered directly by an entity such as the government to a particular organization for restricted purposes.

Many of the projects state principles such as transparency and accountability, disclosure of power relations, or the right to open information. It is striking, however, that the vast majority of cases do not put much of these principles into practice through their own data visualizations by means that they don’t release the databases used in the visualizations, among other practices. From this can be inferred:

- The weak relationship of open data culture linked to data visualizations.
- The incoherence in the discourse of institutions that use data visualization to subvert the opacity of information by institutions of power.
• The deliberate will not to share data due to other reasons not explicit in the projects.

All three are fairly generic conclusions but they provide first lines of action to foster a critical data culture. The archive aims to contribute from design to a more critical and knowledgeable data culture, so it points its efforts to the first of these stated observations. How design can you contribute to a more critical data culture?

4. Aesthetic practices of alternative data visualizations

Working with data for alternative narratives brings with its aesthetic practices that reformulate the way data is visualized by moving away from the traditional way. A new paradigm aesthetic that seeks to promote questions not only from the final output of the visualization but also from how they are constructed. They expose not only the conflict but also the ways in which the conflict is perceived by disrupting visual components of digital interfaces to propose a new reading in their use and meaning.

Visualizations follow an aesthetic of digital disruption through the re-appropriation and détournement of graphic elements (e.g. use of the pixel), digital languages (e.g. emojis, links, gifs), and re-use of platforms for other purposes (e.g. use of Twitter to create a bots that reproduce a database). These new expressions and ways of counting on data move away from traditional graphical visualizations, proposing more elements that involve the audience with the narratives.

The projects in the collection present a well-defined point of view in relation to the subject matter, which is not always contrary but inquisitive to the hegemonic narratives. There is no intention of being neutral in the way the data-based narrative is approached. The vast majority of the actors behind these projects lucidly assume that the data are not neutral, and neither is their representation. In other words, working with data from its interpretation, representation and communication intentionally moves away from a pure neutral aesthetic that advocates efficiency and parsimony linked to statistical graph design. Visualizations in alternative narratives do not follow Tufte's proposal that 'the design of statistical graphics is a universal matter [...] like mathematics' (Tufte, 2001, p. 10). Instead of proposing a purely analytical representation, they integrate other aspects to narration and representation such as the emotional and playful dimensions. These variables are materialized in the use of visual variables in addition to interactive variables (animation, activation of filters, etc.).

The aesthetic practices of disruption that are observed also integrate an open approach to the representation of uncertainty, to the unfinished, and to the disclosure of how the visualization components. It approaches the aesthetics of imperfection (Saito, 2011), by declaring the appropriation and articulation of meanings, languages and visual tools. These
characteristics that are observed from the visual aesthetics of digital projects are often confirmed by the methodological statement of the projects.

Several of the visualizations in the collection assume hybrid aesthetic characteristics that combine different components: in part it is possible to find characteristics of analytical visualization, in part it is possible to find characteristics linked to an aesthetic of artistic information design, as well as components that come from other areas such as oral history and data journalism.

The projects presented below exemplify the aesthetic practices of appropriation and détournement, disclosure and the unfinished, and uncertainty and imperfection by means of narratives.

4.1 Appropriation and détournement of the digital as a means of new languages

Alternative narrative that proposes the use of digital platforms or the lexicon of a digital platform, to give it a twist and say something completely unexpected. With this kind of narrative there is a double meaning: the alternative story, and what the medium that is being re-proposed means. The contrast of the two is what enhances the irony and the subversion of this type of narrative.

This type of alternative narrative brings together socio-political and techno-political elements. As mentioned above, the re-appropriation and re-proposal of digital tools are practices that have been carried out in social movements in recent years. They are also directly related to the principles of open-source culture and tactical media.

Figure 2. Tarjetas Black to de Future: A Twitter bot that tells micro stories of the executives of Caja Madrid-Bankia through the expenses made with Black cards 10 years ago. Each tweet
is a story. Instead of doing charts or aggregating data they use an existing platform (familiarity) for publishing the unduly expenses of the politicians.

Within the context of Spanish 15M, a leak was revealed with information of embezzlement and public money by Spanish politicians. The leak was a large database detailing which politician spent how much, where and when. Montera34 developed a Twitter bot (@BlacktotheFuture) which tweets every time one of the directors spent money using the black cards 10 years ago. People who follow the account could receive a Twitter notification of one of these stories. The project’s aim is to reveal the cheekiness use of black-not transparent money by the authorities through a “in a day like today, 10 years ago” narrative which helps people to realize the lifestyle and irresponsibility of their actions. Dosing the contents of the leak in a time frequency frame that the audience could associate to everyday life actions, increases the sensibility of the crime. The choice of Twitter as the medium increased the “everyday life” perception of a crime that happened 10 years ago as something normal. Instead of analyzing aggregate data, Montera34 chose a different approach to data: small data in doses to reveal the silent crime (small data for mini-narrative in a one tweet dimension).

4.2 Disclosure and the unfinished

“El caso Ayotzinapa” is a project by Forensic Architecture, Equipo Argentino de Antropología Forense, and Centro Prodh. They reconstruct spaces of conflict using the residual evidence of the intense destruction produced by explosions, bullet holes in walls, images captured with closed-circuit TV cameras, amateur and professional photographs and videos, audio recordings and the architecture of the city among other things as pieces of evidence. Their work follows a forensic aesthetics and methodology using a "raw" visual language leaving the same modelling tools with which they reconstruct their research. There is an evident intention not to make up or perfect the technical elements used, making the process of creating the visualization transparent.
Figure 3. Screenshots from the “Plataforma Ayotzinapa” exploration interface. Data and evidence was positioned in time and space. The interface allows the user to navigate through time filtering by victims, security forces, government workers, alleged organized crime members, among others. There are also filters to highlight actions, objects and scenes. Retrieved from www.plataforma-ayotzinapa.org in June 2019.

As a result, narratives present an alternative to those constructed by the dominant power structures using data. “Plataforma Ayotzinapa” like other Forensic Architecture projects, is first and foremost a tool that takes a side in the conflict itself, meaning that its political stance includes the redistribution of power by giving knowledge back to individuals who previously were relegated to just being spectators. Once the spectator gains knowledge they become the audience, taking a position on the matters exposed. The visual models that reconstruct and reshape the data are the political tools that turn the spectators into the audience.

4.3 Uncertainty and imperfection

“U.S. gun deaths” in 2010-2013 is a project led by Periscope in which depicts a database of victims in the United States dead by gun accidents. In orange their lifelines are represented and in grey the hypothesis about how long they would have lived. Visualization is not intended to be an analytical representation, nor does it hope to demonstrate a pattern in the victims' deaths. It proposes to visualize with uncertainty how many years of life were lost by the victims, reinforcing the emotional aspect of what the data represent.
5. Conclusions

The paper presents the archive as a way of presenting the state of the art of bottom-up practices of data-driven alternative narratives, raising knowledge and awareness about the type of projects, actors who mobilize them, the issues they address, and the ways in which they work with the data. It seeks to serve as a source of inspiration and dissemination for designers and activists by promoting critical thinking over data when it comes to design data-driven alternative narratives. The archive reveals aesthetic practices, characteristic of this type of data-driven counter-narratives that are different from other types of data-driven narratives.

The paper also highlights how alternative data-based narratives dissociate themselves from traditional analytical data visualizations, proposing new ways of storytelling. Based on cases from the archive collection, it shows how data practices from below are promoting new aesthetic practices that address unconventional aspects in data visualization design. The representation of what is uncertain, of the hypotheses propose new readings to the data bringing them closer to people's experiences, incorporating emotional components to them. Appropriation practices are also an invitation to rethink what is or is not a data visualization that allows audiences to become involved with the phenomena represented. Finally, the design of an uncanny aesthetic emphasizes content and process rather than layers of makeup that hinder understanding in the construction logics of visualizations.

Therefore, it is urgent to start creating a data culture that is conscious of the politics that surround data. It is essential that as data users we start being aware and more critical of the top-down structures that manage, control and collect huge amounts of data and information from the datafied society. Bottom-up structures (individuals, collectives, civil organizations) need to begin to shape knowledge and take control of the implications of data. It is also
important to encourage the alternative use of data, questioning the modus operandi of things, creating spaces of confrontation that promote the active participation of individuals in democracy.

References


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Becoming Lost and Found in Translation

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Abstract | Becoming Lost and Found in Translation is a participatory co-designed research project involving university art and design students and staff investigating how acts of translation can enhance learning and critical thinking. Using our collaboratively constructed design school manifesto as a starting point it has been translated into over 45 languages that are spoken at our university. This paper outlines the initial findings of this project and how it can be used to think about ideas of meta cognition in learning, transitions from one state to another, liberating and decolonising curricula and how translation itself advances thinking in design education.

KEYWORDS | TRANSLATION, COLONIALISM, LANGUAGE, COLLABORATION, META-COGNITION
1. Becoming introductions (Diventando presentazioni)

“The question arises, therefore, how far the difference can and must extend - how large? how small? - in order to remain within the limits of the concept, neither becoming lost within nor escaping beyond it.” (Deleuze, 1994 pp. 29-30)

Salman Rushdie (1991) asserts, “It is normally supposed that something always gets lost in translation; I cling, obstinately, to the notion that something can also be gained.” Lost and Found in Translation is a project run by students and staff from our university, that has used our co-constructed design school manifesto as its starting point to investigate what it means to learn, to translate and be in transition (p. 16).

Figure 1. Design School Manifesto, London College of Communication, UAL. (2018)

This paper deals with the origins and continuing evolution, and becoming (Semetsky 2006), of the Lost and Found in Translation project as active participatory co-designed research. It will focus on ideas of critical thinking, meta-cognition and inclusivity and how all student’s voices and thinking should be heard and acknowledged in the production of new work about inclusion and social justice. (Bhagat & O’Neill 2011, Freire 1990, Richards & Finnigan 2015).
The project stems from a university funded teaching scholarship I initiated, called “Thinking Design”, which aimed to investigate ideas of meta-cognition in university art and design education. This is outlined in section 2, *Becoming meta-cognitive*, which argues that when acts of thinking are contemplated by the learner then a greater understanding of the processes of learning can be achieved (Livingston, 2003), (Hargrove, 2011), (Ingham, 2012).

In section 3, *Becoming translators in transition*, I describe the development of the project from my initial conversations with students about why our design school’s manifesto was only displayed in English. They pointed out that over 35% of our student cohort are speakers of languages other than English. These new students were in transition from one state; Further Education, undergraduate studies, other parts of the UK or from multiple other countries, to our university, a place they mostly only knew by reputation (Field & Morgan-Klein, 2010), (Land, 2014). This moment of crossing a threshold and to find a place to belong, became central to is project and is developed further in this section (Sabri, 2014).

Section 4, *Becoming pedagogies a concluding becoming*, maps ideas of meta-cognition, translation and transition onto how they could enhance our transformative teaching and learning practice and thinking at our university. From a lecturer translating academic design briefs, so it becomes something that is productive for the student’s learning, to the student making the brief into a physical form, material, writing, or even another idea. This section acts as a conclusion to this paper.

2. *Becoming meta-cognitive* (메타인지되기)

“On the one hand, it is apparent that acts of recognition exist and occupy a large part of our daily life: this is a table, this is an apple, this the piece of wax, […] But who can believe that the destiny of thought is at stake in these acts, and that when we recognise, we are thinking?” (Deleuze, 1997 p. 135).

2.1 Beginnings (Początki)

“… continual beginning afresh.” (Dewey 1916/ p. 417)

One of the precendents of the Lost and Found in Translation project was a two year University funded pedagogical enquiry during my “Thinking Design” Teaching Scholarship. My research aim was to look at the possible value of metacognition in university design and design studies education. I wanted to go beyond the contestable ideas of ‘learning styles’ (Curry 1990), and look more deeply in to the ways we, as educators, can think about and use meta-cognitive ideas of learning, to help our learners learn better.

For the purposes of the enquiry metacognition referred to “…higher order thinking, which involves active control over the cognitive processes engaged in learning.” (Livingston, 2003, p. 2). It theoretically investigated ways we can help students, at all levels of knowledge acquisition, to understand how they think about their learning. As Ryan Hargrove (2011)
suggests, “The area of metacognition can be the scaffolding for future problem solving, as the goal remains to enable designers to utilize creative design thinking/processes with optimum efficiency.” (p. 9)

This enquiry had a number of theoretical frames (Bal, 2002). One being a philosophical approach, using key concepts, as discussed by Gilles Deleuze (1997) in Chapter 3, The Image of Thought, of his 1968 book Difference and Repetition. This illuminating and complex philosophical tract has been used successfully by some of my PhD, postgraduate and undergraduate students when they have started to question their own thoughts about the way they think about their research. By questioning what we think thinking is, or philosophical has been thought of as thinking, these students, after an often-fraught initial conceptual wrestling match, gained a much better understanding that we cannot base thinking on the concept that just because, “Everybody knows, no one can deny”. (Deleuze 1997 p. 130).

2.1 Images of Dinosaurs (Imagenes de Dinossauros)

“The thought which is born in thought, the act of thinking which is neither given by innateness nor presupposed by reminiscence but engendered in its genitality, is a thought without image. But what is such a thought, and how does it operate in the world?” (Deleuze, 1997, p. 167)

One example of this philosophical meta-cognitive strategy was used by Abigail Buchan, a final year Graphic Design undergraduate student, who wanted to explore the representation of dinosaurs. She investigated how we can know what dinosaurs appeared to be like and how past illustrations of them have influenced our thinking about what they might or might not have looked like. Dinosaurs do not look like the ones in Crystal Palace Park or even Jurassic Park, she argued, but they create enduring images that a hard diverge from.

She developed the concepts explored in her written thesis into a practice-based investigation for the ‘Dissertation Transformation Exhibition’ displayed in our college galleries. Abigail set up a wall with the simple instruction, draw me a dinosaur, (figure. 2) (Buchan, 2015).
Figure 2. Abigail Buchan’s “draw me a dinosaur...’. Wall drawing in the ‘Dissertation Transformation Exhibition’ at London College of Communication, UAL. (Buchan, 2015)

Figure 3. ‘draw me a dinosaur...’. Drawings of dinosaurs from the ‘Dissertation Transformation Exhibition’ at London College of Communication, UAL. (Buchan, 2015)
This practice-based research demonstrated that when we start to think about something, as seemingly simple as what a dinosaur might have looked like, and then be asked to translate this into an image, we often rely on what we already think we know about the object we are trying to translate. The act of translation in this case involved a fun element, but the participants did start to realise that it was not as easy as they first thought and their thinking about what to draw was based on previous encounters with images of dinosaurs.

Figure 4. ‘draw me a dinosaur...’. Participant’s drawings of dinosaurs during the ‘Dissertation Transformation Exhibition’ at London College of Communication, UAL. ‘draw me a dinosaur...’. (Buchan, 2015)

These moments of metacognition were seen even more acutely when students were asked to translate our design manifesto. Often the initial response was, yes that will be quick and easy, to slowly recognising that the process would take longer and involve more thought and often dialogue with others. Participants went from states of eagerness to ones of contemplation and even mediation, to help and try to make the translations as accurate as possible. It made them aware of the deeper meanings of the manifesto and made them aware of their own learning processes.
3. Becoming translators in transition (Convirtiéndose traductores en transición)

“...if there is language, it is fundamentally between those who do not speak the same tongue. Language is made for that, for translation, not for communication.” (Deleuze & Guattari, 2005, p. 430)

Following on from the theoretical research carried out during the ‘Thinking Design’ project and after I had taken a teaching and learning sabbatical, I returned to our university and decided to become more nomadic in my thinking and teaching (Semetsky, 2008). I decided not to have an office but work in spaces that were free or were the most appropriate for the circumstances I found myself in. Wanting to reconnect with as many colleagues and students as possible as quickly as possible, this seemed to be an ideal way of being openly visible and available (Ingham, 2019).

3.1 Becoming nomadic (खानाबदोश बनना)

“The nomadic – smooth – space is an open territory, providing emancipatory potential to those who are situated in this space in contrast to striated, or gridded, space...” (Semetsky, 2008, p. vii-viii)

The department I work for presents work during the London Design Festival each year and was holding its annual public programme exhibition when I returned to work. A number of tables and chairs had been set up in one of the galleries as a space for workshops to be held. I decided to inhabit this space and use it as an ‘office’. For LDF18 and our public programme I ran a project called ‘Mapping Strange Assemblages’ (2018) which involved a number of students and alumni carrying out performative research as gallery guides, and where,

“..."probe-heads"; [...] (becoming) cutting edges of deterritorialization (that) become operative and lines of deterritorialization positive and absolute, forming strange new becomings, new polyvocalities.” (Deleuze & Guattari, 2005. p. 191)

Working in the galleries enabled me to be an integral part of these interventions. This had a number of very productive consequences. One being that I became a ‘guide’ to lost new students who could not find their classrooms or where intrigued by the exhibition. One topic of conversation that reoccurred was our LCC Design School manifesto (2018) displayed at the entrance to the ground floor galleries (Figure 6). The students on the whole were very taken with it and we started to discuss ideas of belonging and language. One question cropped about why it was only in English as there were a large proportion of students for who it was not their first language.
As the idea of translation had always been at the heart of the ‘Thinking Design’ Scholarship project I decided to do an email call out to students and staff to ask them if they would help translate the manifesto into another language. This was sent out on the first day of the new academic year 2018/19. Within two days we had over 40 responses and the manifesto had been translated into 25 different languages. The feedback was remarkable. The students said the exercise made them feel they belonged to the school and had been given an immediate investment in its ethos and future. The idea of translation was also taken into the
formal lessons of the students by colleagues in the department. (Freeman, Anderman, and Jensen 2007).

“…this is just to let you know that DBS students loved Manifesto translation exercise. They found all sort of ways to do it: the English speaking students used child’s voice, school French or street language and the students who have English as the second language worked on interpretation of the sentences as they quickly figured that it cannot be literal. I used the difficulty around the translation to explain how we write in a different voice than how we speak and how academic writing is developed similarly (they are submitting their first assignment next week so this was a timely exercise). It will also allowed me to situate them within this institution and speak about the community of practice – lovely.” (Milic, 2018)

3.2 Becoming visible (变得可见)

“To hear each other (the sound of different voices), to listen to one another, is an exercise in recognition. It also ensures that no student remains invisible…” (hooks, 1994, p. 41)

Below is a sample of responses given by the students when they sent in their translations to me. These and the face-to-face conversations I had with numerous students made me aware of the importance of visibly showing new students that they are welcomed at their new university (Freeman, Anderman & Jensen, 2007). Translating the manifesto helped with enabling the students to feel actively connected to the department and started to help them to feel they belonged in and with the college. It also shows that it had made them think deeply about acts of translation (Field & Morgan-Klein, 2010).

- “I have translated the rest of the “We Believe” into Chinese and make some changes on the manifesto I translated last week. They are not perfect, but I hope it helps.” (Helen 2018)
- “I've translated to Portuguese (from Portugal, not Brazilian...). I am not 100% sure about one of the sentences, I wrote in the doc which one it was and why the uncertainty. Hope it helps!” (Benedita 2018)
- “Please find attached the Arabic translation of the Design School Manifesto. I see it as a work-in-progress as I feel like interpretation of text is always subjective. Please keep me posted on any communication regarding the working design group. I’m still very interested in being part of it.” (Yasmeen 2018)
- “…please find the translated table, there are some phrases that don’t fully satisfy me, I might need another Italian person to compare the translations. It’s very hard to translate while trying to keep it consistent and readable.” (Pietro)
- “I translated it into Polish. I did it to my best knowledge and qualification but I am not a translator so I hope it’s all correct and carries the meaning :)
  (Dominika)
We now have over 40 different languages translations, translated by 60 students and staff at our university. We have started to translate the manifesto into Sign Languages and Braille. The student group, Lost and Found in Translators (LaFiTers), are recording these translations into sound and video works to be put on social media platforms like Instagram. These recordings (Audio Lost In Translations, 2019), have developed into students talking about their own cultures and ideas of serotypes (Osborne, 2007).

3.3 Becoming collaborative (Stát se Spolupráce)

“Something in the world forces us to think. This something is an object not of recognition but of a fundamental encounter.’ (Deleuze, 1997, p 139)

From this initial flurry of activity, a group of students and staff at our university was formed (the LaFiTers). We decided our terms of reference were to explore ideas of; social inclusion (Cameron, 1992), social justice, (Smyth, 2011), culture shock and belonging (Burke & McManus, 2009) and transitions (Sabri, 2014). These would be through ideas of what it means to translate something from one state to another and to be in transition.

![Figure 8. Drawing by the LaFiTs group showing how the Manifesto could be translated and developed. London College of Communication, UAL. (2018)](image)

The students in the group have creatively and gainfully fused written, oral, visual languages, to create new kinds of thinking about the manifesto, with and for our multicultural students.
at our university (Healey, Flint and Harrington, 2014). From our first meeting the students came up with a set of initial ideas,

“... to film or to record students and other people that are involved in the school. The results would be then put as an Instagram story on the university account. This medium reaches a great amount of people that are somehow involved with the school.” (LaFiTers, 2018)

3.4 Becoming critical (Att bli kritisk)

“The point is rather to elaborate the theoretical, critical, and textual means by which translation can be studied and practiced as a locus of difference, instead of the homogeneity that widely characterizes it today.” (Venuti, 2004, p. 42)

Inclusivity and critical thinking are central to this project as its aim was to give a sense of belonging and ownership to the students at our university (Freire, 1990, hooks, 1993). After the initial translations were completed, criticisms emerged and were voiced by the students in the group. There were a number of critiques of the manifesto, the students saw that it was about design, “...but as one of its principles is communication, some of the sentences were not clear and hard to understand.” (LiFiTers). They saw it as not being democratic, as it was made by tutors. Their solution was for the content of their audio/visual recordings to come from asking questions about the manifesto, to criticise it, to ask people to translate them on the spot, ask them about their culture, stereotypes. (Cowden & Singh, 2013)

3.3 Becoming inclusive (Incgho nsonye)

“I share as much as possible the need for critical thinkers to engage multiple locations, to address diverse standpoints, to allow us to gather knowledge fully and inclusively.” (hooks, 1994, p. 91)

They decided that they liked the act of recording and came up with the following ideas. To make a podcast that would consist in recording conversations. The recordings would be conducted by the people leading the projects. They would then take the material and find different topics within the conversation and make theme-based podcasts (Ibid). They came up with these set of questions and prompts.

- Does your language change your identity: who are you in English compared to you mother language?
- Any stereotypes? Ask people to tell what they think about x culture and then show to someone from the actual culture and see how they react and respond.
- What do you want to tell about your culture?
- What does the manifesto mean to you?
- Say “Hello how are you” in your language?
- Do you have an accent within your language, how complex is it?
• Ask someone to translate it – write down as you hear it – let someone else read it out loud.

“[A] few conversations about the manifestos were recorded to see what the effects would be and what kinds of answers we would have. ‘It turned out to be interesting while interviewing someone the surrounding friends wanted to be involved in the debate.”’ (LaFiTers, 2019)

One aim of this project was about the transition for our new students into the diverse communities at our university. To then help create a sense of belonging for all our students at all stages of their engagement with the institution. This includes all students who may feel ‘othered’ when entering Higher Education, whether that is to do with race, gender, sexual orientation, transgender, religion/belief or any other protected characteristics and including class (Equality Act, 2010). As Janey Hagger, Karen Scopa and Christabel Harley state in their chapter ‘The Art of Smooth Transition’ (Cited in Bhagat & O’Neil, 2011 p. 126).

“...the transition into the culture of HE was challenging for many, in the crucial first stages of study. The challenges experienced by students could be identified as those related to adjusting to the HE culture(s) and environment, (such as), Integration issues for mature students, Introduction to diverse languages and cultures, Awareness of different social and educational backgrounds.” (Ibid)

At this stage the project made us aware that the more students are involved in the conception and production of objects like our manifesto the more a sense of belonging starts to happen (Freeman, Anderman & Jensen, 2007). We also noticed that the very act of translation, which is a daily part of a lot of our student’s lives, became legitimised in a world that was communicated predominately in English. It became away to opening out the discussions about what the manifesto was trying to mean and how it could be reinterpreted through translation to be clearer and even more meaningful.

4. Becoming pedagogies (Fariĝante pedagogioj) a concluding becoming.

“We learn nothing from those who say: ‘Do as I do’. Our only teachers are those who tell us to ‘do with me’ and are able to emit signs to be developed in heterogeneity rather than propose gestures for us to reproduce.” (Deleuze, 1994 p. 23).

Pedagogy according to Gilles Deleuze (1997) amongst others, is not something that is “done to one” or “is done by one to others,”. It is something that one participates in, it should be a mode of co-construction, teaching and learning become fused, one is opened up to the future, and one is better able to question knowledge construction as such (Cole, 2016). This project continues to be collaborative, cooperative and contestable. Its aim is to create new concepts and new ways of thinking about inclusion and diversity. (Steventon, Cureton, and & Clouder, 2016). From this project a number of key concepts have created ‘lines of flight’ and made us think differently about the creation of such objects like our manifesto.

Figure 11. Participatory installation, Translation table(s) in the ‘Education in Progress Exhibition,’ Smith (2019) at LCC UAL, performed by Ingham et al. (2019)
4.1 Becoming language (تصبح لغة)

“Intralingual translation interprets linguistic signs by means of other signs of the same language (Derrida, 1985, p. 173).

We interrogated the use of the English language as a part of an ongoing colonisation of the world by its seemingly increasing domination of world languages (Cameron 1992, Phillipson 1992, Rihane 2018). Alison Crump (2014) argues for “...an emerging theoretical and analytical framework...” called LangCrit, or Critical Language and Race Theory. Crump “...urges language studies scholars, both within the field of English language teaching and beyond, to continue to look for ways in which race, racism, and radicalisation intersect with issues of language, belonging, and identity.” (Crump, 2014:1)

The Lost and Found in Translation project has opened up the idea that English itself is a colonising force. The project feeds into and supports the liberating and decolonising curricula project at our university (Panesar, Patel, & Jethnani, 2018). It continues to interrogate ideas of cultural Imperialism and linguistic imperialism. Robert Phillipson professor of international language studies, defines English linguistic imperialism as,

“...the dominance of English... asserted and maintained by the establishment and continuous reconstitution of structural and cultural inequalities between English and other languages.” (Phillipson, 1992:36).

English is often referred to as a global "lingua franca", but Phillipson argues that when its dominance leads to a linguicide, it can be more aptly titled a “lingua frankensteinia.’ (Ibid).

This project has put into question the dominance of English in UK art and design academic institutions. The paradox of English being a ‘common ground’ and common meeting place for all our students and at the same being a barrier to learning for some has not been lost on the students. It has put into focus the way language is privileged in some academic discourses and disciplines, yet is often not taught or discussed at any productive or significant level. Our hope is that this project has started to forefront the use of translation as a way of creating a better sense of belong for our students and to help in the way they learn. Our recent postgraduate show’s publicity included, for the first time, translations of a welcoming message from the university (LCC PG Shows, 2019).

“Translations can be creative. New pure regimes of signs are formed through transformation and translation.” (Deleuze & Guattari, 2005. p. 136)

This project has continued with two public expositions. One being in the exhibition Education in Progress (2019) (Figure. 11) and the other in the London Design Festival 2019. These both produced new translations and renewed interest in the project from incoming and continuing students, who have started to create visual translations of the manifesto (Figure. 11). Funding was received to, conceive, codesign and coproduce with students and a translation expert, Dr Emily Salines, an interactive work book that would include all the translations so far. This notebook with blank pages for further translations would have given
to all incoming students at the beginning of the 2020/19 academic year, September 2020. Due to the UK Lockdown this project has been turned into an online interactive project using the Instagram \textit{bla.bla.bla.translation}, in conjunction with a Padlet site Becoming Lost and Found in Translation at: \url{https://bit.ly/2Sgx8Fi}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure12.jpg}
\caption{Design School Manifesto being translated and redrawn on walls in a corridor at London College of Communication UAL during the London Design Festival created by Ingham et al. (2019a)}
\end{figure}

I believe that as Athelstan Suresh Canagarajah (1999), a Tamil-born Sri Lankan linguist, argues “The way forward is to promote the 'pluralistic identities and hybrid discourses' desired by (our) communities.” (p. 173). The power of language, both as a way of building shared communities, and as a colonising force will be explored more deeply in further iterations of this project. As in when bell hooks (1994, p.172) encourages her students to use the vernacular in her classes and to give students the space to translate form their own language, this project questions the ideologies of translation. It aims to deterritorialize translation’s flows (Deleuze & Guattari, 2005) so that the power of dominant languages to become colonising forces is contested, challenged and resisted. We want to create a resistance against the standard, to resist the major (ibid) and to become liberated in translation.
References


Ingham, M. et al. (2019 ). Participatory installation, Translation Table(s). *Education in Progress Exhibition*. Smith (2019) at LCC. Performed by students and staff from UAL.


Milic, N. (2018). University email correspondence from her to me.


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**About the Authors:**

**Mark Ingham:** I am a Reader in Critical and Nomadic Pedagogies and a UAL Senior Teaching Scholar. My research forms entangled encounters with: images of thought and memory, rhizomatic and meta-cognitive learning theories, fuzzy narratives and virtual and physical liminal teaching spaces.

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CULTURE (OF) REVOLUTION. Critical Thinking in fashion design education – New learning approaches for a systemic change in the fashion industry

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Abstract | While sustainability related issues are more pressing today than ever before, the global fashion industry is still one of the most resource hungry and harming industries for people and planet (Fashion Revolution, 2019). Designers’ work starts at the very beginning of the supply chain of products (Tischner & Charter, 2001) hence fashion design can have an enormous impact on sustainability in all stages in the lifecycle of clothes. Simultaneously, there is also an opportunity for designers to reinterpret the understanding of design and thus create a more sustainable and holistic approach (Ehrenfeld, 2016). However, in fashion design curricula in higher education in Germany, this is not visible. Therefore, a new set of competencies for sustainable thinking and acting, like Critical Thinking, is needed for fashion designers to be also incorporated in their education. Only then there is the potential to transform the fashion industry towards a systemic change.

KEYWORDS | CRITICAL THINKING, FASHION DESIGN EDUCATION, INTERDISCIPLINARY LEARNING, SUSTAINABLE DEVELOPMENT GOALS (SDGS), SYSTEMIC CHANGE
1. Introduction

Sustainability-related issues are more pressing today than ever before. We are exploiting resources of any kind beyond earth’s carrying capacity. And even if we will only use renewable energy and recycle all our resources in the future, we will face an increased use of resources yet alone due to the forecasted increase in global population. Therefor the United Nations have proclaimed 17 Sustainable Development Goals (SDGs) to be delivered within a “decade of action” also calling for action from businesses (United Nations 2019).

The fashion industry is one of the most resource hungry and polluting industries on the planet (Global Fashion Agenda, 2017; Obregon, 2012). It overwhelmingly promotes and “feeds an ever-accelerating consumption culture predicated upon a TAKE > MAKE >WASTE model” (Ellen MacArthur Foundation, 2020). Like other industries, it is far away from being a circular industry (Circularity Gap, 2020). When aiming to make a contribution to the SDGs by the fashion industry, besides the often-criticized supply chain, this also relates to the ways fashion items are designed and produced. In the fashion industry, designers are working at the beginning of the lifecycle of a garment, hence they have a great impact on the garment-related sustainability issues, including the respective supply chain (Fletcher, 2014; Charter & Tischner, 2001). As Tham (2008) succinctly puts it:

"Making good decisions already at the design stage makes cleaning up further along the line redundant." (Tham, 2008, p. 27)

According to Charter and Tischner (2001), at least 80% of a product’s subsequent social and environmental impacts are determined at the design stage. Fashion designers therefore can have an impact in every single step along the fashion and textile supply chain (Fletcher, 2014; Tham, 2008). Simultaneously, there is also an opportunity for designers to reinterpret the understanding of design and thus create a more sustainable approach (Ehrenfeld, 2016). Based on the current situation in the fashion industry with all its so-called “wicked problems” (Tulder, 2018), it is important to start at the origin of these problems in familiarizing future fashion designers with the possibilities of sustainable action within their studies and future careers. Fashion design education today must use its transformative role to move from a focus on aesthetics, optics and haptics demanded by individual target groups and the industry (Faerm, 2012) to include aspects of sustainability and responsibility (Edelkoort, 2016; Tham & Fletcher, 2019), digitalization and automation (Freyer, Noel & Rucki, 2008). Within this approach a new set of skills and competencies is needed not only of fashion designers but in education for fashion design. This discussion is also been developing on a global scale recently (Union of Concerned Researchers of Fashion, 2020). Whereas in Germany design research and design education research are relatively new fields of study (Joost et al., 2016; Jonas et al., 2016) and research in fashion design education is almost not visible in these movements (Banz, 2016).

The aim of this research is to derive a didactical proposal of learning approaches for an interdisciplinary course concept for sustainable fashion design to be developed for the
University of Applied Sciences in Berlin (HTW), Germany. Since the 2000s key competencies are discussed intensely in social sciences as a required framework for monitoring and assessing learners’ development (Arnold, 2008; de Haan, 2007) as well as in human resource development for measuring competencies for job profiles (Rosenstiel et al. 2017; Erpenbeck & Sauter, 2011). Competencies are abilities “to successfully meet complex demands in a particular context through the mobilization of psychosocial prerequisites (including cognitive and non-cognitive aspects)” (OECD, 2005, p. 4). Within this, various concepts of key competency frameworks for sustainability (de Haan, 2007; Wieck, Withycombe & Redman, 2011; Rieckmann, 2018) have been proposed over the last years. Key competencies are defined as overlying competencies with a broader focus, and not only for a specific context (Rychen & Salganik, 2005). Therefore, learning approaches within this proposal are based on key competencies for sustainable development referring to competency frameworks for Higher Education for Sustainable Development (HESD) (Wieck, Withycombe & Redman, 2011; Rychen & Salganik, 2005). In every framework Critical Thinking has an established and broad role. It is understood within different definitions, as a basic competency or even a key competency, and at the same time as a valid overlying teaching and learning approach for all learning movements (Chatfield, 2017; Wieck, Withycombe & Redman, 2011; Moon, 2008). Hence, a focus of the envisaged didactical proposal will be on the successful implementation of Critical Thinking.

2. Theoretical context

2.1. Learning approaches and key competencies for HESD

Learning approaches as defined within Education for Sustainable Development (ESD) and HESD are an overall objective rather than a defined body of information and knowledge (Hopkins, 2012). The UNESCO outlines:

“ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a justice society for present and future generations, while respecting cultural diversity. […] ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment. It achieves its purpose by transforming society.” (UNESCO, 2020)

Since the late 1990s and within the Bologna reform of Higher Education (United Nations, 2003), the discourse on education has shifted from an input orientation, focusing on lists of essential educational content, to an outcome-based competency approach (Giangrande et al. 2019; Wieck, Withycombe & Redman, 2011; Godemann, 2006). These outcomes include enabling people to engage effectively in this increasingly complex world and contribute to transforming its structures. Therefore Rieckmann et al. (2018) outline: “There is a general agreement within the international ESD discourse that the following key sustainability
competencies are of particular importance for thinking and acting in favor of sustainable development” (Rieckmann et al., 2018, p. 39):

Table 1. Competencies in HESD for sustainable development (relating to Rieckmann et al., 2018).

<table>
<thead>
<tr>
<th>Competency</th>
<th>Description</th>
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<tbody>
<tr>
<td>Systems thinking competency</td>
<td>Ability to recognize and understand relationships, analyze complex systems, deal with uncertainty</td>
</tr>
<tr>
<td>Anticipatory competency</td>
<td>Ability to understand and evaluate multiple futures – possible, probable and desirable - create one’s own visions for the future assess consequences of action</td>
</tr>
<tr>
<td>Normative competency</td>
<td>Ability to understand and reflect on norms and values that underline one’s actions and negotiate sustainable values, principles, goals and targets, in conflicts of interest</td>
</tr>
<tr>
<td>Strategic competency</td>
<td>Ability to collectively develop and implement innovative actions that further sustainability at the local level and afield</td>
</tr>
<tr>
<td>Collaboration competency</td>
<td>Ability to learn from others; understand and respect the needs, perspectives and actions of others (empathy); understand, relate to and be sensitive to others (empathic leadership),</td>
</tr>
<tr>
<td>Critical Thinking</td>
<td>Ability to question norms, practices and opinions, reflect on one’s own values, perceptions and action</td>
</tr>
<tr>
<td>Self-awareness competency</td>
<td>Ability to reflect on one’s own role in the local community and (global) society, continually evaluate and further motivate one’s actions, and deal with one’s feelings and desires</td>
</tr>
<tr>
<td>Integrated problem - solving</td>
<td>Overarching ability to apply different problem-solving frameworks to complex sustainability competency problems and develop viable, inclusive and equitable solution that promote sustainable development</td>
</tr>
</tbody>
</table>

Concerning the development of didactical-pedagogical concepts, this approach of teaching means it is less about “WHAT we teach and more about HOW we teach” (Howlett, 2016) to offer learning situations that enable these competencies to trigger the desired effects and reactions in learners (Howlett, 2016; Ehrenfeld, 2008; UNESCO, 2006). Accordingly, forms and fields of learning as well as methodological-conceptual approaches are needed that support a self-determined, active, but at the same time also reflexive and social learning. Previously, investigated learning approaches in ESD and HESD with a high value of interpersonal and personal action and reflection are:

- Social learning (see Bandura, 1971; Wals, 2010; Wals & Jickling, 2002)
- Collaborative learning (see Dillenbourg, 1999; Strijbos & De Laat 2010; Zhang Ayres & Chan, 2011)
- Interdisciplinary learning (see Rieckmann, 2016; Adomßent & Michelsen, 2014; Leal Filho et al., 2009)
- Participatory learning (see Reid et al., 2008; Tsien & Tsui, 2007)
• Transdisciplinary learning (see Rieckmann et al. 2018; Sipos et al., 2008; O’Sullivan, 1999; Wals, 2011)
• Project-based learning (see Kaliva, 2016; Gudjons, 2008)
• Critical Thinking (see Rieckmann et al., 2018; Wieck, Withycombe & Redman, 2011; Kruse, 2009; Moon, 2008)

This list is not intended to be exhaustive regarding general competency-promoting teaching concepts or forms of learning for sustainability. It leads to an approach which implies more ‘thinking’ before starting to create, which is also relevant for applied studies like design. This seems to be especially of interest when dealing with the wicked problems (Tulder, 2018) of sustainability. For students this also means that design solutions for the unsustainable practices within the fashion supply chain as discussed earlier, are not easy and fast to find. More time is needed here to think, discuss and reflect before going into prototyping and design processes (Pasricha & Landgren, 2011). Within that context Critical Thinking can foster to act critically in personal and interpersonal spaces, but also “to seek professional success, and to become a member of a smart society” (Halpern, 2014).

2.2 Critical Thinking

The necessity of Critical Thinking and the resulting reflexive action is clearly emphasized by Rychen (2008) as a competence for ESD and justifies this in the constantly changing requirements for learning in times of social and technical changes. However, there is no uniform definition for Critical Thinking (Moon, 2008) and it is discussed as a competency (Wieck, Withycombe & Redman, 2011; Chatfield, 2017; Kruse, 2009) as well as a learning method or learning process for sustainable development (Rieckmann et al., 2018) and responsible personality formation (Moon, 2008; Paul & Elder, 2003). The adjective critical implies not a negative (criticize) way of thinking, but a thinking thought out and carefully considered out of facts and not of own emotions, attitudes and biases. Critical Thinking is important not only for carrying out daily professional activities, but also for enabling people to raise reasonable, critical questions leading towards the best solutions (Paul & Elder, 2003). It supports being able to reflect on their own and other people’s activities, and for understanding the importance of their personal impact to the development of organization, society and the planet (Wieck, Withycombe & Redman, 2011; Scriven & Paul, 1987). The learning approach of Critical Thinking is highlighted in this research, because it is a competency which is being required of students not only in their personal and professional life but is also referred to ESD and HESD as a key competency (Rychen, 2005) and as a basic competency (Wieck, Withycombe & Redman, 2011) for sustainable thinking and acting in the reviewed competence frameworks in this research. This paper will give an overview of didactical approaches and within that the competencies needed to implement sustainability in the fashion industry for a systemically change.
3. Methodology

The research presented in this paper is based on a preliminary qualitative analysis of five curricula for Bachelor (B.A.) Fashion Design to generate a first overview concerning the status of sustainability. By 2019, fashion design can be studied in Germany at eleven public institutes for higher education. Within this research, the five analyzed curricula are the ones who are publicly displayed by the respective institutions (HTW Berlin, 2015; UdK Berlin, 2013; HAW Hamburg, 2011; HS Trier, 2013; HS Weissensee, 2012). The selection of the curricula from these institutions of the preliminary analysis was based on an internet research and the available list of fashion design schools at the German associations of fashion designers (VDMD, 2020; German Fashion Council, 2020).

Table 2. Overview and main characteristics of the analyzed institutions.

<table>
<thead>
<tr>
<th></th>
<th>HTW Berlin</th>
<th>UdK Berlin</th>
<th>HAW Hamburg</th>
<th>HS Trier</th>
<th>HS Weissensee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established in</td>
<td>1994</td>
<td>1875</td>
<td>1905</td>
<td>1884</td>
<td>1946</td>
</tr>
<tr>
<td>University of</td>
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<tr>
<td>Applied Sciences</td>
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<td>x</td>
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<td>x</td>
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<tr>
<td>University of Arts</td>
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</tr>
<tr>
<td>Background</td>
<td>Engineering</td>
<td>Fine Arts</td>
<td>Engineering</td>
<td>Arts &amp; Crafts</td>
<td>Arts &amp; Crafts</td>
</tr>
<tr>
<td>Public University</td>
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<td>x</td>
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<tr>
<td>Focus of program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>B.A. Fashion Design</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>M.A. Fashion Design</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Semester of study</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Ø Students in 2019</td>
<td>59</td>
<td>31</td>
<td>36</td>
<td>N/A</td>
<td>14</td>
</tr>
</tbody>
</table>

The aim of the pre-analysis is to derive a first insight on the status quo of fashion design education in Germany concerning aspects of sustainability, especially ascertaining a competency-based approach for sustainability or topics related to that content in any module or course. The curricula as well as module manuals were analyzed by keywords and coding of sustainability related content like “sustainability”, within that sub-keywords like “sustainable design”, “sustainable textiles” or “circular design” as well as keywords like “social competency” regarding a deliberate competency-orientation of studies. Furthermore, after this a qualitative literature review on ESD and HESD was conducted to derive relevant information on latest adequate requirements of learning for sustainable development (as proclaimed by the SDGs) concerning relevant learning approaches and underlying competencies for the to be developed course concept. The literature review is supposed to identify learning methods and approaches for sustainable development in ESD and HESD and learning approaches and application for Critical Thinking in ESD and HESD.
4. Findings

4.1. Sustainability in fashion design curricula in Germany

A first sampling in the preliminary analysis shows: The category "competency" is either not mentioned in the prescriptive curriculum published (HAW, 2011), is defined only in the context of professional competency in a module manual (HS Weissensee, 2013, HTW Berlin, 2015) or is vaguely defined as “discussion competency” (HS Trier, 2013, p. 20). Only one institute mentioned “social competency” (UDK, 2013, p. 15) as a learning approach within “cooperation with partners”. Categories like “learning approaches” within “interdisciplinary”, “social” and “personal” competencies that could function as validation not only for “learning outcomes” as acquired of the Bologna Reform for Higher Education (see United Nations, 2003), but also as an aspired competency enhancement for students towards a sustainability approach, are only mentioned in one curriculum (UDK, 2013). Furthermore, sustainability-related categories (for example “sustainable thinking”, “sustainable materials”) were not found in four out of five analyzed documents. Only one mentioned “ecology” as a topic in a module about fibers and textiles, where as ecology was also addressed in a module referring to an own design project on collection development (HTW Berlin, 2018). Innovative strategies like “circular design”, although widely discussed in fashion research and the industry as a concept to approach fashion supply chains´ sustainability issues (Earley, 2017; EllenMacArthur Foundation, 2020) are not mentioned in any of the analyzed curricula. This relates to the assumed that the subject of fashion design is predominantly still mainly taught as the classical profession of an industrial designer as it was 20 years ago (see Obregon, 2012; Fletcher & Grose, 2012; Fletcher & Williams, 2013; Faerm, 2011). It is clearly highlighted in four out of five module manuals, that the modules are mostly oriented towards professional competency. The category of “Critical Thinking” as a competency or as a learning approach is not mentioned in any curricula. Triggered by the quest for sustainability, a holistic or systemic turn is demanded vigorously by international design researchers, not only in the profession of fashion designers and the industry, but also in education (Goldsworthy, Earley & Politowicz, 2019; Fletcher, 2014; Ehrenfeld, 2016). This need for a systemic change is not yet represented in fashion design education in the analyzed module manuals and curricula. Naturally, this preliminary analysis cannot reflect all learning and teaching scenarios of fashion design and instructors´ individual course plans or projects (HTW, 2019). But it can be summarized that on an organizational level sustainability in fashion design as well as the corresponding learning approaches and competencies for HESD are not base of any of the analyzed curricula so far.

4.2. Main areas of learning

When starting to engage, reflect and discuss deeply within the topics of sustainability, students firstly need a strong and expanded knowledge in terms of an Ecological Literacy as
Orr (1992) stated. To adapt this term to sustainable fashion education, students need not only knowledge in sustainable design strategies, materials and fibers, but also in sense of sustainable values and attitudes (Fletcher & Tham, 2016; Fletcher & Grose, 2012). This more holistic approach is guiding towards a “Sustainability Literacy” for fashion design (Ermer, 2019). Decision-making for designers and interventions of designers can only be integrative, future-oriented and sustainable, if the design strategies are thought through. This refers to the impact these decisions will have on other people and the environment, affected by or integrated within the respective supply chains (Fletcher, 2014; Fletcher & Tham, 2016). It orients towards a learning approach of social learning (Bandura, 1971; Wals, 2010; Wals & Jickling, 2002), that both characterizes and contributes to a learning system in which people learn from and with one another and “collectively become more capable of withstanding setbacks, of dealing with insecurity, complexity and risks” (Wals et al., 2009, p. 11). Social Design for example, “a design that attempts to fill the deficits of political commitment, to step into the gaps left by the state or government in its constant withdrawal from social responsibility for society, for its citizens” (Banz, 2016, p. 15), refers directly to these insecurities.

Accompanied by a disposition to learn to live with the uncertainty of the future under these circumstances, rather than to reduce uncertainties in pedagogical discourse there is seen a need to accept vagueness and emergence as essential properties of sustainability (Wals & Rodela, 2014; Kagawa & Selby, 2012). Seeing the aspects of a design process as several small different possible connected processes (e.g., choice of fiber, purpose, colors, production steps etc.) collaborative and interdisciplinary learning settings come to focus which also highlight especially personal and interpersonal competencies as important for students in future working situations (Sterling, 2011; Rieckmann et al, 2018). Collaborative learning is achieved within a joint development of a task (Zhang, Ayres & Chan, 2011). All group members contribute their own specific knowledge and skills equivalent at all stages of the work. These multi - stakeholder approaches (Tulder, 2018) are mostly benefitting when coping with the wicked problems, that can occur within non-sustainable situations. Hence, not only interdisciplinary learning, but a transdisciplinary learning (Rieckmann et al., 2018; O´ Sullivan, 1999) is required, that refers to all these different stakeholders along the supply chain, which means also farmers and textile workers as well as the consumers (“users”) of fashion. Since this also implies a project-based learning, it is a learning close to real life working scenarios (Kaliva, 2016; Gudjons, 2008). Fashion design students often are familiar with project-based learning typical for design thinking processes, but not in sustainability related contexts (Faerm, 2012). It is an action-oriented form of learning that is geared to the interests of the learners in terms of content. It offers them a social learning environment, in which they can work out problem solutions in a self-organized manner and realize them in the form of artefacts or concepts (Kaliva 2016, p. 12). Therefore, the aim for this didactical proposal for fashion design studies is to collect as many different equitable perspectives, information and skills as possible within envisaged learning processes (fig. 1):
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Within project-work the collaboration could be of academia and industry, but preferably also of different cultural, professional and personal backgrounds of students (Fletcher & Tham, 2019; Earley, 2017; Fletcher, 2014). For educational learning approaches this also means, learners should be able to take on different perspectives and thinking beyond their own disciplines, as well as including intercultural and international aspects in problem-solving approaches and decisions (Wals, 2010) for a "Sustainability as flourishing" (Ehrenfeld, 2016, p. 62).

The learning areas of the course concept refer to a multiple competency approach (see tab. 1). Critical Thinking has an established role in the various reviewed competency frameworks (Rieckmann et al., 2018; Wieck, Withycombe & Redman, 2011; Rychen & Salganik, 2005), within which it is understood as a basic competency or key competency and as a valid teaching and also a learning approach for HESD (Moon, 2008; Chatfield, 2017).

Table 3. Key competencies for HESD (Rieckmann et al., 2018) and learning areas for a course concept “Sustainable Textiles and Fashion Design” (HTW Berlin).

<table>
<thead>
<tr>
<th>Key Competencies (C.)</th>
<th>Learning areas of the course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inter-/transdisciplinary</td>
</tr>
<tr>
<td>Anticipatory C.</td>
<td>x</td>
</tr>
<tr>
<td>Strategic C.</td>
<td>x</td>
</tr>
<tr>
<td>Normative C.</td>
<td>x</td>
</tr>
<tr>
<td>Critical Thinking</td>
<td>x</td>
</tr>
<tr>
<td>Systems Thinking</td>
<td>x</td>
</tr>
<tr>
<td>Interpersonal C.</td>
<td>x</td>
</tr>
<tr>
<td>Intrapersonal C.</td>
<td>x</td>
</tr>
</tbody>
</table>
4.3. Topics of intervention and learning for fashion design

Based on the findings within the literature research for competency-based learning approaches in ESD and HESD relevant for the course concept, topics of interest are built along the single steps of the circular fashion supply chain (fig. 2). Today it is assumed (Ellen Macarthur Foundation, 2020; Nicoletti, 2018; Smith, Baille & Hattie, 2017) that the circular supply chain must replace the linear supply chain for a sustainable and resource saving approach in fashion (see Ellen Macarthur Foundation, 2020; Cradle to Cradle, 2020). The single phases of the circular supply chain are (fig. 2): design strategies, textiles and materials, production and manufacturing, distributing and sales, the use phase of products and the phase of discarding, recycling or prolonging the use phase through different kind of “second life” or “third life” concepts (for example upcycling or sharing).

Figure 2. Fashion Supply Chain and relating topics of intervention for the proposed course concept (simplified, own representation).
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Not only the topic of sustainable design strategies, but also all other proposed topics are in need for interdisciplinary discussion and work in class. For a holistic approach all topics are subject of discussion (Fletcher & Tham, 2019; Ermer, 2019; Hasling & Ræblid, 2018; Fletcher, 2014). In sense of a circular design approach, this supply chain can have multiple more and also different circles (Earley, 2016). For example, design a product for several uses or users to prolong the lifecycle of a product. At last, regarding the acclaimed systemic change of the fashion industry also the behavioral mindset, views, assumptions, and attitudes not only of designers, but also of users of fashion have to be taken into account for a critical discussion for new solutions in fashion design studies (Pasricha & Landgren, 2013).

5. Discussion

The first finding within the analysis of the five curricula for the Bachelor program fashion design showed that not one single institution has integrated sustainability-related topics in their curricula neither as relevant sustainability - related key competency nor as basic learning approaches towards HESD. Only in one curriculum it was referred directly to aspects of sustainability (HTW, 2018). Although this analysis cannot display the overall situation thoroughly, e.g., specialty Master programs were not observed within the analysis and extracurricular projects within sustainability related topics are not displayed, it gives a first insight into foundational studies. Furthermore, it can be stated, within comparison to fashion design education research in other European countries like Finland, Great Britain or Denmark, Germany is clearly lacking behind (Earley, 2017; Hasling & Ræblid, 2018; Aalto University, 2020).

The literature research showed, to start with Critical Thinking at the beginning of a course can help students to get out of the phase of helplessness (Ermer, 2019; Moon, 2008; Armstrong & LeHew, 2011), that can evolve naturally during project-work (Conner, 2012) and especially in regard to sustainability related topics (Ermer, 2019, Hasling & Ræbeld, 2018). However, it takes time to introduce and practice Critical Thinking and within a course concept for example for just one semester, as estimated for “Sustainable Textiles and Fashion Design” at HTW Berlin, there might be not enough time to process and practice this new and systemic way of thinking as to establish a new routine (Armstrong & LeHew, 2011; Paul & Elder, 2003). The integration of Critical Thinking in fashion design studies on a long term can be seen as a clear benefit not only for students’ personal development, but also for a sustainable future-orientation of their work. Thus, it is rather recommendable to integrate it in all design studies starting already within the first semester to get used to the specific way of thinking and reflecting. Simultaneously, students can get used to discussing design ideas more broadly within this interdisciplinary or transdisciplinary approach. They can learn to empathize with colleagues and different kind of stakeholders along the supply chain through these collaborative learning movements. Especially when diving deeper into the difficult sustainability-related topics of fashion, Critical Thinking can also offer students new...
ways of thinking into a very objective and factual view, to come from feeling into thinking and acting (Moon, 2008). The point here is not to change or improve the uncertainties, students are going through in their learning processes, but rather for them to accept and to adapt to these uncertain situations (Wals, 2013). At the same time, it is of importance that these educational spaces “should build a culture of learning awash with uncertainty and in which uncertainty provokes transformative yet precautionary commitment rather than paralysis” (Kagawa & Selby, 2010, p. 243).

6. Conclusions

It can be stated, although there already exist various reliable competency frameworks for HESD, that could support fashion design education to adapt the requirements sustainability asks for, the implementation into curricula is not yet accomplished. Thus, regarding movements towards the integration of the SDGs into the fashion supply chain, also fashion design education in Germany currently lacks behind. In reference to the “decade of action” (United Nations, 2020), an immediate need for action to integrate sustainability in the respective curricula is required. A systemic change of the fashion industry is without alternative and within the last few years the global fashion industry seems to have noticed. In Germany, there has been a rise of governmental and institutional coalitions recently to engage more in sustainability-related issues, e.g., towards a sustainable supply chain (Lieferkettengesetz, 2020) or to enable more transparency within the supply chain for users of fashion (Grüner Knopf, 2020). Within learning processes taking in all stakeholders around a product of fashion, a noticeable move not only towards the integration of sustainability in education, but also for the industry at large can be created. Therefore, next to the need for a competency-based education, a beneficial implication can also be seen by the authors in a much closer collaboration within transdisciplinary projects of organizations within industry and academia to move towards the successful integration of sustainability.

Competency-based frameworks for sustainable thinking and acting are valuable proposals that can offer a starting point for a new didactical focus of learning in fashion design education. A learning model integrating Critical Thinking as well as Sustainable Literacy, Collaborative and Social Learning and Inter- and Transdisciplinary Learning can support a holistic set of learning approaches for fashion designers that is not only beneficial on a professional and personal level, but also regarding a call for action for sustainability in fashion.
References


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Design as a methodological stance in interdisciplinary research

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Abstract | Design methods are increasingly used by multidisciplinary teams to tackle complex issues within the public sector through participatory approaches of codesign to gather information and create innovative solutions. However, can we categorize these projects as research projects or as design projects? These questions echoed following a multi/interdisciplinary research project (design, nursing and psychology) with the codesign of a tool for future nurses that was translated into the prototype of a portfolio fostering a reflexive nursing practice to improve patient safety competencies. However, diverging views of design research between these disciplines emerged and highlighted ambiguity regarding the operational nature of design, where focus is put on design practice rather than on its ability to produce knowledge. Considering this, it seems relevant to think that design research needs a clearer scientific positioning to be recognized by the healthcare sector before claiming to revolutionize it.

KEYWORDS | PUBLIC SECTOR, HEALTHCARE, INTERDISCIPLINARY RESEARCH, DESIGN RESEARCH, DESIGN METHODOLOGY
1. Introduction

Design research is still at its early stages and questions remain regarding its objectives, methodologies and impacts in knowledge creation and in knowledge application, especially in interdisciplinarity research projects. In other words, what is design research, how and why is it conducted within multidisciplinary contexts? Is the objective of design research to produce knowledge or to create products and services? To this extent, design research needs to be discussed and this discussion is particularly needed in interdisciplinary research where some confusion seems to remain as to the contribution of design in terms of knowledge production within the scientific research project.

Design as a research methodology can be understood as an active, situated and engaged project type research which some call project-grounded research where the design project is equivalent to the research field of social sciences, like action research, or to the laboratory of experimental sciences (Findeli, 2004). This is particularly true when design methods are used by multidisciplinary teams to tackle complex issues within the public sector through participatory approaches of co-design with stakeholders in order to gather information and to create innovative solutions (Bisson & Gagnon, 2005; Côté, Bélanger & Gagnon, 2017). In that sense, Sanders and Stappers (2008) remarkably illustrate the distinction between the use of design methods for a design project and its use for a research project. For instance, the end result in a design project usually takes the form of a product and/or a service unlike the ones pursued by a research project that are directed at the production of scientific knowledge relying on the thoroughness of the social sciences approaches (Bisson & Gagnon, 2005; Gagnon, Côté & Barré, 2012). More importantly, this distinction is significant because the scientific knowledge production is then clearly situated within the design research project where it can support informed decisions and actions.

However, these distinctions can sometimes be blurry in interdisciplinary research practices, especially when the research team members rely on different disciplinary epistemologies. Nevertheless, the validity of the different paradigms is to be accepted in order to produce knowledge for all disciplines involved in the research (Findeli & al., 2008; Morse & al., 2007. In Nimkulrat & al., 2020). These reflexions echoed following an interdisciplinary research project (design, nursing and psychology) aiming at a smoother transition from academic to professional contexts in nursing practices. The project was developed around the codesign of a tool for nurses that could be translated into the prototype of a portfolio fostering a reflexive nursing practice to improve competencies regarding patient safety (St-Germain & al., 2019; St-Germain & al., 2020). Misconceptions about the object of design research emerged within the research team and highlighted the misperceptions regarding what design research is really about and how to distinguish it from design practice. Hence, in this particular case, research and practice cultures are different: the healthcare field is dominated by a research paradigm relying on evidence-based practices (Chamberlain & Craig, 2017), whereas the design research field can be associated with research on design, through design or as (for) design (Frayling, 1993; 1999; 2015). Design research on design is
conducted from a historical or sociological perspective regarding design-related productions. This is perhaps the easiest way to get scientific recognition since the subject of the research concerns design culture interpretations which can simply be associated with an evidence-based practice paradigm. However, it is less easy to arbitrate between the other research approaches introduced by Frayling, research through and as design. Research through design is what Findeli (2004) claims to use within project-grounded research, which is situated in the research-creation perspective of Stévané & Lacasse (2013; 2018) and more broadly, to action research in social sciences. In that respect, design is used to study a research problem through the action’s context (i.e. design project) in order to identify contextualized interpretative elements that are otherwise difficult to obtain and then, contribute to the production of knowledge. Design as research is certainly the most controversial of design’s research approaches because it situates the creative process as the research itself, an epistemological stance that should be shared by the design research team from the onset to the extended research team in order to fully embrace the potential of multidisciplinary views. In this paper, we discuss issues and challenges associated with design research through a case study from a healthcare context involving a multidisciplinary team where misconceptions towards design research led to misunderstandings. Moreover, the paper illustrates the challenging conciliation of innovation through design within a project-grounded research paradigm (Findeli, 2004; Verganti, 2009; Gagnon & Côté, 2016a; Gagnon & Côté, 2016b). In other words, if this kind of design research strives to be recognized and transform the public sector, it still needs to better define and communicate its knowledge production within its proper epistemology and methodologies, especially in multi-interdisciplinary research settings like in the public healthcare system.

2. The INSÉPArable project

The Canadian healthcare system faces difficult challenges in relation to an excessive workload for medical staff and hospitals often ill-adapted to the changing realities of patients and caregivers. In fact, a large-scale survey with Canadian nurses (O’Brien-Pallas, Tomblin Murphy & al., 2005) and the work of Alderson (2010) highlighted the hardship and even the distress that nursing staff increasingly has to deal with in its workplace. However, it is the lack of workforce that is most concerning in Quebec (Canada) because it could imply that its healthcare services may have fewer nurses willing and/or able to work in these conditions resulting in a possible degradation of the quality of care. In other words, the tenuous nursing workforce combined to a more complex healthcare system (i.e. aging population, rising technology use and interdisciplinary work advocated by management) could lead to considerable and avoidable errors regarding patient security (MSSS, 2015). Therefore, how could nurses feel less tired, stressed, distracted and overworked in order to favour a patient safety culture guided by multifaceted bioethical values?
The INSÉPArable project stemmed from this context, where the French acronym can be broken down into: IN (infirmier/ère – i.e. nurses), SÉ (sécurité – i.e. security), PA (patient – i.e. patient) forming an inseparable unit for the elaboration of a tool; a reflexive portfolio for tomorrow’s nurses aiming at the consolidation of their patient safety competencies (St-Germain & al., 2019; St-Germain & al., 2020). This tool is intended as a support in patient safety training for nursing students and also for employed nurses who are looking to improve their competencies through continuous learning. Moreover, in Quebec, the professional order overlooking the nursing profession requires, from its working members, a professional continued education portfolio to maintain their skills as well as to ensure safe and high-quality caregiving (OIIQ, 2012). Currently, this portfolio is essentially used for an annual update of the hours its members devoted to continuing education and consequently, if they reached the minimum training required by the Quebec’s professional nurses order. However, according to St-Germain & al. (2019; 2020), the transformative power of the actual portfolio is limited in its actual form because it does not engage nurses in a reflexive approach where they are invited to reflect on changes in their practice following a training, nor does it support them in achieving real personal and professional development that would lead towards a more humanistic caring perspective and better partnership with patients and their family. Therefore, the INSÉPArable project aimed at bridging these gaps in the professional portfolio by endowing nurses with a tool that fosters knowledge acquisition and thrives to maintain patient security competencies no matter the management and environmental factors found in their workplace. This kind of professional portfolio would allow nurses to continuously acquire and update their competencies in order to develop a safe and sound practice from the outset as students, to practitioners in the healthcare system. The reflexive practice, based on the learners’ cognitive, functional, personal and relational as well as ethical skills (Chanel, 2013) and called for in the INSÉPArable project, should then enable nurses to have a better understanding of who they are as practitioners to ensure high quality care by meeting the patients’ needs adequately throughout their careers.

In order to elaborate this kind of professional portfolio, the INSÉPArable research project relied on a design research approach which was similar to Julier & Kimbell (2016) standpoint on how transdisciplinary design research could allow a socially oriented co-production of knowledge shaping and informing change. In that context, Julier & Kimbell (2016) argued that research guided by design could favour a mediation between the observed realities and the projected possibilities by documenting public issues through the study of ambiguous places and/or events in order to highlight the differences between improvement and innovation. Thus, the design approach in the INSÉPArable project was clearly developed as a methodological stance that was based on the study of the relationships between physical and emotional environments, of the nurses’ and patients’ experiences as well as of the issues related to security in order to explore possible solutions suitable for the public sector. In that way, the conclusions drawn from design research could be translated into new spaces, products, services and systems as well as into new users, organizations and contexts.
not only to improve the actual reality, but also to transform its material, virtual and organizational forms (Julier & Kimbell, 2016; Côté, Bélanger & Gagnon, 2017). This posture is quite close to the reflection of Stévance & Lacasse (2013) on research-creation as a space for dialogue and exchange between scientific research and creative practices based on applied discursive strategies. In other words, a research-creation project is a research approach established from or through a creative process resulting in a double dissemination: a creative production and a theoretical discourse (Stévance & Lacasse, 2013: 122). Thus, the INSÉPArable project planned to adopt a research-creation approach or, as Findeli (2004) defines it, a project-grounded research approach where the expected end-results were not only intended to take the form of a reflexive tool for nurses but also a contribution to scientific knowledge for public design in healthcare systems, especially regarding design’s input for reflexive nursing practices in their actual work environments.

3. The methodology

The INSÉPArable project, within a project-grounded research perspective, called for an inductive methodology that was translated into an ethnographic qualitative research which enabled the collection and analysis of data from the healthcare experiences of patients and nurses as well as to the documentation of the nurse’s work environment (spaces and tasks). In that respect, the methodological strategy was based on 4 types of data collection as well as the prototyping of the portfolio (Figure 1):
1. **Literature review and expert interviews** to understand the transition between academic and professional settings in the nurse’s training as well as the interdisciplinary relation between nursing and design disciplines in research projects. This first phase prepared the immersive data collection (observations and interviews) regarding the interactions between patients and nurses as well as the interactions between nurses and their work environment.

2. **Non-participatory and participatory observations** of the context and of the interactions within the context of care units were conducted to obtain in-depth information. Four observations were made in acute care units (general medicine) and six in long-term care units (rehabilitation). Moreover, the observations were planned to cover the different working shifts of the nurses (day, evening, night and weekend). In terms of non-participatory observations, the data collection was made through space mapping, objects and medical equipment inventories and human interactions recording within the care units. Furthermore, a second type of observation took place using a shadowing technique consisting of a participatory observation which allowed the researcher to follow a nurse during a 2 to 3-hour period and document his/her journey through spontaneous qualitative interviews, notes and sketches/photographs of the caregiving experience in context (*Figure 2*).
3. **Semi-structured qualitative interviews** of approximately 1 hour followed the shadowing activity among participating nurses and patients. A total of 20 qualitative interviews were completed in order to identify weaknesses and/or flaws in patient safety, incidents and/or accidents and perceptions of the caregiving experience as well as the healthcare environment (*Figure 2*).

4. **Codesign workshops** were introduced to validate the data collected through visual communications (i.e. personas, storyboards, etc.) and the design of a tool, the professional portfolio, with the intention to create a prototype. Carried out by the design team, the data analysis from the observations and interviews were conducted by 2 postgraduate students (one from nursing and one from design) as well as 2 design researchers to develop an initial prototype that evolved during the preparation of the final codesign workshop. Moreover, it should be noted that the design team interpreted most of the data to facilitate the development of the prototype and to integrate the material dimensions needed to situate the nursing practice and to understand the complexities and the interrelations with patients in the healthcare environment. During that time, the nursing team produced an interpretation of the data that focused only on the nurses’ experience that was not intended for the prototype development but for a theoretical construction of nursing practices. Therefore, two interpretations of the phenomenon were developed in parallel. The nursing team conceptualized one with a focus on the nurses’ experience as an iceberg/sphere model where the nurses’ work is sometimes visible (i.e. technical care, physical safety, etc.) and sometimes invisible (i.e. patient partnership, caring relationships with patients, etc.), the portfolio was then intended to help make visible the invisible part more consciously. The other interpretation was proposed by the design team and took the form of a portfolio prototype to be validated through a final codesign activity that brought together a wider audience of 16 participants from diverging backgrounds (nurses, healthcare managers and patients). The activity took the form of a 3-hour workshop accompanied by research assistants (postgraduate students from nursing and design) as well as facilitators (product design undergraduate students) who animated the codesign activities where participants tested the prototype and commented on its validity and on its relevance to nursing practice realities.

5. **Portfolio design iterations** were drawn from the first and second codesign workshops by 4 undergraduate product design students and two design postgraduate students under the supervision of the principal design researcher. These iterations were also punctuated by a few meetings with the nursing team to adequately integrate all of the data.
4. The results

In the pre-analysis stages of the research, design researchers created the first prototype with a design and a nursing research assistant who collected the data. This initial prototype was inspired by the idea of a compass indicating the course towards patient safety that emerged from the pre-analysis of the field data. As illustrated in Figure 3 centre, two main axes divide the compass; the vertical axis modulates the levels of awareness needed in nursing practice from little to considerable and the horizontal axis, the levels of empathy from functional to relational. Moreover, this first data synthesis also allowed the elaboration of an earlier version of the nurses’ and patients’ persona profiles. This initial prototype was then refined by the design team where the data analysis of all the interviews and observations allowed the production of nurses’ and patients’ experience summaries. Consequently, in the light of this more in-depth data analysis, illustrations of the healthcare work environment for nurses were created in the form of typical situations and personas encountered in the nursing practice. Thus, the prototype includes not only an improved version of the compass but also (Figure 3):

- 8 profile cards (4 nurse and 4 patient personas)
- 16 situation cards from caregiving experiences and work organization (simple, complicated and complex caregiving situations)
- 1 board for problematic and risky situations with solution proposals
- 1 notebook for nurses

Furthermore, the analysis of the nurse’s work contexts, tasks carried out as well as material and spatial realities of the units’ environment helped to acquire a better understanding of external factors pressuring their work (i.e. built environments and work organization).
Following the realization that patient safety far exceeded the nurse’s sole responsibility already occupied by numerous tasks, it felt important to shed light, through the portfolio, on the units’ physical and material environments as well as on the work organization issues that can affect patient safety. Finally, the analysis of the last codesign workshop clarified the usefulness of the tools included in the prototype which should be intended for nurses as training tools to foster reflexive practices regarding their work. In fact, the analysis of the discussion themes that took place during the final codesign activity made it clear that the portfolio could be beneficial in academic contexts as well as in continuing education activities. However, a number of questions were raised regarding its utility for nurses’ daily practice. For instance, some stakeholders mentioned the opportunity to use the portfolio as a managerial tool, but this questioned the original intent of the project concerning the objective related to fostering a reflexive nursing practice and the need for more data of that particular managerial context emerged, as well as the need to address it in order to improve the portfolio.

**Figure 3. The INSÉPArable design project prototype: an illustration of its tools**

**5. A priori, learnings and limits of the INSÉPArable project**

From a design perspective, the portfolio prototype in its actual version can be viewed as a materialized hypothesis which should be further tested in healthcare settings. On the one hand, the analysis of the last codesign workshop brought to light the need for iterations in
the portfolio’s actual form in order to be of use in its application as well as to present a
genuine solution to the raised issues that stemmed from the problematic. On the other
hand, the portfolio’s development conditions suggested a methodology review to better
define design’s contribution to knowledge production, to interrogate the interdisciplinary
context of the project and thus, to mitigate the research project’s results according to
respective disciplines. Finally, the dual objective of the project-grounded research (i.e.
design project and research project) can lead to some confusion regarding design’s
contribution to knowledge production, at least in this case. Moreover, it can be tricky for
less versed researchers in research-creation or project-grounded research to understand the
prototype as a situated knowledge production formalizing nursing practices as a
conceptualized comprehension similar to a theoretical model construction. In this sense,
references to the conceptualizing categories of Paillé and Mucchielli (2012) can be of use to
illustrate that the compass concept mobilized in the prototype development belonged to
this kind of categorization. Understandably, it may be tempting to consider the portfolio as a
finished design project, even in its prototype form, to be solely used as a tool for nurses.
Hence, the discussion will focus on these matters.

5.1. The design project’s limits and design’s contribution to knowledge production

The main limit of the approach used in the INSÉPArable project is associated with how the
final hypothesis (i.e. portfolio prototype) relates to the complexity of its objectives and of its
data collection. Given the needed resources and time required to produce the portfolio, the
first two prototypes were mainly based on the formalization of the nursing practice and
patient safety issues through a series of tools: a compass, patient and nurse profile cards
(persona) and problematic situation illustrations of work organization and healthcare
spaces. The project development did not focus on reflexive learning strategies, strategies
that could have helped further development of the portfolio through situational validations.
One workshop with nurses and patients was insufficient to validate such ambitious tools as
well as to support consequent and iterative design work. Ideally, discussions with a broader
set of stakeholders involved in the nurses’ work organization and environment should have
taken place in order to investigate more thoroughly patient safety issues. A better
understanding of training contexts could also have allowed greater achievement of the
primary objectives, even though the codesign workshops were positive in regard to their
application in training contexts. Nonetheless, validation tests should also be considered in
order to improve its understanding as well as to allow design adjustments. In short, the
analysis conducted by the design team allowed to identify problematic elements in nursing
practice through the combination of experiential and material data. So, beyond the patient-
nurse care relationship, the prototype illustrates how the work and spatial organization are
crucial external factors in patient safety issues. In other words, with regards to the data
collected and the limits associated with the research methodology, the prototype helped to
conceptualize the patient-nurse care experience partially, but enlighteningly.
5.2. A methodology tested through interdisciplinarity

The research question was initially situated in a nursing context while the methodology was mainly based on a project-grounded research approach (Findeli, 2004). The conjunction of these two approaches aimed at some form of innovation through its data collection and its participatory methods coming from codesign workshops. The prototype production as a research result should have brought novelty to the healthcare field, which is not accustomed to this type of formalization. Furthermore, the methodological stance implied a strong connection to a collaborative approach where the interdisciplinary work should have led to integrative knowledge production supporting the design project (Findeli & al., 2008). In this light, it seems important to address the challenging interdisciplinary work of the INSÉParable project. The research process of the project remained sequential and disciplinary putting interdisciplinarity to test mainly because traditional ways of working prevailed on both sides. On the one hand, the general research context was characterized by formal meetings, work in consecutive stages and analyses coming from disciplinary frameworks. On the other hand, a more iterative design approach combining qualitative analyses to visual representations as well as to spatial and material data was difficult to share between researchers from such different disciplines, resulting in an asymmetry in the analysis tools used by the research team. As Stévance and Lacasse (2018) point out, a research-creation project must favour a synergy among the researchers involved which is not always easy to create. Furthermore, Sanders and Stappers (2008) highlight «gaps» in interdisciplinary teams as symptoms of the expert mindset where each member then feels the need to defend his-her discipline to avoid misunderstanding or even, just to be heard.

It is, therefore, hardly surprising that joint analyses were difficult to obtain and that a research protocol better suited for this type of approach should have been conceived from the start in order to facilitate internal collaborations. Consequently, the knowledge production was generally accomplished in a disciplinary and independent manner (Table 1): the nursing team came up with the iceberg/sphere model concept, while the design team developed the compass concept.

Table 1. «Disciplinary integration in research» (In Nimkulrat & al., 2020, p.272)

<table>
<thead>
<tr>
<th></th>
<th>Multidisciplinary</th>
<th>Interdisciplinary</th>
<th>Transdisciplinary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of interaction</td>
<td>Team members cooperatively conduct research in parallel</td>
<td>Team members coordinate frequently and consistently throughout the project</td>
<td>Team members act, plan, and combine research as a collective</td>
</tr>
<tr>
<td>Problem definition</td>
<td>Usually guided by one disciplinary paradigm and often</td>
<td>Mutually developed by researchers from multiple disciplines</td>
<td>Transcends disciplinary boundaries; context-specific with multiple</td>
</tr>
<tr>
<td>Epistemology</td>
<td>Team members rely on disciplinary epistemology, but of differing paradigms.</td>
<td>Team members may rely on disciplinary epistemology, but must accept the validity of different paradigms.</td>
<td>Team members rely on a transcendent or common epistemology that reflects the nature of the problem.</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>Design research questions, methods and theory</td>
<td>Team members use traditional disciplinary approaches; research questions and scales are framed by the discipline that defined the problem.</td>
<td>Team members coordinate research design, questions, methods, and theory; temporal and spatial scales and conceptual frameworks are synchronized.</td>
<td>Team members develop new conceptual frameworks that transcend disciplinary boundaries; research design, questions, methods, and scales are collectively developed.</td>
</tr>
<tr>
<td>Knowledge generation</td>
<td>Knowledge created within disciplines, but conclusions may generate research questions that are applicable to other disciplines.</td>
<td>Knowledge created that may impact knowledge structures in all disciplines; conclusions generate new types of interdisciplinary research questions.</td>
<td>Knowledge restructured through the creation of new shared knowledge; conclusions drive new theoretical frameworks and areas of research.</td>
</tr>
<tr>
<td>Products</td>
<td>Disciplinary or summary of combined disciplinary findings for disciplinary journals.</td>
<td>Joint synthesis manuscripts; for interdisciplinary journals.</td>
<td>Joint synthesis manuscripts that transcend disciplinary orientations; for interdisciplinary journals.</td>
</tr>
</tbody>
</table>

Moreover, the iceberg/sphere model concept was mainly based on the nurses’ interviews whereas the compass concept attempted to integrate all the collected data. However, it seems important to emphasize that these two models have their own value and complementarity which deserve to be better articulated. Hence, the INSÉPArable project was generally conducted through expert, even disciplinary, approaches where interdisciplinarity turned out to be a challenge. Therefore, it would be more appropriate to qualify the project as based on a multidisciplinary approach, useful for nursing in one way and useful for design in another (Figure 4).
5.3. A dual purpose to discuss

This situation is certainly common to several projects which claim to be interdisciplinary, but this research project questions the mutual understanding of the research cultures specific to each discipline involved. The dual purpose of the design approach certainly brings its share of confusion precisely because the design project carried out (i.e. the portfolio prototype) offers potential applications which can limit the perception of its interpretative value as well as the scientific rigor on which its production is based. Moreover, it may also seem difficult to clearly distinguish the different design research approaches, their particularities and epistemological stances. Frayling (1993; 1999; 2015) was one of the first to point out the ambiguous nature of design research through a categorization (i.e. research on design, through design and as design). Thus, if the design research paradigm on design is easy to articulate as the production of knowledge on design, it is still difficult to award a contribution to knowledge production within the research-creation/project paradigm or through the design project as defined by Frayling (1993: 1999; 2015; Bisson & Gagnon, 2005; Findeli & al., 2008). Finally, the most contested approach is certainly where design, as a creative process, is considered research in itself (Frayling, 1993: 1999; 2015; Bisson & Gagnon, 2005). Consequently, it goes without saying that the design research team shares Frayling’s reservations towards design as research, whereas the design project should not be considered as scientific research per se. Therefore, as seen with Sanders and Stappers (2008) as well as with Kimbell and Julien (2016), it now seems clear that the chosen approach in the INSÉPArable project was based on a rigorous qualitative methodology leaning on Findeli’s (2004) project-grounded research model and on Stévance and Lacasse (2013; 2018) research-creation definition while using the conceptualized data collection methods for design research from Bisson & Gagnon (2005). To conclude, it is precisely this epistemological stance that should have been better defined and communicated within the
INSÉPArable project in order to avoid misunderstanding regarding design's contribution in knowledge production. The impression of operationalization and/or hegemony of design could have been avoided to make way for a real interdisciplinary collaboration with the objective of shedding light on knowledge creation and application for each and every discipline involved in the research. Lesson learned.

References


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Design for Fast Track Democracy.

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Abstract | This paper explores if and how mechanisms from economical and design strategies could be transferred into political structures to fasten up processes for representative democracies in order to react to matters like climate change in time. We filter and summarize helpful cases to transfer their success principles to representative democratic systems in Europe. This happens from an analytical and design research point of view. Concluding this paper, the insights are used to propose extensions for the current representative system with new approaches to tweak it to enable a faster and meaningful change, which is urgently needed against the backdrop of an increasing number of worldwide challenges.

KEYWORDS | DESIGN AS POLITICS, DESIGN AND DEMOCRACY, DESIGN STRATEGIES, CLIMATE CHANGE, REPRESENTATIVE DEMOCRACIES, DISRUPTION FOR CHANGE, TRANSDISCIPLINARITY
1. Introduction

Processes of the representative democracy are solid but at the same time often painfully slow. Change often takes a long negotiation process that is conducted between the different stakeholders of these processes. The results are often long-term outcome-focused plans including objectives, budgets, and measures. These plans are then implemented into the operative decision making and administration structures of the democratic system which is creating additional lag due to their bureaucratic logic. This makes sense for working out agreements in large scale long-term policy-making amongst different actors with different political agendas and diverging views and values where time is no critical factor.

When the rigid system of representative democracy is faced with wicked problems (Rittel, Webber, 1973) like the acceleration of digitalisation or the exponentiality of growing issues regarding climate change, fast decision-making to reach meaningful action seems almost impossible. Politicians appear hesitant in their reactions towards a seemingly overwhelming demand for change. With small steps, the giant system slowly moves towards a direction, but change is barely recognizable.

Challenges for the political actors are the multiple, diverging interests of citizens (cf. Mulder 2011), accompanied by the parallel fear of politicians to cause imminent societal divisions and growing tensions in society when change is happening too fast for those in economically weak situations and places.

There are the progressive actors, fighting for actions to defeat the multiple crisis (Brand, 2016), and pushing for significant change within the near future. And there are individuals and groups that are caught in the structures of the current system and are not able to transform easily or only with a tremendous financial effort towards sustainable action – like the farmers trapped in the conventional agriculture system.

In this tense situation, the question arises, how a transition phase can be developed by utilizing elements and mechanisms for acceleration to reach e.g. a zero-emission industry in Europe within the coming decade.

Coming back to the need for rapid change-making in representative democracies the central question of this paper is: what processes and principles of economy and design can be extracted to speed up sustainable and social change in representative democratic structures?

The approach of this paper is to extract mechanisms that can be used to extend and enhance the present structures of the representative democratic system with flexible, innovative approaches from the economical and design sector. This bears the potential to make the political system more agile and prepared for increasing complexity and societal divides.
We extract principles and tactics with potential for experimentation, providing new perspectives – always respecting the requirement and objective of a representative democracy to fulfill and moderate the demands of a heterogeneous, open and diverse society (cf. Putnam et al. 2001, cf. Sennett 2012).

We are aware that economical processes are faster, because the degree of freedom to come to a decision more quickly, is higher within commercial entities because fewer values and diverging interests need to be accounted for. We are aware that this paper describes the domains of economy and politics only in a broad outline. Additionally, we recognize that our perspective is written from a European centric perspective and therefore also from a privileged point of view.

2. Design of Democracy

When reflecting on the model of Manzini/Margolin (2016) named “Design of, for, in and as Democracy” this paper mainly focuses on a Design of Democracy, which aims at “improving democratic processes and the institutions on which democracy is built”. The other paradigms – the Design for, in and as Democracy – play an important role as well, because this paper explores worlds of interdisciplinary knowledge exchange (as) and asks how to revitalize democratic structures through experimentation, which allows for more stakeholders to participate and active citizens to be part of those mutual actions (for, in).

3. Strategy towards the Future – Don’t let the past shape the future

Our basic hypothesis is that current representative democratic systems underline and maintain the status quo, instead of looking at future opportunities. As a consequence, the current actions are only aligned towards a strategy based on the paradigms of the past. But it’s not the past that is going to save us from the current crisis, instead, it is the future. Today many people have future angst and lean towards a past that has created a lot of the problems of today. We should better give these people an idea of favorable futures to prevent further populist ingratiating. We have to shift our focus from re-action to action.

Even if lately actors in the political domain decided to make a big step towards the future, to tackle the next phase of technological development in Europe (e.g. the Decode research consortium\(^1\) or the Diem25 European Movement\(^2\)), we would like to give one example,

\(^1\) decodeproject.eu
\(^2\) diem25.org
which shows the lag with which the representative democratic system is acting when it comes to fast and decisive action:

In 2019 the French government offered a 5,5 billion US dollars fund for digitalization and innovation for their entrepreneurial scene (Dillet, 2019). After a year of talking about initiating a similar fund, the government of Germany is still in the planning phase of a “Future Fund” of 1,2 billion US Dollars (Sigmund et al, 2020). An example from the private sector in comparison: Between 2017 and 2019 the Japanese Softbank offered 200 billion US dollars in their so-called Vision Fund (Brien, 2019).

This demonstrates the disproportion between the determination to act (and the need for action) in the public sector on one, and the private sector on the other hand. This can also serve as an indicator for the difference in degree of optimism and faith when it comes to strategizing for future developments.

4. Think beyond the crisis

Thus, we claim a Politics of the Future that should act as a flexible, evolving and adaptive practice serving as a bridge towards new, alternative systems which will enrich the existing structures.

We propose the introduction and implementation of additional parallel structures that accompany and inform the traditional organization of democratic decision making. These structures would utilize the quality and potential of design as a way of thinking and focus on forward-looking action towards more sustainable and integrative scenarios for the future.

In order to create preferable futures (Hancock & Bezold, 1994; Dunne & Raby, 2013), we have to overcome our limited view of the status quo as one of crisis and challenge. We have to widen our view and set sight on the shores of a new system we imagine to be better for more people and the planet. We have to undertake the creative effort to integrate new and old, future and past against the background of opportunities created by new knowledge, new technologies and a rising motivation for change.

5. Design as translator between different disciplines

Within this approach, design has the ability not only to take on the role of an adaptive facilitator between disciplines, domains, and systems but can also work as a translator for languages and taxonomies of different systems and is able to organize the inter- and

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3 2017 93 billion and 2019 200 billion Euros
transdisciplinary processes due to its disciplinary openness and adaptability (Findeli et al., 2008).

Design as a discipline is able to dive into the terminology, habits, and frameworks of other disciplines (Park, 2010; Jonas, 2010). Through its openness it can adapt its methodology and processes to a certain context and mediate between different actors and “life-worlds” (cf. Brandes et al, 2009, cf. Joost et al, 2014). At the same time, it is capable of tackling multi-disciplinary challenges, which is relevant for an increasing number of issues that need to be considered. We want to use the power of design to translate and mediate between the economical and the political field and look through the lenses of design methods and business strategies towards politics, strengthening the approach towards an extendable representative political system.

6. Principles

As a first step towards a design-driven Politics of the Future, we have identified and formulated six principles. We use examples of economic strategies and design practice to illustrate these principles. We then come back to the initial question of “How to accelerate current democratic processes by applying these principles?”

[MINIATURISATION] Downsize the scope – Embrace experiments

Idea: Create a frame that is feasible to allow for quick and secure modelling and testing of possible solutions.

Strategic perspective with aspects from economy and design:

Building a Framework for experimentation and temporarily decoupling it from the existing system frame that has hindering regulatory paradigms.

Companies often test new systems or processes in a scaled-down version like a pilot plant or test-pilot a project with limited scope before scaling the system or implementing it company-wide. Risky or experimental solutions are often tested in safe environments or laboratory settings (sandboxes, testbeds). Successful test-pilots then have the power to generate great stories which make it easier to gain buy-in from investors, corporate sponsors or important stakeholders.

Example:

Eskilstuna, a Swedish industrial town of 65.000 inhabitants, is a leading role model in the circular economy. Based on the initiative of a group of local politicians they developed a visual, user-friendly system for recycling their daily garbage. Under the provision of free garbage bags in seven different colors, the citizens can establish an intuitive recycling system
at home. Through a visual detection system, the recycling facility automatically sorts the garbage and reaches a really high recycling rate.

But this is not the only systemic solution this Swedish town has implemented: They also initiated “Retuna” (retuna.se), the first worldwide recycling shopping center. Opened in 2015, by the Initiator Anna Bergström, the center has already reached break-even after three years. Owners of 14 shops can draw on the collection and storage, filled with donated secondhand goods of citizens. The shop owners are using the donated material to upcycle it into new products or for the repair of bikes or audio equipment (Wagner, 2017; Ammar, 2019; Stadter, 2020).

What did we learn for the Design of Democracy:
After testing an experimental framework which proved as working (as in the example of the Swedish town Eskilstuna) an up-and cross-scaling process could be the next step (cf. Schubert & Uğur Yavuz, 2020). After another iteration, a transfer to several similar sized towns in the same or other cultural contexts could take place, always planning for a phase of adaptation to the specific localities and their respective conditions. If scaling up on a regional level generates positive outcomes, the approved system could be scaled up on a national, European or international level. Thus, a higher impact will be created, and the adapted system will run more smoothly because it was iterated several times in a smaller scale before expanding it as a more standardized concept. The quality of design enables understanding and easy adoption of verified systems by making complex interconnections apprehensive through the use of designerly means like interfaces, blueprints or visual manuals.

[PARALLELISATION] Simulate zero gravity – create environments with less friction

Idea: Create parallel structures outside the existing ones to avoid bureaucratic friction.

Strategic perspective with aspects from economy and design:
To build parallel tracks outside of the institutional structures.

More and more companies found innovation units, collaborate with or act as venture capitalists, form (or participate in) incubators and accelerators to circumvent their own bureaucratic culture and procedures. They shift to funding initiatives round-per-round after successful results and proof-of-concepts instead of budgeting on a per-year basis. They scale promising projects fast and stop the failing ones early.

If we look at other areas where institutions are challenged by disruptive forces like the digital revolution, a growing number of private commercial institutions understand that their traditional top-down, plan-based, step-by-step way of working and controlling is not always
feasible when it comes to dealing with fundamental shifts in the way businesses operate and customers consume.

Example:
Organizations and companies like Google (e.g. Google Ventures, Google X) have spearheaded a whole new way of developing products and innovation initiatives by introducing new problem-solving and innovation strategies and added them to their existing portfolio of instruments. Many companies have built parallel tracks outside of their corporate structures (or only loosely associated with these) to short-cut their own bureaucracy, gain speed and flexibility when exploring new business and technology landscapes. BMW for example is involved in the car-sharing service Drive Now as is Mercedes in CarToGo. Cannibalizing their company’s traditional business model of selling cars would not have been this easy or even possible inside the company’s own structures. Today companies and products are often developed in “incubators” and scaled in “accelerators” without their origin companies intervening much in the decision making or business operations.

While observing that governments and municipalities initiate formats like think tanks, future labs, or citizen assemblies, the outcomes are not really recognizable due to the lack of scaled implementation. There is a need to integrate newly established structures and insights back into the “bigger system” in order to create a long-term impact.

What did we learn for the Design of Democracy:
When governments and municipalities have capacities to initiate parallel, innovative endeavours, a “back coupling” to the existing system is needed. The reconduction and refeeding of the insights is necessary to innovate for the bigger picture and create real impact. For a meaningful back coupling, designerly approaches like *infrastructuring* (Star & Ruhleder 1996, Ehn 2008) – combined with visual means – can support the integration.

[PROTOTYPING] Always-in-beta – Use iterative prototyping to find “market”-fit

Idea: Create a very basic solution that you then continuously improve with feedback from the target users or groups.

Strategic perspective with aspects from economy and design:
*Using Rapid Close Loop Learnings for problem-solving and continuous improvement of the beta-solution.*

Design thinking focuses on the iterative approach of testing assumptions and failing early while learning and improving the solution, service or product with each cycle. Innovation strategies like the *Lean Startup* idea focus on rapid iteration, solution-testing and continuous improvement cycles towards a scalable product-market-fit solution.
In the challenging race to new markets, start-ups around the world are abandoning traditional waterfall-processes in favor of agile product development methodologies and many organizations strive to implement innovation ecosystems utilizing a scaled-agile approach at enterprise level. Product-market fit is reached by following a quick test-based development process where mistakes are made early and cheap. Several interrelated issues are explored and coordinated in parallel while constantly synthesizing basic testable working solutions and prototypes. The insights and ideas from constantly testing and evaluating prototypes are then fed back into the process and continuously improve the solution with every cycle in consequence.

Example:
Tesla first tested their product – an “improvised” EV sports roadster (a remodeled lotus elise) – with a small target group of prosperous clients. By improving their expensive niche product step-by-step with less financial effort than if done for a mass market vehicle, Tesla learned everything they needed for the later scaling-up phase when targeting a broader mass market. What they learned in their small-scale project had tremendous impact when building huge production streets like the GigaFactory (Musk, 2006).

What did we learn for the Design of Democracy:
Many current administrative procedures are really painful and time-consuming experiences both for employees and for citizens. At the same time each administration unit provides an ideal testing ground for innovating bureaucratic procedures. Successfully tested innovations could then be applied on a much bigger scale.

Through integrating prototyping strategies into the development of services and processes a market fit is iterated step-by-step. Through constant improvements and adaptations to different contexts and user needs, the developed system is open and flexible. This principle could be transferred to new political agendas. Through an iterative “always-in-beta” status, agendas can span a range of diverging citizen’s living conditions and can react more easily to changing environmental and societal parameters.

When it comes to dealing with pressing complex issues like the climate crisis that have to be tackled immediately and with dedication – a wicked problem which cannot be addressed without accounting for its multi-dimensional, interrelational and fuzzy nature – one important approach is fast closed-loop learning, adoption and constant solution-modelling.

A learning system with the right feedback loops in place can continuously improve itself and offer new ways of working till the right fit with the changing context and its shifting paradigms is accomplished.
[ANTICIPATION] Anticipate futures – Make “bets on the future”

Idea: Look at current developments (like demographics in western countries or decreasing price and increasing capacity of micro-computers) and start building solutions based on your projections of these prospects.

Strategic perspective with aspects from economy and design: 
*Cost-curve analysis and Scenario Modelling.*

Strategies that use anticipation as their principle, focus on the future intersection of a business (in development) and a certain technological trend or dynamic trajectory (economies of scale, network effects, cloud computing, mass-adoption of certain behaviors). These strategies often include portfolios of multiple innovation initiatives, big bets as well as pipelines of ideas and flexible resource allocation frameworks.

Example:
When Netflix was a DVD rental business, they saw that prices for mobile bandwidth were coming down and smartphone distribution and bandwidth speed was accelerating. They figured that in the future people would be able to watch video content by streaming it on their mobile devices (cf. Oomen, 2020). After modelling this scenario, they decided that it might be smart to start building a platform around this anticipated business model. Had they ignored this or not tried to predict developments related to their industry this opportunity would have been a bigger threat to their existing business model than a new business opportunity.

Tesla’s success was based on one big bet that the cost of batteries would come down so fast that electric cars would become affordable to the masses. This could be demonstrated with a simple cost-curve analysis. But acting with dedication based on this model afforded a lot of courage.

What did we learn for the Design of Democracy:
Anticipating future developments like the development of prices (of batteries or solar panels for example) or demographics and courageously acting upon these projections gives us the opportunity to create better futures because we learn to anticipate them and act on the basis of various forward-looking models. We can avoid a purely reactive mode relying on data from past developments.

Design approaches for projecting and forecasting the future (Jonas, 2007; Hanock & Bezhold, 1994; Dunne & Raby, 2013) can enable courageous and forward-thinking concepts. It can enable political stakeholders to switch from a reactive to a proactive mode and position themselves as proactive drivers.
[NARRATION] Create powerful narratives – Focus on story and experience

Idea: In order to get buy-in for change you can leverage the power of story-telling and the intuitive human relationship with visual language to bridge imagination gaps and stop purely theoretical discussions.

Strategic perspective with aspects from design and economy:
*User Experience Design, Storyboarding and Narration Frameworks, Critical Design.*

Designing and implementing strategies for large organisations often involves a large amount of storytelling to get ideas across towards employees, stakeholders and customers. Persuasive narrative structures are used in presentations, marketing and pitches to bring ideas to life and convince stakeholders and decision makers to take action towards realizing the described and visualized scenario (Boudens et al 2019).

Example:
When AirBnB tried to imagine their service, their business model and their customer experience as one coherent system they asked a former animation artist (Pixar) to help them storyboard their room-sharing service (Akkawi, 2018).

What did we learn for the Design of Democracy:

By taking advantage of the immediacy and emotional quality of (visual) narratives you can make it easier for people to comprehend complex interrelations and to get them motivated for action and behavior change. This also works vice versa by creating dystopian narratives (using the critical design approach for example) that then show scenarios that could evolve when we do not act or act in non-sustainable ways. Effective storytelling can help to enable game-changing decision making (e.g. through movies like *An inconvenient truth* by Al Gore).

Storytelling puts information into a semantic, sequential and digestible order. Thus, it becomes efficient as it is now more comprehensible and recognizable. This tactic is not so often used in political discourses probably due to the fear of being recognized as unprofessional or superficial, but it sure would help to make political agendas better accessible to a broader public.

[HACKING] Hack the System – Create informal solutions & “make” politics

Idea: Learn from the example of hackers and subversive artists and improve the system by breaking it in ways that help to create better versions of it.

Strategic perspective with aspects of design and economy:
*Use re-framing techniques, mash-ups, up- and recycling, a tinkering mindset.*

Thinking of alternative uses for existing solutions and tinkering with combinations and re-
configurations is part of technology innovation and product development in smart organizations (3M for example “invented” the post-it accidentally when they found a “hacky” way to re-use one of their glues that had failed at the originally intended purpose). Having laboratories, cross-industry collaboration and open-source projects often leads to unintended successful innovations for corporations.

Example:
Developing smarter ways that short-cut or re-frame current systems, we might be better able to reach our goals and improve the system at the same time. If you make policies that increase the costs of driving cars within the city limits, you allow rich people to live out their convenient unsustainable lifestyle while forcing behavior change onto people with less income. But if you make the streets smaller and allow for more bicycle space (as it was implemented in Bogota or Brussels in Covid-19 times) you make it more painful for everyone to drive a car in the city – especially bigger cars – and at the same time you reward people for riding the bicycle in the city.

When the city of Copenhagen was planning to build their new waste-to-energy plant in the middle of their city to limit traffic and emissions from transportation they asked the architects to come up with a proposal that would help the citizens to perceive and experience the new power plant as an improvement in living quality rather than a necessary evil. The architects found a very bold mash-up solution by adding a skiing slope on top of the building allowing the citizens to use “their” energy plant for recreational activities (Murray, 2019). The re-framing of a utility building shows how powerful designing-out-of-the-box is when you have the courage to realize such projects.

What did we learn for the Design of Democracy:
The Copenhagen example shows that questioning the existing, enables new transformative thinking, imaginations and alternative realities describing a preferable future. When politics moves beyond a reactive mode, it is also possible to think and act beyond the existing and learn how to add, alter and combine existing solutions into something new.

7. Conclusion
From a design research point of view, this paper addresses new ideas and perspectives for the extension and improvement of representative democratic systems by borrowing from other domains like economic strategies. We extracted and condensed several principles to be utilized for acceleration and creative problem solving. These principles can be applied as stand-alone approaches or be combined as a strategy. Decoupling processes from existing frameworks offers the advantage to think and make in new ways. The challenge lies within the re-integration of new models and approaches into the existing system. It is this translation procedure that calls for further research and investigation.
Maybe there could be some overarching, interdisciplinary political entity as a horizontal
interface in between the different departments with the objective to address such issues of synchronization, scaling and implementation. The key benefit from the dialectic working of traditional representative democratic processes on the one hand and innovation strategies on the other hand combined in one approach, for a faster and more agile change-making agenda, would be that the democratic system itself could become more resilient during times of crisis. Looking back to the described need for new approaches in design of democracy (Manzini & Margolin, 2016), this paper describes pragmatic and supplementary approaches for finding ways of addressing complexity.

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Disrupting governance by Systemic Design and co-creating the public value

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Abstract | Massive transformations characterize our current era at a multidimensional level, and our governments worldwide are facing the urgency to translate this complexity into a manageable common strategy. Strong synergies and cooperation on a quadruple-helix model are identified as primary conditions to build value for society. In that view, systemic perspectives and participatory methodologies - which Systemic Design combines - can trigger innovative processes of sharing knowledge and experiences among different stakeholders and can build innovation in the public sector. This paper investigates how Systemic Design methodology can be used for a governance “paradigm shift” for value creation, on a long term perspective. Such a method opens the way to a more adaptive and co-creative innovation in policy-design processes, by exploring new ways and tools provided by design, which enable broader and collaborative access to public governance. Applying a systemic perspective into those strategies means to favor a type of governance, whose outcomes are iterative and autopoietic, creating endurable public value.

KEYWORDS | SYSTEMIC DESIGN, POLICY-MAKING, CO-DESIGN, GOVERNANCE, VALUE CREATION
1. Introduction

Massive transformations characterize our current era at a multidimensional level. From the environment and climate change to market instability, towards waste pollution and enormous production, these are just a few examples of the complexity and “wickedness” of nowadays. Such trivial and interconnected phenomena cannot be solved with the traditional linear and analytical method of problem-solving, but they call for a radical shift in policy regulation around the world.

Even if there is an increasing acknowledgement of the systemic nature of global challenges, however, it is still a significant challenge for the different governments worldwide to translate this complexity into a manageable common strategy to address present and future transitions (EEA, 2019). Such wicked scenarios are often promoted and reinforced by a linear model of governance, which encloses problems into “silos”, and limits the understanding of the bigger picture (Head and Alford, 2015).

The need for quick response has brought to a “reactive policy-making” that contrasts with a model based on the generation of value in the public sector, which inevitably requires a long-term perspective. Moreover, this bureaucratic model rejects external views on topics and policies which are often generated “behind closed doors”, favoring a perceived sense of opaqueness from the outside and minimizing people participation. For this reason, there is an urgent need to disrupt these silos and to shift towards a more adaptive and collaborative policy framework.

Such system transitions in governance disrupt the established investments, jobs, behaviors, knowledge and values. The aim is to constraint governments to impose policy instruments that are consistent with long-term environmental goals, as Sustainable Development Goals. On that long-term perspective, how to build value in governance? It is necessary to change the conception of “value creation”, which is used and abused in our current economy, and which is mostly absent in the public sector (Mazzucato, 2018). In that view, the first condition to reach sustainable development is to build strong synergies and cooperation between the socio-economic components of the system. By providing a common understanding of complex problems and sharing responsibilities to cope with change, participatory approaches enable adaptive governance and resilient systems.

To approach such complex relations in governance and their wickedness, we need systemic and interconnected solutions (Brown T., 2011). In the last decade, Systems Thinking has provided practical approaches for raising social awareness about interconnected societal complex systems (Jones, 2018) and Systemic Design has shown the means and knowledge to navigate these wicked scenarios aiming to maximize the value of government.

Design practices like participatory design and co-design (Bødker & Grønbæk, 1991; Manzini & Rizzo, 2011) are born from this approach, and they all share a systemic perspective (Bødker, 1987). This one has been instrumental in the definition of a new role of design
inside complex social systems and set up the bases for social innovation as a space for design thinking and research (Jones, 2014). Design for policymaking has opened the space for design practices to be involved in the construction of policies addressing designers’ skills and knowledge towards higher goals like sustainable behaviors and development (Kimbell, 2015). These practices have been vital in the development of the discipline and have helped designers to move from the production sphere, leading them to become significant actors of social transformations (Buchanann, 1992).

From that view arises Systemic Design, which approaches and tackles problems on a systemic and complex level through the creation of strong and synergic linkages among all the stakeholders involved. This co-creation process favors and reinforces the socio-economic systems connected, on a long-time perspective. Nevertheless, we must acknowledge that design is not yet “completely” inside the governance culture, even if there are examples around the globe of design-gov cooperation through the so-called “innovation labs”.

This paper aims to explore the Systemic Design methodology for a governance “paradigm shift” towards collaboratives approaches for value creation. Such methods in policy-design processes explore new ways and tools of an adaptive and co-creative innovation. This opens doors for everyone to access public governance, while directly and effectively responding to people’s needs and governments future trajectories.

The paper is structured as follows. In the first section, the research frames the understanding of the wicked problems’ nature in the public sectors. The following section introduces the main challenges that our current governments are facing when approaching today's challenges. It reflects the importance of participatory approaches, on which design leverages, to build innovation and create value for policymaking in the public sector. Finally, the discussion is narrowed, explaining how systemic design can unveil the hidden assets of a context underlining its strengths and threats in a policymaking scenario.

2. Wicked problems and current state of the art

The last century, our extractive society model has brought irreversible impacts on ecosystems at every scale. Such problems are associated with climate change, pollution, chronic diseases, unemployment, poverty and corruption. The interactions between them are classified as the so-called “wicked problems”. These, defined by Rittle and Webber (1973), are represented by their complexity, uncertainty, interdependence, and highly interconnected social-ecological systems. Later on, Martin (2009) reframed the wicked problems identifying them in four dimensions:

First, causal relationships are unclear and dynamic. Suggesting that the causes and effects of wicked problems are complicated to identify as their complexity makes them ambiguous. (Roberts, 2000). This uncertainty can also be considered political in a public sector context when it is overseen in the causes and effects of such wickedness. For example, is climate
change a problem or just a manageable consequence of the quest for growth? (Bason, 2018). A current example of such a situation in 2020 where the wildfires in Australia: was the government more prepared on preventing them or into fixing the consequences?

Second, the problem does not fit into a known category. The wicked problems undertake interconnected and overlapping challenges, and characterized by cutting nature over several policy fields and levels of governance. This cross-cutting nature means they are embedded in other problems like economic development or environmental preservation (Weber, 2008), increasing the levels of uncertainty (Van Bueren, Klijn, and Koppenjan, 2003). This interpretation of the problem presents a significant limitation to the managing authorities as their notion of problem-solving is “evidence-based policy”, which intends that those policy decisions are based on reliable information of “what works”. (Bason, 2018)

Third, attempts at problem-solving change the problem. Such dimension is related to the linear approach on problem-solving and how the reactive nature of it has perpetuated the wicked problems over time. In the case of governance, this is reflected in the classic top-down dynamics where the inflexible system only allows “one-shots solutions” for potential ideas, plans, laws or initiatives. From that perspective, wicked problems require more iterative and nonlinear ways of addressing problems (Halse et al.; 2010).

Fourth, there is no stopping rule. As wicked problems cannot ever truly be solved, there are no criteria to know if they have ever been addressed, meaning they imply a no “stopping rule” (Rowe, 1987) (Ritchey, 2011). Such argument comes from the assumption that every solution proposed can always be upgraded and improved in an iterative process.

In that view, understanding the nature of wicked problems can allow us to comprehend the nature of the current issues on the governments which address such problems linearly.

3. Governance challenges and decision-making

The current system at the moment addresses problems into “solving” and “fixing” with reactive formulas and not considering that our complex situations are not something we can rationally analyze and ‘solve’ in predictable ways. The current practice of our governments to usually enclose problems into closed-off “silos”, limits the understanding of the bigger picture (Head and Alford, 2015), by generating a clash among policy planners and policy implementers (Bason, 2014). Indeed, environmental challenges are a perfect example of wicked and complex problems: ambiguous and unstructured, overlapping in their impact on different domains, not entirely and forever solved so this requires a continuous and iterative process of trying, learning and monitoring (Bason, 2018).

Indeed, in exposing the complexity, uncertainty and no-linearity of wicked problems make it clear that transitions towards particular sustainability outcomes cannot merely be planned and implemented. That means the public sector needs to comprehend the nature of wicked
problems to be able to generate systemic solutions towards long-term environmental and socio-economic goals. Moreover, to address increasingly globalized environmental challenges, active cooperation on a quadruple helix model (governments, industries, communities and research institutions) is needed. This introduces two key concepts of this paper, closely linked one to each other: on the one hand, the shift from “government” to the broader concept of “governance” and on the second hand, the practice of co-design in policymaking.

Firstly, with the term of “governance”, is intended “the totality of interactions in which government, other public bodies, private sector and civil society participate (in one way or another), aimed at solving public challenges or creating public opportunities” (Meuleman, 2008). Consequently, this implies the shift in the role of government: from acting as a pilot with the knowledge and tools to steer society towards sustainability, to act as an enabler of society-wide transformation processes (Bason, 2018). Such argument leads to the second concept of co-design. An appropriate definition of co-design methodology in policy-making delivered by Blomkamp E. (2018) who describes it as a design-led process, in which different kinds of people and knowledge cooperate in public problem-solving, guided by creative and participatory principles and tools.

It is a matter of fact that nowadays almost every government worldwide, especially in Europe, is facing the urgency to shift towards sustainability. In fact, the newborn European Green Deal (which aims to make Europe the first carbon-neutral continent by 2050), as well as the New Circular Economy Action Plans (which focuses on the use of sustainable resources, especially for high-impact sectors) and the broader and global SDGs, they all witness the willing to cooperate for a more sustainable future.

Nevertheless, the clash between wicked problems and traditional problem solving, together with the shift from government to governance represents a significant reframing of Europe's sustainability challenges and response options. Even if it is acknowledged an urgency shift towards sustainability, however, implications for public policy and institutions are mostly unexplored.

As pointed out by the European Environmental Agency (EEA) the complexity of sustainability transitions opens the way to additional governance challenges, especially in terms of directionality, coordination and the management of unexpected consequences.

Governments deliver the “Directionality” by defining visions, pathways and targets. Such action implies inevitably for an articulation of alternative futures and how to get there. Fundamental on that sense is specific normative choices, underlining the importance of public engagement and deliberation.

The different activities and the diversity of actors across sectors and scales of governance creates the need for coordination. Public institutions have a crucial role to play in ensuring horizontal coherence across policy areas, as well as vertical coherence between local, national and international levels.
Finally, new emerging issues implies a need for both analytical approaches (e.g. horizon scanning) and adaptive governance approaches, grounded in monitoring and learning, that enable the timely reorientation of transition processes. The table below presents the main governance challenges and how they relate to the characteristics of sustainability transitions.


<table>
<thead>
<tr>
<th>CHARACTERISTICS OF SUSTAINABILITY</th>
<th>GOVERNANCE IMPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multidimensional Changes in Socio-technical Systems</td>
<td>Policy mix approach that goes across environmental, industrial, sectoral (mobility, energy, food, housing), tax and educational policies. This is important to achieve horizontal policy coordination.</td>
</tr>
<tr>
<td>Multi-actor Multi-scalar Process</td>
<td>Multilevel governance allows top-down guidance and funding as well as local policy experimentation. Such polycentric governance involves flexible and self-organising activities by non-state actors.</td>
</tr>
<tr>
<td>Mission Orientated Targets</td>
<td>Indicators about the governance direction (e.g. through financial incentives, regulation, targets) and more specific indications about innovation pathways (through roadmaps and foresight exercises).</td>
</tr>
<tr>
<td>Disruption and System Reconfiguration</td>
<td>Stimulate sustainable innovations but also engage incumbents and potential losers (via compensation or reorientation policies).</td>
</tr>
<tr>
<td>Promoting Transformative Innovation and Experimentation</td>
<td>Portfolio approaches, project-based learning and experimentation, especially with radical innovations (social, technical, business models)</td>
</tr>
<tr>
<td>Risks, Unintended Consequences and Adaptive Governance</td>
<td>Monitoring and adaptive governance, to ensure directional flexibility and address side-effects.</td>
</tr>
<tr>
<td>Urgency and Acceleration</td>
<td>More robust innovation and diffusion policies. Phase-out and innovation policies (through bans or stronger environmental regulations).</td>
</tr>
</tbody>
</table>

Nowadays, despite the significant investments of money and resources in tackling our current major challenges, it seems that most of them are just superficially solved (e.g. plastic pollution). While these problems continue to be a source of expenditure in the public policies agendas, new ones seem to emerge, increasing the pressure.
The aforementioned demonstrates again that wicked problems cannot be addressed as our institutions are used to - with a linear approach -, but it calls for a change in directionality - in a more systemic way -.

4. Co-creation for value creation

So how to address the wickedness in the current governance challenges?

Mostly the wickedness of our current scenario comes from the lack of value creation. On that view, value intends the wealth creation or the benefits that society obtains from the system - and vice versa -: provisioning services (e.g., food), education institutions, health and social care services, housing, social security, infrastructures, energy, water and waste system, regulating services (e.g., flood control,) and cultural services (e.g., recreation) (Cole and Parston, 2006). These categories of the public value are a way of measuring countries’ progress towards the achievement of societal goals - such as the Sustainable Development Goals -.

Through this paper, we aim to expose furthermore an idea of innovation in which public policy actively shapes and co-creates services that drive more sustainable and inclusive forms of welfare and growth in our current system (Jacobs et al; 2016). From that perspective, we intend co-creation as a collaborative design process among public sectors, private sectors, research institutions and civil society. In this scenario of collective policy design, all the actors involved, including citizens, are all intended as equal partners in design and delivery, and people are assets and not just subjects of policies (Sanders and Stappers, 2008; Gillinson et al., 2010).

Certainly, this type of model faces several barriers:

- **the current reactive policy-making** which is more focused on fixing the market failures and re-distributing wealth among other value-extraction activities (Mazzucato, 2016);
- **a siloed-shaped public bureaucracy** which rejects external views on topics and policies, minimizing people participation;
- **lacking consciousness**, public servants are not even aware that there is a different way to develop new approaches (Bason, 2014);
- **lack of tools and platform** to conduct co-creation in practice (workshop, toolboxes, innovation labs).

Nevertheless, it is crucial to underline that input from a diverse group of stakeholders is needed to effectively incorporate both social and ecological dynamics in environmental decision-making processes (Irvin and Stansbury, 2004; Reed, 2008). Indeed, by confronting their different sets of values and world-views, a much broader scenario is analysed from the beginning. More specifically, including different stakeholders can contribute to:
• **a deeper knowledge on different scales**, which has a central role in order to support adaptive governance and ecosystem-based management programs (Gadgil et al., 2003);
• assure higher quality and an **endurable decision making** towards environmental challenges (Millennium Ecosystem Assessment, 2005);
• **make the implementation processes smoother**, saving time and money on political wrangling (Pahl-Wostl and Hare, 2004).

Besides the benefits brought from a diverse stakeholder engagement, participatory and co-creative approaches reinforce other social aspects necessary to address wicked problems:

• the enhancement of social learning and capacity building;
• the increase of transparency by building trust;
• the mediation of power through cross-sector collaboration.

By providing a common understanding of complex problems and sharing responsibilities to cope with change, participatory approaches enable the first conditions to build adaptive governance and resilient systems.

5. **Systemic Design as leverage for policy-making and value creation**

As our system challenges have turned into more wicked, the design discipline on its problem-solving nature has broadened its approach to services and systems (Ceschin & Gaziulusoy, 2016), by extending to a wider network of actors and co-design practices. That evolution of the discipline has brought to a considerable growth of the policy design field.

On that view, there is an increasing amount of literature on design in policymaking, which examines the use of design approaches in policy making teams or “policy labs” (Kimbell, 2017). Nevertheless, to clearly understand the relevance of the design discipline in the policy field, Bason (2014) explains that design provides a diverse way of understanding policy problems. In his view, design is intended as a hybrid blend of research methods from different disciplines like anthropology, systems thinking, and data science, through cooperation among different stakeholders. Other authors like Christiansen and Bunt (2014) make a similar affirmation defining the usefulness of design to cut the distance between policy and implementation (Mintrom and Luetjens, 2016) (Hobday, Boddington, and Grantham, 2012).
For a Policy Design practice, it is imperative to address the before mentioned pressing issues on value creation in our system. Moreover, it requires to implement a method that allows the combination of technology, design, business and social organization. On that view, systemic perspectives and participatory methodologies can trigger an innovative process of sharing knowledge and experiences among the actors mentioned above. To tackle such wickedness globally means that “Systemic and interconnected problems need systemic and inter-connected solutions” (Brown and Wyatt, 2015). To address that among the design methodologies is the Systemic Design (SD) which approaches the complex phenomena on a systemic level through design tools. This expertise provides a method that is focused on the holistic analysis of territory, allowing the design discipline to serve as a mediator among technicians, economists, humanists, and others (Celaschi, et al; 2013), generating autopoietic open systems based on contextual values. Furthermore, this method merges human-centred design inside complex, multi-stakeholder systems (Jones, et al; 2018) which can highlight the potential opportunities for value creation, delivering new collaborative relations among the local actors and entities (Barbero & Fassio, 2011). Jones (2014) also underlined that SD combines designer skills such as research, reasoning methods and visualization practices, creating innovative reconfigurations for complex services and systems.

The capabilities of SD can serve effectively to the components of participatory co-design that Policy Design processes require. On that view, SD favours the visualization of opportunities for value creation, enhancing the active collaboration between stakeholders, and boosting locally-based value chains (Barbero, 2012). To understand its implementation in a policymaking scenario, it is furthered explained its 6 main steps (Battistoni et al., 2019):

- **Holistic Diagnosis (HD):** Composed by a desk and field research, which scopes out the system context on the economic, social and environmental perspectives, taking into account the flows of energy and matter;
- **Definition of problems and leverages for change:** taking the framework established by the HD, the system connections and patterns are examined to highlight the possibilities for value creation and threats that inhibit it in future scenarios. The challenges and opportunities are regarded as leverages for change from which the new system strategies can be defined and initiated;
- **Design the system:** A new system model is designed whose aim is to create value in an autopoietic way and tend to zero emissions by optimizing energy and material flows and by valorizing resources;
- **Outcomes Evaluation:** assessment of the environmental, economic and social advantages that comes from the new model of value creation (production);
- **Implementation:** the execution of the new designed system for the specific scenario, considering an estimation of the new business plan feasibility;
• **Results analysis and feedback:** assessing the executed system and unlocking more opportunities, to make the system autopoietic.

Through these steps, SD unveils the hidden value of the socio-economic assets of a territory, creating new valuable relations and synergic linkages, in a long time perspective. Indeed, design capabilities reveal more about the individual and their context and can encourage civil servants to unlock opportunities for an iterative creation of value on a contextual level.

Based on the previous, we suggest SD as a useful method to translate the political vision into executive actions (policies) through the integration of SD steps into the so called policy cycle (Birkland 2001; Raulik-Murphy & Cawood 2009; Hobday et al., 2012). In both the processes, stakeholders and their relationships cover a central role in the socio-technical system targeted for the policies implementation, and they both acknowledge the iterative nature of the process itself. In 2008, Knill & Tosun elucidated the five main steps that constitute a policy cycle, namely: 1. agenda setting, 2. policy formulation, 3. policy adoption, 4. implementation, and 5. evaluation. A policy cycle starts with the problems classification and the priority setting in the policy agenda. It follows a draft of the policy proposals which will be later assessed and implemented. Ultimately, policy impacts are measured, evaluated and reformulated iteratively. This means that the policy cycle is constant and infinite (Maffei et al., 2013), and subject to continuous improvements.

The table below shows which SD’s step can be integrated into each policy cycle step and its potential impact per phase.

<table>
<thead>
<tr>
<th>POLICY CYCLE STEPS</th>
<th>SYSTEMIC DESIGN STEPS</th>
<th>POTENTIAL IMPACT</th>
</tr>
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<tbody>
<tr>
<td>1. Agenda setting</td>
<td>1. Holistic diagnosis</td>
<td>HD highlights the hidden resources of a territory and helps police-officers in identifying more effective targets to address their policies, also leveraging on the criticalities and opportunities raised through the HD</td>
</tr>
<tr>
<td></td>
<td>2. Definition of problems as leverage for change</td>
<td></td>
</tr>
<tr>
<td>2. Policy formulation</td>
<td>3. Design the system</td>
<td>Based on the holistic review of policy strategies, SD supports the policy formulation by designing a new and more resilient system based on the local assets</td>
</tr>
<tr>
<td>3. Policy adoption</td>
<td>4. Outcomes evaluation</td>
<td>A jointly and broader feasibility evaluation is given taking into consideration the environmental, economic and social benefits, implying a governance foresight vision</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>4. Implementation</th>
<th>5. Implementation</th>
<th>SD supports the policy cycle in developing programs to execute short and long term policy plans for a local value creation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Evaluation</td>
<td>6. Results analysis and feedbacks</td>
<td>SD supports the assessment of the implemented system, by measuring its resilience under the economic, environmental and socio-technical lens</td>
</tr>
</tbody>
</table>

SD methodology has already some implementation cases, on a policy design level, in projects or regional initiatives. For example, the Design School of the Politecnico di Torino has experimented the methodology both in European projects (e.g., RETRACE Interreg Europe project and ProGIreg H2020 project) and collaborative studies with industries (e.g., Agrindustria Tecco s.r.l., Luigi Lavazza S.p.A., and Groupe Poult).

Even though design has still a long way to be recognised as a powerful means in a governmental environment, there are examples of innovation agencies worldwide that have similarities with the design approaches, at different governance levels. Among these:

- **MArs solution lab (social innovation lab):** Based in Canada, brings together governments, industry, non-governmental organizations, academia, and community to assess complex problems from the citizens’ view. They collaborate with multiple stakeholders to develop, prototype, and scale new solutions, and create opportunities to learn how to shift the system and local policies.

- **The Finnish Innovation Fund - Sitra (National Agency):** is a future-oriented organisation that promotes Finland’s competitiveness and the well-being of the Finnish people. It’s aimed at anticipating societal change, fostering innovative models and boosting business that aim at sustainable development. Sitra focuses and assesses the social change and their impacts on Finland’s policies.

- **OECD- Observatory of Public Sector Innovation (Intergovernmental Agency):** It is focused on assessing and reviewing examples and shared good practices of public sector innovation to deliver practical advice to governments on how to make innovations work.

These examples illustrate how the systemic approach is delivered in similar ways at different scales. Also, they prove there is ample room for SD to grow in the policy design field: by integrating it into governmental agencies, SD can have an impact on the policy at a micro and macro scale. These increasing practices aim to shift the role of public investment generating policy imperatives for governments seeking smart growth and wealth creation.
6. Limitations of the approach: challenges to establish a value creation model

Such approaches, as SD for the generation of policies towards value creation, deliver an extensive and holistic research background. Nevertheless, it is likely to point out some constraints related to the SD methodology which have been introduced at the research phase.

One of the main challenges on tailoring SD for different scenarios is the accessibility to database consultation. In the early research phase, this challenge is widespread as database platforms in each country have different units, language, and update status. In most cases, the critical point is to find an average amount of available data, to make a holistic diagnosis properly. Moreover, this process of quantitative and qualitative data collection, requires a robust cooperation between stakeholders and managing authorities, which is limited by the siloed-shaped bureaucracy, as previously explained.

Secondly, to approach policy design processes with SD, it is required a direct engagement with civil servants, industry, and community representatives which allows increasing awareness on local resources, opportunities, and challenges. Unfortunately, the bureaucratic cultural paradigm, strongly fixed into a top-down approach, limits cooperation among all the actors. That is why this is recognised as a critical point for SD to enable a quadruple helix approach, which is needed for adaptive governance.

To overcome such barriers, SD has a system visualization component that eases the decision-making process. This one delivers a broader perspective for all actors and allows more enriching feedback from all the participants. The idea is to stimulate participants in the policy design process to think holistically.

Lastly, another crucial factor is the time frame that managing authorities need to establish in a Policy Design process: in many cases there is a fixed period to execute specific actions for which a specific budget has been already defined. In that frame, SD has to come with actions that only serve on a current scenario and for an immediate change, which is not possible because policies have effects after several years the policies are released. For the same reason, SD effects are complicated to measure because they are designed on a long time perspective. This means that the impacts must be planned with a foresight vision on short, medium and long term views, in order to address the change and a broader value creation.

7. Conclusions

Today, to address the wickedness and the creation of public value, governments are focused on reaching targets such as the SDG by 2030. Even if those targets seem broad, governments’ efforts must address them with a sufficient directionality. Nevertheless, in the
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majority of the cases, policy servants can feel lost from the broadness of these concepts. Even if there is an increasing acknowledgement of the systemic nature of global challenges, however, our governments persist in using a linear approach to tackle those problems. It is still a significant challenge for the different governments worldwide to translate this complexity into a manageable common strategy to address present and future transitions (EEA, 2019).

As widely discussed in this paper, the first condition to reach sustainable development is to build strong synergies and cooperation between governments, institutions, businesses and citizens. In that view, this paper has discussed how collaborative policy design processes, developed among different stakeholders, are essential to move towards value creation in a long-term horizon: they enhance social learning and capacity building, they build trust, and mediate the power through cross-sector collaboration.

Systemic perspectives and participatory methodologies - which SD combines - can trigger innovative processes of sharing knowledge and experiences among different stakeholders and can build innovation in the public sector. Applying a systemic perspective into those strategies means to favour adaptive governance, whose outcomes are iterative and autopoietic, creating endurable public value.

Following this, SD can act as a mediator in those policy-design processes that address complex problems and deliver new solutions. Indeed, SD favours the visualization of opportunities for value creation, enhancing the active collaboration between stakeholders, and boosting locally-based value chains (Barbero, 2012). On that purpose, systemic design can unveil the hidden assets of a context as shown in projects and regional initiatives such as RETRACE Interreg Europe project, ProGIreg H2020 project and many collaborative studies with industries.

Nevertheless, we must recognize that systemic design is not yet “completely” inside the governance culture, even if there are examples around the globe of design-gov cooperation through the so-called “innovation labs”. These agencies are approaching the public value at different levels and, even if the number is gradually increasing, it currently amounts to 162 spread around the world (http://publicsector-map.designforeurope.eu/en/). However, these innovative experiments certainly require fundamental changes in our current governance and economic system works.

This momentum must not be missed, expertises such as SD need to be at the forefront of a governance culture to unlock the generation of new public value and public policies that create and shape a different economic future.
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Disruptive technologies and behavioural change: Design fiction as trigger for critical thinking.

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Abstract | Design research and practice are increasingly interested in critical theories and practices, especially when it comes to the use of disruptive technologies (i.e., wearables, artificial intelligence, etc.). These technologies can support users in changing behaviours towards societal issues (i.e., environmental sustainability, health, safety, etc.). This paper reflects on how Design Fiction discipline can trigger critical thinking toward the use of disruptive technologies, considering its societal and ethical values, for designers and researchers dealing with design for behavioural change topics. The case study of this paper shows the results of the workshop held with design researchers and aimed at developing the near-future scenarios for the technologies able to tackle behavioural change related to the specific societal challenge; this, supported by the use of several existing tools found in the literature. We will discuss and make some suggestions that emerged from the results of the new approaches for the design for behavioural change research and practice

KEYWORDS | DESIGN FICTION, CRITICAL THINKING, DESIGN FOR BEHAVIOURAL CHANGE, DISRUPTIVE TECHNOLOGIES
1. Introduction

“Our world is increasingly involved and engaged in complex […] debates and experiments. […] design researchers should adopt practices, methods and tools to reason about futures’ scenario relevant to nowadays debate.” (Grand and Wiedmer, 2010)

Building on this, the design and HCI community are increasing their interest in critical theories and practices, especially when it comes to disruptive technologies. These technologies are changing the way people behave, act, interact and think, they can be powerful tools to support the user in changing behaviours towards societal issues such as environmental sustainability, health, safety, etc.

In this paper, the authors analyse the current design for behavioural change research and practice and reflect on how Design Fiction can help designers and researchers trigger critical thinking when using disruptive technologies. Authors suggest that the Design Fiction approach might help designers and researchers be more critical toward the societal and ethical issues and the role of behaviour and technology. (Rapp, 2019) Design Fiction with its principles may indeed be, considered an alternative approach for behavioural change researches and practices. As Tanenbaum (2014) explains:

“Design fiction […] allow us to adopt a range of different intellectual commitments and values about the future and explore the consequences of those commitments […]”.

This paper describes the first findings and results of on-going doctoral research aimed at suggesting the new approaches for the design for behavioural change research and practice, based on design fiction principles as a way to trigger critical thinking regarding the ethical and societal issues when dealing with disruptive technology. To better understand the influence of design fiction on design for behavioural change research and practice, we set a workshop (case study), addressed to design researchers. During the workshop, we decided to evaluate several design tools aimed at developing envisioning future scenarios about the technological artefacts able to tackle the behavioural change, starting from the societal challenges while using design fiction-based approach.

Through this workshop, we observed and analysed the impact of design fiction principles, such as envisioning storytelling, and the influence of Science Fiction (SCI-FI) films on creating scenarios about the technologies able to tackle behavioural change.

In conclusion, we will summarize the results gathered from the workshop and discuss the further steps of the research.
2. A potential meeting for critical thinking

Innovation in the technology sector makes new technologies rapidly disrupt the previous one. The disruptive technologies may change entirely both how we use the technology and design artefacts able to influence human behaviour. Said so, the role of disruptive technologies considers a larger context, such as its impact on the individuals, society, and environment.

These technologies can motivate the user through engaging interaction modalities and forms that can reach the user in a non-intrusive way, but also as Goodwin (2008) explains:

“Any disruptive technology that enables entirely new behaviour can cause fundamental changes in how people see the world.”

When designing disruptive technologies, there is a high demand for ethical and societal issues. It is crucial to guide human behaviour ethically and sustainably and understand the impact of human behaviour and the use of technologies for the future.

Several tools have been designed with a purpose to help designers in creating technological artefacts able to tackle a behavioural change, such as Design for Sustainable Behaviour (Loughborough University), Design with Intent Tool (Brunel University), Behavioural Design Toolkit (Doblin & IIT University), Brains, Behaviour & Design Group toolkit, etc. By analysing them, we realized that these tools often draw upon the traditional design principles, suggesting the established strategies and solutions, rather than stimulating critical inquiry about the future behaviours and the impact of behaviour on the outer world. In regard, Ilstedt and Wangel (2014) explain:

“Sustainable lifestyles are today, however often depicted through a sacrifice-based cultural narrative […] These ideas, or expectations, about the future thus provide an opportunity for intervention.”

For this reason, we decided to introduce the critical practices, with a particular focus on design fiction as a way to reflect on design for behavioural change research and practice, and imagine the future of technologies. Rapp (2019) is proposing the design fiction as a possible alternative tool for designing for behavioural change:

“Design fictions […] could represent a tool for reasoning on how current behaviour change designs embed values, opportunities and threats […].”

Based on this ground, we introduce experimentation on how design fiction can trigger critical thinking in design for behavioural change research and practice dealing with technologies.
3. Case study

The experimentation object of this paper investigates the influence of design fiction principles, such as “what if?” scenarios, with a focus on the narrative dimension of design fiction and its potential to trigger critical thinking. The experimentation was carried out with nine participants actively involved in design research, six PhD students and two Research fellows, coming from different fields of design (smart materials, digital manufacturing technology, interaction, and experience design, industrial design, fashion for sustainability, cross-cultural teamwork in design-based learning). The objective of this experimentation was to produce a near-future scenario that describes the context, the role, and the shape of a technological artefact - considering its material properties and the experiences related to the interaction modalities, semantic, social, and ethical values - able to tackle the behavioural change. Here and after, we will introduce the method used in the experimentation and describe the activity (workshop).

3.1 Researching through the critical inquiry: Methodology

This workshop was founded on the use of the PPPP (Dunne and Raby, 2013) model, which stands for Present, Plausible, Possible, and Preferable future, and it aims at defining the different kinds of potential future. The reason for this choice was to facilitate the journey from the present to the preferable future in production of the near-future scenarios. For the experimentations, we created a fit on purpose format for which we assigned existing tools to different stages on the “P” scale. (see Fig. 1)

![Figure 1. Application and formatting the PPPP model according to the tools used in the experimentation.](image)

A format proposed in this workshop is a linear approach to designing, where the “present and plausible future” encompass the topic of the Societal Challenge, the human behaviour (Dwi Tool), and the setting of the design brief. Just after, comes the “What if?” zone that leads to the construction of the near-future scenario (preferable future). The participants were, indeed, asked to develop a near-future scenario (considered as intangible explorative
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artefact) to envision a “preferable future” in which the protagonists are the not-yet-existing technological artefacts.

Summarizing in one day workshop, we asked to develop a near-future scenario in a format of narrative story through stages organized within PPPP Model, by using the following support tools:

1. Present and Plausible stage: Explore the Societal Challenges Topics

For setting societal challenges topics, we took as a reference the Loughborough University research about the design for behavioural change as a driver for sustainable innovation: Environmental sustainability, Health and Wellbeing, and Safety. Table 1 below shows how we categorized the societal challenges in macro-topics and sub-topics within these.

<table>
<thead>
<tr>
<th>Macro topic</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental sustainability</td>
<td>Air pollution (1), Waste management (2), Energy saving and pollution (3), Water saving and pollution (4)</td>
</tr>
<tr>
<td>Health and Wellbeing</td>
<td>General health prevention (1), Worker’s health (2), Ageing (3)</td>
</tr>
<tr>
<td>Safety</td>
<td>General citizens safety (1), Cyber safety (2)</td>
</tr>
</tbody>
</table>

2. Present and Plausible stage: Analyse the behavioural matter (Design with Intent Tool)

The second element of the experimentation is the Design with Intent tool (DwI), found the most suitable for our experimentation, for creating the Design for Behavioural Change brief. We used it as a tool to help researchers describe the target Behaviours and strategies for influencing behavioural change. DwI tool is based on eight lenses and several patterns within each lens, proposing a different strategy for designing the products and services able to tackle the behavioural change. In our experimentation, we narrowed the selection of the lenses and patterns to five. (see Fig. 2)
Figure 2. Selection of five (5) DwI lenses with patterns for our experimentation.

We set the Cognitive, Perceptual, and Machiavellian lens as mandatory to use, or combine, while the use of the Ludic and Interactive lens was facultative. (see Table 2)

Table 2: Selection of the lenses in relation to their principles.

<table>
<thead>
<tr>
<th>Lens</th>
<th>Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive lens</td>
<td>Takes inputs from the behaviourist economy and cognitive psychology</td>
</tr>
<tr>
<td>Perceptual lens</td>
<td>Combines the concepts of gestalt psychology and product’s semantic</td>
</tr>
<tr>
<td>Machiavellian Lens</td>
<td>Proposes solutions based on the thought that “end justifies the means.”</td>
</tr>
<tr>
<td>Ludic lens</td>
<td>Proposes the strategies that can engage the user long in time.</td>
</tr>
<tr>
<td>Interactive lens</td>
<td>Uses the interaction modalities and interfaces to stimulate the user’s behaviour.</td>
</tr>
</tbody>
</table>

3. “What if zone?”: Exploring the fictional worlds (Tech Inspiration Cards - TICs)

This tool has a purpose to help participants in giving a shape to the technological artefacts, inspire on the not-yet-existing technologies and near-future worlds, within SCI-FI films. In specific, understand how diegetic prototypes are contextualized within the fictional historical, social, and political sphere, and as a consequence open a discussion and critical reflection about the disbeliefs and collective imaginary about the future, and inspire the imagination when it comes to exploration of the new forms, interactions, materials,
applications, and others, but also to take into consideration possible ethical and societal implications. For building this envisioning tool, we analysed which disruptive technologies will be the most suitable to tackle behavioural change in the next 15 years. As support, we used the Seealsology tool that collects data from the Web and classifies data on different levels. What emerged from this analysis is that disruptive technology appears in many different levels of application and forms, but taking into consideration our application, we realized that we could narrow the classification of disruptive technologies on four macro categories: Artificial Intelligence, Simulated Reality, Wearables, and Smart Materials.

According to these latest tendencies in the technological sphere, we started research for SCI-FI films that represent these technologies in the future. Data extracted in Seealsology were transformed into keywords and helped to the creation of the tool “TICs”: a selection of cards containing the film’s title, images, and plot. (Fig. 3)

**Figure 3. Tech inspiration cards: design fiction support tool for envisioning the near future technologies through the SCI-FI films.**

4. Preferable Future stage: Analyse the potential role of the technology (Fogg’s Triad) and production of the Scenario

At this stage, the participants started to reason about the not-yet-existing technological artefact. Firstly, the participants selected a disruptive technology to implement in the
artefact they want to design. Then, they reasoned on how this technology may influence human behaviour. To facilitate this phase, we introduced Fogg’s Functional Triad (2008), for defining and describing the role of technologies on three levels: technology as a Medium (provides the experience), technology as a Tool (can increase the capability), and technology as a Social Actor (creates the relationship). (see Fig.4)

![Figure 4. Fogg’s functional triad describing the role that technology can have in persuading the users.](image)

The Functional Triad was used just as a support tool here, after the TICs, to help the participants start reason on a not-yet-existing technology in a functional sense. They were not limited to this. The development of the scenario contextualizing the technological artefact had to contain the inputs from all the activities of the workshop.

3.2 Activity

The experimentation lasted one day, split into two sessions. The morning session was framed into three activities: (1) Selection and analysis of the Societal Challenges’ topic; (2) Use of the DwI tool for defining the behavioural issue and target behaviour; (3) Definition of the General brief. The afternoon session was framed into two main activities: (4) Take inspiration for technology from the SCI-FI films for identifying, and (5) imagine how these will evolve 15 years from now, in terms of applications, interaction modalities, aesthetics, etc. As a support tool to help in describing the potential of the technology to influence human behaviour, we provided Fogg’s functional triad. Here, we describe the outputs.
Group 1 selected the topic Cyber Safety, focusing on digital assistants - control and management of personal data. They identified a lack of awareness when dealing with these devices due to the poor comprehension of data. The results of the use of DwI tool and selection of the strategies are in the table below:

Table 2. Group 1 selection of the DwI lenses and patterns, and they purpose.

<table>
<thead>
<tr>
<th>DwI Lens</th>
<th>DwI Pattern</th>
<th>Target behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive</td>
<td>Tailoring, and Summary Feedback</td>
<td>(1) Inform the user about the relationships, activities and functions of the digital assistant, (2) Monitoring of the collected data, (3) Acting proactively toward the data collection, (4) Communicating with the assistant in an uncomfortable, intentional and unconventional way.</td>
</tr>
<tr>
<td>Perceptual</td>
<td>Metaphors, Possibility trees, and Transparency</td>
<td></td>
</tr>
<tr>
<td>Ludic lens</td>
<td>Unpredictable reinforcement</td>
<td></td>
</tr>
<tr>
<td>Machiavellian</td>
<td>Degrading performance</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the brief set by the participants, and how they explored the SCI-FI films and selected the technologies to use in their designs in regard.

Table 3: Relationship between the Brief – SCI-FI title – Selection of technology – Role of technology (Group 1).

<table>
<thead>
<tr>
<th>Brief</th>
<th>Selection of SCI-FI titles</th>
<th>Selection of technology</th>
<th>The role of technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design a solution able to increase the awareness and agency related to the use and expectations we have from digital assistants, where the concept of “tailoring metaphors” for data storage, and transparency concerning user - assistant.</td>
<td>“Her”, “The Entire History of You” and “Nodesive” (AI).</td>
<td>AI</td>
<td>Technology as a tool able to increase the capability of the user by improving the comprehension toward the use of device and management of personal data. Technology as a social actor because it aims at improving the communication between the user and the device.</td>
</tr>
</tbody>
</table>
Their scenario is about the personal assistant as a digital organism that expands regarding the users' needs. In the year 2035, data will become recognized as the property of the user, and he will be able to decide when and how much data to provide through different "metaphoric profiles" (i.e., relatives profile, secretary profile, partner profile), manipulated through different interaction modalities.

Group 2 selected the topic of health prevention related to eating habits and food quality, focusing on bad eating habits. The strategies and target behaviours defined through the use of DwI tool are represented in the table below.

**Table 4. Group 2 selection of the DwI lenses and patterns, and they purpose.**

<table>
<thead>
<tr>
<th>DwI Lens</th>
<th>DwI Pattern</th>
<th>Target behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>Habits, Emotional engagement, Personality, Scarcity</td>
<td>Eat earlier, Balance diet, Change the way of cooking,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foresting sociality, dimension of eating, cooking and sharing; Create good eating conditions.</td>
</tr>
<tr>
<td>Perceptual</td>
<td>Fake affordance, Mood, Nakedness</td>
<td></td>
</tr>
<tr>
<td>Machiavellian</td>
<td>Worry resolution, Serving suggestion</td>
<td></td>
</tr>
</tbody>
</table>

Table 5 shows the brief set by the participants, and how they explored the SCI-FI films and selected the technologies to use in their designs in regard.

**Table 5. Relationship between the Brief – SCI-FI title – Selection of technology – Role of technology (Group 2).**

<table>
<thead>
<tr>
<th>Brief</th>
<th>Selection of SCI-FI titles</th>
<th>Selection of technology</th>
<th>The role of technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design a technological product able to prevent the users from eating late in the evening and change their attitude toward healthy food through enriching the social dimension and suggest new cooking techniques.</td>
<td>“Little Joe” (olfactory stimulation technology) “Strange days”, “Arkangel”, and “Black Museum” (behaviour control and surveillance), “Her”, “Hang the DJ” (OS-human relationship and personalization), “Gattaca” (bioengineering technologies)</td>
<td>AI, Smart Materials, and Wearables</td>
<td>The technology is a medium because it provides the experience able to influence the positive attitude toward the healthy food. It has a role of a tool because it suggests a new technique for cooking. It has a social actor when it wants to enrich the social dimension.</td>
</tr>
</tbody>
</table>
This scenario is about a man, tired to cook in the evenings and needs to acquire healthy eating habits. At the moment he tries to reach a “fast food”, the item starts to look spoiled. At the same time, the “healthy choice” reminds John to eat healthily. The scenario describes some smart cooking tools that activate chemically and change the food properties; an automatic cooking machine and wearable able to track the health and user’s needs.

Group 3 started with the topic of Air pollution. They identified negative behaviour emerging on two levels: (1) the industries, waste management, and transportation, and (2) the use of chemicals at home. The table below shows how they used the DwI tool:

Table 6. Group 3 selection of the strategy for behavioural change and identifying of the target behaviour.

<table>
<thead>
<tr>
<th>DwI Lens</th>
<th>DwI Pattern</th>
<th>Target behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>Habits, Social proofs, Emotional engagements, Community and Consistency</td>
<td>Avoid misuse of chemicals in everyday life that harm health and pollute air.</td>
</tr>
<tr>
<td>Perceptual</td>
<td>Colour association, Fake affordance</td>
<td></td>
</tr>
</tbody>
</table>

Table 7 shows the brief set by the participants, and how they explored the SCI-FI films and selected the technologies to use in their designs in regard.

Table 7. Relationship between the Brief – SCI-FI title – Selection of technology – Role of technology (Group 3).

<table>
<thead>
<tr>
<th>Brief</th>
<th>Selection of SCI-FI titles</th>
<th>Selection of technology</th>
<th>The role of technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design a solution able to persuade people to use chemicals properly in everyday life.</td>
<td>“Existenz” (simulated reality, organic technologies and materials), “Hitchhiker guide to the galaxy” (materials and flexible technologies), “Her” (OS).</td>
<td>AI, Smart Materials, and Wearables</td>
<td>The technology is a medium because it has to provide the experience able to increase awareness toward the use of chemicals. It becomes a tool because it is supposed to enhance the human capability of surviving in a polluted world.</td>
</tr>
</tbody>
</table>
The scenario is about a polluted world where people need to wear protective equipment continuously. The rich people wear artificial skin suit while the poor people wear the DIY (Do It Yourself) equipment, made of living organisms stored in living organisms’ banks. Before going out, it is necessary to measure pollution. They wear the organic head accessorize that indicates the level of pollutants through the change of colour, a helmet for data collection, and a protective mask. These artefacts purify the air too.

4. Discussion

The experimentations provided useful insights for the research, and we were able to find out whether the tools we selected for the design of near-future scenarios were purposeful or not in trigger critical thinking. We evaluated this through (1) observation of the performance of each activity through pictures and notes, (2) analysis of delivered scenarios, (3) questionnaire submitted to participants. We realized that the participants got very engaged in analysing the topic, negative behaviours, and the most plausible futures. (fig.5)

![Figure 5. Participants involved in the first activity: Selection of the societal challenge topic.](image)

From the results emerged, that all groups were capable to analyse critically different topics, and use independently the DwI tool. At this stage, they started already to think about the possible design solutions. In the afternoon the participants started to use the SCI-FI Tech inspiration cards and library. (Fig. 6)
Disruptive technologies and behavioural change: Design fiction as trigger for critical thinking

While discussing proactively with the participants, we found that Group 1 and Group 2 approached insecurely to TICs, and they tended to select those films that they were familiar with, which prevented them from thinking critically on technologies. They also claimed a lack of time to explore more contents and go on-line for videos. While facing difficulties, Group 2 inverted the stages, by trying to define the technology for the scenario first, and then explore the SCI-FI, but they stated that this inversion made the process even more difficult.

About the scenario, we realized that participants produced very different scenarios, using mainly the text, while some of them used the sketches and user journey. (Fig.7)

Group 1 introduces the near-future scenario as a world in which are established new laws regarding the use and management of data, but they do not consider behavioural aspects. They suggest a new interaction modality, still describing them poorly, and TICs did not help them much in envisioning the not-yet-existing technologies.

Group 2 focused on the performances of near-future products and technologies, but they lack an explanation of how human behaviour changes. They missed the detailed description of context and why the user should change his attitude toward the food in the near-future.
They make a wide selection of film inspirations, but it’s difficult to identify what they inspired on.

The scenario of Group 3 was the one that moved more toward the near future compared to others and that succeed in creating the story through analysing the context and socio-political implications. Although they do not specify behavioural aspects in a sense how the technology supports the changes. Yet, they explain well the adaption of the human to new climatic conditions and development of new habits and behaviours. The solutions they propose are envisioning, and the inspiration taken from the films is evident.

The third method we used for evaluation is the questionnaire, based on open questions and the qualitative evaluation of the experience, transformed in qualitative data. The questionnaire was divided, into two main sections: (1) General information and (2) Activity. From the General information, we collected some data regarding the participants' previous experience with the topics and comprehension of the relation between the fields of Societal challenges, Design for behavioural change, and Design fiction. Less than half of the participants have already used the Design for behavioural change tools and strategies (Fig. 8).

![Chart showing the participants’ familiarity with the Design for Behavioural Change field.](image)

Additionally, we were interested in understanding whether the participants were able to understand the relationship between different topics tackled in this workshop, and the answer was generally positive, although some of the participants, suggested thinking about inverting some tools or introducing them in the beginning, such as TICs. (Fig. 9)
The participants believe that the near-future scenarios may help in designing critically, although they experienced some difficulties while dealing with it. Participants stated that the use of DwI helped in triggering critical thinking for behavioural aspects. While for disruptive technologies, the Tech library was evaluated as less triggering by the participants. The use of Societal challenges as a starting topic was not motivating enough for participants. Finally, emerged that in this experimentation, critical thinking was more triggered for behavioural issues than for disruptive technologies. (see Fig.10)

Figure 9: Chart showing the comprehension of the participants in finding the relationship between different topics of the workshop (SCs – DfBC-Technologies).

Figure 10: Chart showing how the participants evaluated the critical thinking in relation to the stages of the workshop.
5. Further development

This experimentation helped us understand the effectiveness of selected tools in developing a near-future scenario. The DwI tool was well used and useful for the purpose. The same happens with the Functional Triad. TICs need refinement, such as a platform that enables participants to navigate easily through the tool by having a clearer image of the technologies in films and how these are related to the fictional context. We noticed that the current format was incomplete as representation and the relation to the societal and ethical dimension wasn’t perceptible enough.

Additionally, we noticed that final scenarios neglected some aspects of behavioural change, and the description of not-yet-existing technologies and the world construction were a bit bland. The protocol based on the PPPP model at this stage of the research was useful to understand the strengths and weaknesses of relating different theories and tools, but it won’t be purposeful to continue this doctoral research. Based on the results that emerged from experimentation, we will set the new protocol. The new protocol will aim at relating the proposed theories and tools in a better way by expanding the social, ethical, and behavioural dimensions and build stronger relationships between these elements and the design of technological artefacts. The protocol with TICs will be subsequently applied and tested in two different institutions, one is the academic contest with design researchers, and another is the educational context with students, to tailor the approach for designing consciously technological artefacts able to tackle the behavioural change.

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Disruptive technologies and behavioural change: Design fiction as trigger for critical thinking


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Does design thinking matter? Empirical study and survey on the effectiveness of design thinking

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Abstract | While design thinking has been broadly integrated into design education, it can also be deployed in any discipline’s curriculum. However, without measurable validation, it is challenging to advocate the effectiveness of design thinking. This article introduces experimentation in design thinking to a group of Journalism and Mass Communication major students as a case study to examine the impact of design thinking on non-design major students’ empathy and creativity development skills. In fall 2018, the student group participated in a design thinking workshop. Through the workshop, the participants’ competencies in empathy, storytelling, attention to detail, and personal approach to the users, significantly improved: 53.41% on average. A significant difference also emerged in the type of emphasis on the participants’ concepts. Compared to the concepts from the pre-workshop assignment (53%), the concepts from the post-workshop assignment emphasized how people’s everyday life would change more than the functionality of the product (93%).

KEYWORDS | EFFECTIVENESS OF DESIGN THINKING, DESIGN THINKING FOR NON-DESIGNER, MEASURABLE VALIDATION OF DESIGN THINKING, EMPATHY MAP, DAILY JOURNEY MAP
1. Introduction

Design thinking is a people-oriented problem-solving method that prioritizes one’s empathy building process for users and creativity. Ever since IDEO brought design thinking to the mainstream design industry in the early 1990s, it has been a popular problem-solving method in contemporary design pedagogy. (Decker, 2019) While the method has been broadly integrated into design education, it also has significant possibilities to be deployed in any discipline’s curriculum. However, the effectiveness of the design thinking methodology for students is still questionable. Despite the amount of literature in design thinking, it is challenging to find any research in the evidence-based validation of design thinking. Furthermore, it is also ambiguous how design thinking is beneficial for a certain type of learning factor(s). In this article, storytelling refers to the ability to embellish narratives in order to communicate the core message more effectively. (Decker, 2019)

Without evidence-based and measurable validation, it is challenging to advocate the effectiveness of design thinking. This article aims to broaden the educational application of design thinking to the non-design field by introducing experimentation with design thinking on a group of non-design major students. In the Fall 2018 semester, fifteen senior journalism and mass Communication major students participated in a design thinking workshop in their message development class. The workshop included two exercises: empathy map and daily journey map. The effectiveness of the workshop for those students was measured in two ways: a comparison study of pre- and post-workshop assignments and a post-workshop survey. In this article, this experimentation is adapted as a case study to examine the impact of design thinking on non-design major students’ empathy and creativity development skills.

2. Background

2.1 Empathy and Creativity in Journalism and Mass Communication

Among the many advantages of design thinking, empathy and creativity represent some of the most well-known learning components of design thinking. In this article, empathy refers to the ability to understand and feel from the users’ point of view. (Empathy, n.d.) This has been a critical element for designers in search of pursuing the human-centered approach. According to Tim Brown, the chair of IDEO, “Empathy is at the heart of design. Without the understanding of what others see, feel, and experience, design is a pointless task” (Brown, 2020).

Empathy has also been a crucial element for non-design fields, such as journalism and mass communication. Empathy is one of the core skills in journalism, as it enables journalists to understand people’s biases and also drives meaningful storytelling (Smith-Rodden, 2019). For reporters, empathy factors into the interviewing process as it fosters mutual trust and negates stereotypes (John, 2019). In her book, Pursuing an Ethic of Empathy in Journalism,
Janet Blank-Libra also states that the “core principles of empathy are directly relevant to journalism, particularly to the reporter who uses a narrative approach to storytelling” (Blank-Libra, 2016).

Empathy in design thinking enriches one’s creativity (Carlozzi, Bull, Eells, & Hurlburt, 1995) as it facilitates “a mindset of curiosity and a posture of discovery when faced with adversity” (Perry, 2017). In this article, creativity refers to a structured and systemic problem-solving ability with unique ideas (Fyffe & Lee, 2016). Creativity has been not only a core competency in the design field, but also in the non-traditional creative fields. Journalism and mass communication education emphasizes creativity (Buckingham, 2013) as creativity fosters entrepreneurial journalists (Hunter & Nell, 2011) and media entrepreneurship (Ferrier, 2013).

Research confirms that creativity should be a critical component of journalism education as journalists need to practice their creativity to discover “deep meaning rather than superficial actuality” when they witness events. (Liao, Chang, Liang & Liang, 2016) For instance, in mass communication education, advertising major students benefit from creative excellence to develop better portfolios for their first jobs. (Windels & Stuhlfaut, 2017) This paper aims to evaluate how design thinking, a methodology that is known to enhance one’s empathy and creativity, can also be used with non-design major students through the following experimentation.

2.1 Experimentation Background

In the Fall 2018 semester, fifteen senior journalism and mass communication major students participated in a design thinking workshop in their Message Development class at the University of Kansas. The students developed marketing strategies to promote a denture adhesive product, Poligrip. The workshop took place in the early phase of the project. The participating students had completed initial market research and defined targeted consumer demographics, yet they had not started developing marketing plan. The students had never been trained in the design thinking process. The workshop took approximately 40 minutes and consisted of two exercises: A. Empathy map and B. Daily journey map.

3. Methods

3.1 Experimentation method

The workshop started with an empathy map exercise. An empathy map is a type of character developing tool that allows one to synthesize one’s observation on the users and draw unexpected insights. The design thinking workshop integrated a modified version of Bootcamp Bootleg, a working document published by the d.school, Stanford University
The students engaged in the exercise in groups that consisted of four or five students. The exercise took approximately 25 minutes.

1. Each student team received a large sheet of brown paper (approximately 4ft. in length and 3ft. in height). The Participants drew a circle in the middle of the paper.
2. Based on the user demographics which the participating students had defined prior to the workshop, each student team created a simple persona inside of the circle. The persona included a sketch of the user’s figure as well as the user’s name, age, occupation.
3. Each team created a four-quadrant layout around the persona. The four sections represented the following. Does: What would the profiled user do related to her/his denture? Says: What would the profiled user say related to her/his denture? Thinks: What would the profiled user think related to her/his denture? Feels: What would the profiled user feel related to her/his denture?
4. Each team wrote as many action items on Post-It notes as possible for all four sections.

As soon as the participants completed the empathy map exercise, their next exercise included a daily journey map which allowed participants to map their targeted user’s...
everyday lifestyle as a narrative of daily activities. The participants visualized a timeline that depicted a typical day of their targeted user from the moment he/she wakes up to the moment he/she goes to bed. This exercise is inspired and modified from the customer journey map. Often referred to as a user journey map or journey map, the customer journey map provides a visual depiction of the timeline of a user’s interaction with the product in order to understand the relationship between the product and its users (Kaytes, n.d.) (Rosenbaum, Otelara & Ramirez, 2017). It is a widely used tool for understanding user experience. While the customer journey map entails the convergent variations of the timeline that focuses on the user’s interactions on the particular product, the daily journey map for this workshop entails the divergent variations of the timeline that encompass all of the daily activities of a user.

The exercise intends to allow the participants to understand the users as people, not merely customers. By portraying the daily journey of the user and including daily activities that are not relevant to the product, the participant could also capture unexpected inspirations. The participants continued to work in groups which they formed during the previous exercise. Following are the steps of the exercise:

1. Each team received a large sheet of brown paper (approximately 4 ft. in length and 3 ft. in height). The Participants drew a circle in the middle of the paper.
2. Based on the persona that the team created during the empathy map exercise, the students mapped a morning-to-bedtime journey of the character. Students were encouraged to draw images where applicable. As an option, students could re-draw the simple persona inside of the circle with more details if needed.
3. The students moved the relevant Post-It notes from the empathy map to the appropriated locations in the journey narrative to reflect the correlation between the two exercises.
When the participants conversed with their team members during the exercise, they were required to embody a first-person perspective. For instance, instead of saying, “I think she wants to eat lunch,” they said, “I want to eat lunch,” as if they were the user.

3.1 Evaluation method

The process included two types of evaluations: A. Comparison assessment of pre- and post-workshop assignments, and B. Post-workshop survey.

A. Comparison of pre- and post-workshop assignments: Before the workshop started, the students were asked to write any marketing concept for the denture adhesive product that they could rapidly ideate in 5 minutes on a letter-size paper. After the workshop, the students were also required to repeat the same task with different concepts. The participants’ submissions from these assignments were evaluated based on the following four attributes: empathy, storytelling, attention to detail, and personal approach to the users.

a. On a scale of 1 (strongly disagree) to 5 (strongly agree), the participating students’ pre- and post-workshop assignments were evaluated based on the following criteria.

- C1. The concept shows an empathic attribute of the users.
- C2. The concept demonstrates a storytelling attribute.
Does design thinking matter? Empirical study and survey on the effectiveness of design thinking

- C3. The concept captures the details of the user experience.
- C4. The concept contains a personal approach to the audience.

b. The assignments were also evaluated on whether the concept is focused on the product (C5) or people (C6).

B. Post-workshop survey: After the workshop, the students participated in a survey reflecting their perceptions about the workshop and learning outcomes.

On a Likert scale from 1 (strongly disagree) to 5 (strongly agree), the first part of the survey asked how the workshop helped the participants’ understanding on the users and concept development.

Following is a list of questions:

- Q1. The workshop motivated me to understand my users.
- Q2. The workshop helped me to build the goals of the concept.
- Q3. The workshop helped me to come up with strategies to attract my users.
- Q4. The workshop helped me to come up with different concepts/ideas than what I initially thought or planned.
- Q5. The workshop helped me to be more empathetic to my users.
- Q6. The workshop improved my brainstorming skills.

The second part of the survey consisted of three free-response questions that asked the participants to share the least and most valuable aspects of the workshop as well as suggestions for improvement.

Following is a list of the questions.

- Q7. What is the least valuable learning outcome about this workshop?
- Q8. What is the most valuable learning outcome about this workshop?
- Q9. How would you improve this workshop?

4. Results

4.1 Comparison assessment of pre- and post-workshop assignments

Table 1 indicates the results of the evaluation method A-a from the pre-workshop assignment.

<table>
<thead>
<tr>
<th>PRE-WA</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
</tr>
</thead>
</table>

Table 1. Results of the evaluation method A-a: Pre-workshop assignment.
Table 2 shows the results of the evaluation method A-a from the post-workshop assignment.

<table>
<thead>
<tr>
<th>POST-WA</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Results of the evaluation method A-a: Post-workshop assignment.
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Table 3 addresses the improvement of the criteria since the workshop.

<table>
<thead>
<tr>
<th>P2</th>
<th>5</th>
<th>4</th>
<th>4</th>
<th>4</th>
<th>•</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>•</td>
</tr>
<tr>
<td>P4</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>•</td>
</tr>
<tr>
<td>P5</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>•</td>
</tr>
<tr>
<td>P6</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>•</td>
</tr>
<tr>
<td>P7</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>•</td>
</tr>
<tr>
<td>P8</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>•</td>
</tr>
<tr>
<td>P9</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>•</td>
</tr>
<tr>
<td>P10</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>•</td>
</tr>
<tr>
<td>P11</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>•</td>
</tr>
<tr>
<td>P12</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>•</td>
</tr>
<tr>
<td>P13</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>•</td>
</tr>
<tr>
<td>P14</td>
<td>did not participate.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P15</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>•</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>35</td>
<td>38</td>
<td>41</td>
<td>1</td>
</tr>
</tbody>
</table>

Average score (excluding P14) 3.071429 2.5 2.714286 2.928571 Percentage: 7% Percentage: 93%

Table 3. Comparison of the evaluation method A-a results between pre and post workshop assignment.
Compared with the pre-workshop assignment outcomes, the outcomes from the post-workshop assignment demonstrate a dramatic improvement in all of the four criteria: empathy, storytelling, details of user experience, and personal approach. For instance, Table 4 is one of the outcomes from the pre- and post-workshop assignment.

**Table 4. Example of the pre- and post-workshop assignment outcomes**

<table>
<thead>
<tr>
<th>Scanned image of a handwritten/drawn answer</th>
<th>Flexodent still puts zinc into several of its products (An image of sad face)</th>
<th>Every brand will give you a smile (An image of smiling face with decayed or missing teeth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-workshop assignment (A)</td>
<td>Flexodent still puts zinc into several of its products #1 worst company!</td>
<td>Picture of older guy but he still looks hip and he’s smiling. Maybe he’s on a date and it’s going very well. Poligrip will give you one that lasts (An image of smiling face with healthy teeth) Very large smile, shockingly large. Grotesque even.</td>
</tr>
<tr>
<td>Post-workshop assignment (B)</td>
<td>Every brand will give you a smile</td>
<td></td>
</tr>
</tbody>
</table>

*Competitor’s product name*
Compared to the pre-workshop assignment, Pre, the answer from the post-workshop assignment, Post, in Table 4 is more elaborated and descriptive. The answer from the Pre empathizes the negative aspect of the competitor’s products that have zinc as one of the ingredients. The Post embellishes the message with a specific user scenario and implies how the product can assist the user’s everyday life. The Post demonstrates much stronger empathic and storytelling attributes, details of the user experience, and personal approach to the audience. Furthermore, while the Pre focuses on the product, the Post focuses on the user.

4.2 Post-workshop survey

Table 5 shows the results of post-workshop survey from Q1 to Q6.

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3*</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Score</td>
<td>4.0769</td>
<td>4.0769</td>
<td>3.4167</td>
<td>4.3077</td>
<td>4.3077</td>
<td>4.3077</td>
</tr>
</tbody>
</table>

*One participant did not participate in this survey.

The average score for all the questions was 4.0823 (4:agree); thus, the participants agreed that the workshop helped them to understand their users, build goals of the concepts, ideate strategies to attract their users, ideate different concepts/ideas than what they initially thought, be more empathic to their users, and improved their brainstorming skills. The survey results suggest that the workshop was most helpful for ideation, empathy, and brainstorming, while it was least helpful for coming up with strategies to attract users. The Q1, Q3, and Q5 are relevant to the empathy competency, while Q2, Q4, and Q6 are relevant to the creativity competency. The survey also revealed that the workshop was slightly more effective for creativity (average score: 3.9338) than empathy (average score: 4.2308).

The feedback from participants – the answers from Q7, Q8, and Q9 – on the design thinking workshop was positive as the participants recognized the benefits of the workshop. The participants defined embodying themselves in the user’s shoes and impromptu brainstorming as the most valuable learning outcomes that they gained from the workshop. They also suggested having more time to complete exercises, more classroom space for the teams, and more examples of the exercises.

4.3 Observation

Besides the formal evaluation, there were other noticeable differences in the following area from the comparison studies of pre- and post-workshop assignments. The concept statements from the pre-workshop assignments showed more ambiguous and high-
sounding terms such as “Joy” and ‘Beautiful,” while the ones from the post-workshop assignments reflected more engagement with the daily life of the users.

After the first exercise, the empathy map, the students referred to the user in their persona as “he” or “she,” which created a distance between them and the user. After the workshop, students expressed enthusiasm for having more confidence to ideate more user-centered marketing concepts.

5. Conclusion

Through the design thinking workshop, the participants’ competencies in empathy, storytelling, attention to detail, and personal approach to the users, significantly improved: 53.41% on average. A significant difference also emerged in the type of emphasis on the participants’ concepts. Compared to the concepts from the pre-workshop assignment (53%), the concepts from the post-workshop assignment emphasized how people’s everyday life would change much more than the functionality of the product (93%). The post-workshop survey results revealed that the workshop was most beneficial for the participants in generating various concepts, becoming more empathic, and improving brainstorming skills.

“Journalists tell stories based on facts, but stories cannot be told without imagination” (Liao, Chang, Liang & Liang, 2016). Empathy and creativity have become core competencies in non-traditional creative and artistic fields, such as journalism and mass communication. This article examines the effectiveness of the design thinking on non-design disciplines through experimentation using the design thinking method with a group of journalism and mass communication major students. The experimentation results indicate a significant possibility that design thinking can be integrated into non-design education. Specifically, the experimentation demonstrated how design thinking could cultivate a deeper understanding of the targeted users and enhance their creativity. By engaging with the design thinking exercises, the participants contextualized themselves as the users and captured the details of their users’ everyday lives. The details they recognized organically emerged as inspirations for potential creative and storytelling solutions.

Reflection on the experimentation directed the following additional studies. The experimentation can be assessed with a wide range of non-design disciplines to strengthen the argument of the effectiveness of design thinking. A long-term component of design thinking’s effectiveness can be measured and compared with its short-term effectiveness. The design thinking process consists of five vital phases: empathize, define, ideate, prototype, and test. This experimentation mainly focused on the ‘empathize’ aspect. Further testing that includes the other four phases can broaden the spectrum of the study.
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References


**About the Authors:**

**Park Hannah:** Park's research has been presented at AIGA, CAA, SXSW and TEDx, focusing on healthcare design and design thinking. Her community-engaged design projects were funded by a wide range of organizations, including the Make-A-Wish Foundation, Audubon National Society, and Colgate-Palmolive.

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Education formats to integrate Design with Humanities, Politics, Social Sciences & Education.

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Abstract | The paper looks at future forms of university education in Italy, especially regarding traditional non-design disciplines, such as humanities, politics, social sciences and education, to explore how design can contribute and be enriched by the integration with them. Graduates from these areas of study are hardly satisfied with the professional skills acquired during their studies while employers complain about graduates’ deficits in terms of soft-skills, which are conversely part of the design competency framework. Hence, design can play a catalyst role in challenging these disciplines to close the skill gaps and to explore future scenarios.

The paper introduces a blueprint with four semester-long elective courses coupling students from design and the aforementioned disciplines. Design Debates combines design and philosophy, Sensemaking design and sociology, EducationXEducation design and education. Society Prototyping design and political sciences.

These proposals are meant to invite universities and design institutions to imaginatively reconsider traditional curricula.

KEYWORDS | EDUCATION, SPECULATIVE DESIGN, HUMANITIES, SOCIAL SCIENCES, POLITICS
1. Introduction

The paper intends to look at future forms of university education and to explore how traditional disciplines such as humanities, politics, social sciences and education can be enriched by the integration with design in higher education in Italy. The objective is to discuss four innovative educational formats where students from these fields collaborate with design students.

The paper reviews the situation of higher education in Italy in terms of employment prospects and graduates satisfaction with a particular focus on adults with tertiary education in humanities, social sciences, education and design.

1.1 Higher Education in Italy

According to the latest OECD report (2019) on education in Italy, the employment rates in Italy - compared to the OECD average - are comparatively low while the rates of competences’ mismatch are higher than on average among participating countries.

Tertiary educational attainment is increasing for younger generations, even though the share of tertiary-educated 25-34 year-olds is still relatively low at 28%.

Higher education is offered by three types of institutions in Italy: universities (including polytechnics), arts, music and design higher education institutions and higher technical education institutions.

In Italy, 88% of tertiary students are enrolled in public universities generally with open admissions. Only some tertiary programs have limits on the number of students, though this is not the case for humanities, social sciences and education.

The unemployment rates for adults with a tertiary qualification are relatively high. The rate for adults graduated in the fields of STEM (science, technology, engineering and mathematics) is close to the OECD average. Instead, the unemployment rate for adults with a tertiary education in arts, humanities and social sciences is relatively low at 23%. Nevertheless, these fields remain popular among younger generations as 31% of graduates are enrolled in arts, humanities and social sciences programs.

In Italy, adults with a tertiary qualification earn 39% more than those with a secondary education, which is a low value compared to the OECD average.

At the same time, Italy has one of the highest rates of NEET (neither employed nor in education or training) among OECD countries. 23% of tertiary-educated 25-29 year-olds are NEET compared to the OECD average of 11%.

Lower earnings and limited employment prospects are critical factors that hinder equal access to tertiary education and social mobility in Italy.
1.2 Graduates Satisfaction

According to the latest survey of the University graduates’ employment conditions in Italy (Almalaurea, 2019), a large share of Bachelor’s degree graduates from humanities and social sciences are hardly satisfied with the effectiveness of their degree in terms of employment prospects and adequacy of the competences acquired during their studies.

81% of the graduates with a Bachelors’ degree in Philosophy state that the on-the-job use of competences developed during their degree is limited to nil. The share is 85% for graduates in Political Sciences and Sociology, 45% for graduates in Education and Design.

75% of graduates in Philosophy are minimally satisfied to totally dissatisfied with the professional skills acquired during their studies, compared to 74% of graduates in Political sciences and Sociology, 42% in Education and 45% in Design.

42% of graduates in Philosophy state that their degree was neither required nor useful to perform their current job, compared to 34 of graduates in Political Sciences, 37 of graduates in Sociology, 10% of graduates in Education and 22% of graduates in Design.

1.3 Skill gap analysis

The latest QS global Employers report (2019) shows that, beyond field-specific knowledge, there are deficits in fresh graduates’ training in terms of workforce readiness. The most desirable soft skills are: critical thinking, complex problem solving, written and oral communication and teamwork.

In Italy, more specifically, employers state that there is a major disconnection between the education system and the labour market (OECD, 2017). The separation between education providers and organizations is rooted in the principle that schools and universities should be independent from the industry, even if there is an increasing attention towards the so-called “Third Mission” of university, which is described as the “propensity of structures to open up to the socio-economic context” and is one the quality evaluation criteria of the Italian National Agency for the Evaluation of University and Research Institutes.

Traditional educators generally stand for theoretical teaching over competence development, despite a general agreement on the importance of transferable skills, which are indeed strongly demanded by the employers, who report the graduates’ deficits in terms of team-work, flexibility and organization skills.

Beside this, many fresh graduates enter the labour market without any previous work experience, which, on the contrary, is highly valued by employers’ hiring managers.
2. Design education competency framework

Contemporary organizations are facing ever-changing and complex challenges that require a broader range of competencies. Hierarchical and silo structures, which were perfect to address complicated problems, have been overtaken by horizontal and matrix structures, where teams are increasingly multidisciplinary as multiple expertise, skills and perspectives are required to allow the organization to tackle complex problems and strive. The prevalence of this not-so-emerging work approach requires some particular soft skills: critical thinking, complex problem setting and solving, and effective verbal, visual and oral communication (Reuveni & Vashdi, 2015).

In Italy, where soft skills are hardly nurtured in traditional university pathways, employers would still expect to find certain ones (problem solving, communication, organizational and management skills) as part of the graduates’ background, while the organization still holds the responsibility to transmit its value system (Mangano, 2017).

Hence, the lack of professional competences and soft skills is a crucial challenge, especially for students enrolled in humanities, political sciences and sociology programs, as it is apparent from the graduates’ employment rates, conditions and salaries.

On the other side, the competences highlighted above are considered the key elements of the design attitude (Boland & Colloy, 2004), and the pillars of the holistic framework of design competence. (Gribbin et al., 2016).

Furthermore, another approach can be favored to leverage the theoretical knowledge of humanities and social sciences curriculum and the methods and competences of design education: speculative and critical design (Dunne & Raby, 2013). This approach entails envisioning tactics to explore possible and preferable futures through scenarios and physical prototypes.

2.1 Design attitude and competency framework

When Boland and Colloy (2004) describe the approach of ‘Managing as Designing’, in terms of Design Thinking, they recommend managers the adoption of the so-called design attitude, which refers to a particular mindset and approach to problem solving that designers develop to create meaningful designs for products, services and processes. The assumption is that designers are meant to face problematic situations as opportunities, starting from a proper investigation, questioning the conventional options, and inventing also higher-risk alternatives, whether they are recognized as the most appropriate ones and they can be exploited thanks to the team capabilities (Dunne & Martin, 2006).

Gribbin and others (2016) focus on specific competences to define a holistic approach to design competency, reinforcing the definition of design attitude thanks to the integration of cognitive competences, meta-competences, functional competences and social competences. Again, teamwork, context assessment, problem setting and solving,
visualization, communication and presentation are some of the skills inscribed in this framework (Hummels & Vinke, 2009). Hence, the design attitude is a feature that can differentiate design from other disciplines, even if it can be a valid element in any competency framework.

Design scholars are increasingly critical towards Design Thinking, despite the wide diffusion of it among non-designers, as it suggests a distinction between thinking, on one side, and action on the other one (Kimbell, 2011). Kimbell, in particular, use practice theories to analyze design activity and designers’ expertise, proposing a pair of concepts, design-as-practice and designs-in-practice, to acknowledge the impact of the context, stakeholders and end-users. This approach surely questions the central role of designers and the opportunity to identify specific designers’ cognitive styles, yet it recognizes that design practices tend to be rule-based, routinized and embodied, which can lead to tentative generalizations.

The idea of expanding the domain of designing to non-professional designers is also at the core of Design for Social Innovation, as described by Manzini (2015). He distinguishes between two different meanings of design: ‘diffuse design’ and ‘expert design’. The first refers to the design that can be performed by everybody and the latter stands for the design performed by those who have been trained as designers. While it is assumed that the design attitude and specific competences can be cultivated outside the domain of design learning, it is crucial to recognize that design experts can trigger and support impactful social projects by actively interacting with experts from the fields of humanities, social sciences and education.

Along with these perspectives, Relational Design puts the focus of design practices on the occurrence of human and non-human inter-action and intra-action within situated social contexts. This approach calls for a mutual and respectful ‘relationality’ among all actors, blurring the boundaries between professional designers and so-called ‘complementary relational designers’, and stresses the value of a socialization of designing. This angle also implies the analysis of four relationalities, listed as philosophy, ‘diverse capitals’, alternative economies and poly-disciplinarity (Fuad-Luke, 2014).

Within this social turn we see a shared discourse about the necessity for the design practice to create a social economy for the public good, with a central involvement of non-design professionals and citizens, whether this is driven by government and service providers or grass-root innovators, which require an effective development of trans-disciplinary knowledge and capabilities.

2.2 Speculative and Critical Design

While Design Thinking has been crucial to expand the adoption of a design attitude to other domains, and Social Design and Relational Design have adopted a more open and inclusive approach about design practice to seek ecological, social and economic alternatives to
respond to communal contingent situations, they still operate within the boundaries of reality as it is, usually dealing with specific market or situated community issues.

The potential use of the ‘vocabulary of design’ can be further explored to break the limitations given by reality, and pose provocative questions to inspire new possibilities altogether. This parallel design channel can take specific forms of speculative and critical design (Dunne & Raby, 2013). This approach celebrates the realm of possible, plausible and preferable futures. It provides a space to speculate and experiment with ‘what if’ scenarios and how things could be. They deal with the exploration of ideals, ideas and fictional objects to create visible projections of the future.

Speculative and critical design practices offer a space to imagine and discuss alternative possibilities, and help redefine the relation to reality itself. Design is the medium, through its imagination and critical approach, to trigger future thinking, grow socio-cultural awareness, raise questions, move to action, and to explore alternatives that challenge today’s world (Auger, 2013).

Speculative design in its various forms, namely Conceptual Design, Design Fiction, Design Futures, Adversarial Design, Critical Practices and Near Future Design, is adopted as a pedagogic practice in design education (as currently surveyed by SpeculativeEdu, the education project funded by ERASMUS+), to help students develop a set of skills and behaviors (narrative construction, user interactions, implication assessment, communication and contextualization), by reflecting on the dynamics of today’s world and equipping them with an open mind-set to manage and reinvent their role in a complex, fast-changing world (Ward, 2013).

In the last ten years, several higher education institutions that have explicitly introduced speculative design courses in their curriculum. Among them, there are: Parson’s The New School (USA), UC San Diego (USA), MIT (USA), Royal College of Art (UK), Goldsmith’s University (UK), Edinburgh Napier University (UK), the University of Split (Croatia), the Institute for Transmedia Design (Slovenia), Madeira Interactive Technologies Institute (Portugal), Design School Kolding (Denmark), Australian National University (Australia).

3. Four hybrid education formats

Historically, Italian universities keep humanities, politics, social sciences and education separated from design, and higher education institutions dedicated to design don’t offer humanities and social sciences ‘degree programs. Hence, there is minimal interplay between students and faculty from philosophy, sociology, political sciences, education, and design.

It’s important to highlight that most Bachelor and Master programs in design have already incorporated courses of anthropology, psychology and sociology in their curriculum to help students deepen their user research and analyze the social transformations at a global and local scale, and some of them even act as social innovation incubators, like the MA in ‘Eco-
Social Design’ at the Free University of Bozen-Bolzano and the MA in ‘Advanced Design: Services’ at Bologna University, just to name two programs currently offered in Italy. These programs officially welcome applicants from a wide range of fields, but they generally belong to the respective design departments only.

On the other hand, humanities, social sciences, political sciences and education very rarely offer any design learning experience.

What is proposed here is to encourage the interaction between students and scholars who are currently teaching and learning humanities and social sciences with those who are in the field of design. The assumption is that design and, in this case, a speculative and critical design approach might play a catalyst role in challenging the aforementioned disciplines, addressing the workforce needs, closing the skills gaps, while facilitating alternative visions of the future.

This paper represents an exercise in ‘university making’, by imagining four bi-disciplinary distinctive courses, to invite education leaders from the fields of humanities, social sciences, education, design - and not only - to reimagine the way the university works. These four courses are intended as feasible, practical ideas to perform speculative multi-disciplinary projects drawing knowledge and competences from the existing curriculum.

Universities must move quickly to abandon the antiquated system of discipline silos to one that connects all disciplines through faculty and students thanks to integrated classrooms (Park & Benson, 2013).

3.1 Design Debates

Design Debates combines the fields of design and philosophy. Students are taught to think in future scenarios, as plausible and preferable alternative ways of being. The course takes inspiration from the interaction between philosophy and architecture pursued by Jacques Derrida, Peter Eisenman and Bernard Tschumi in the ‘Chora Works’ project (1982) to translate the principles of deconstructionism to architecture (Derrida & Eisenman, 1997). While their cooperation is considered troubled and the design has never been executed, it probably remains one of the most significant examples of the possible collaboration between the philosopher’s reasoning and the designers’ interpretations (Derrida & Hanel, 1990).

In the academic world, Carnegie Mellon University has been experimenting for ten years with BXA interdisciplinary programs. The Bachelor of Humanities and Arts degree, for example, allows students to combine their concentration in Design with a concentration in a discipline from the College of Humanities and Social Sciences, such as Philosophy. In this case, students have to take a minimum of nine courses in this field, thus interacting with Philosophy-major students. On top of this, in their ‘Capstone Project’, students have to demonstrate the extent of their interdisciplinary work also through experiments and teamwork projects.
The course of Design Debates aims to explore new philosophical constructs to speculate about different distinctive social practices to explore scenarios through the design and prototyping of objects (Bleecker, 2009).

For the course of Design Debates students are asked to write philosophical theories in the form of manifestos and narratives, which are, at the same time, an outcome and a medium to speculate about the future. Students are also tasked to design fictional products to explore applications and implications of new philosophies and ideologies. These constructs can speculate about plausible, original situations that are represented by the fictional objects. Students are invited to raise questions about the socio-cultural, economic and ethical implications and effects of their ideologies.

The objects embody these speculative constructs and act as science-fiction props to provoke the critical thinking of the students, who play with probable benefits and pitfalls and engage in wider conversations about the society and their future.

3.2 Sensemaking

Sensemaking explores the collaboration between design and social sciences (Staley, 2019). Starting with readings from information design and visual sociology (Pauwels, 2000), the course entails the collection and analysis of complex data about the society to discern patterns and meanings, to develop sociological frameworks, and to create visual narratives to make them more understandable for policy makers.

This course learning is based on futuring techniques, such as cross-impact data analysis, Delphi forecasting techniques, expert interviews and focus groups, information design methods and tools. Students are taught to scan the environment (across the STEEP domains: Society and culture, Technology, Economy, Environment and geo-Politics) to acquire data, translate them in viable information, assess the potential implications, infer the possible ramifications of them on a broader social context, and eventually to use visual design tools and artifacts (conversation subjects, conversation prompts and experience enablers) to trigger and consolidate the outcomes (Manzini, 2015).

A meaningful example of such combination can be found in the Master in Urban Planning and Policy at Northeastern University (US), a program combining political sciences subjects with design and planning ones. In particular, ‘Information Visualization Principles’ and ‘Practices and Information Design Critique Seminar’ are two core modules for all tracks, including Urban Analytics, where the capstone project is in partnership with a local, state, or federal agency or nonprofit institution and the scope is to assess a local problem, visualize and present recommended solutions.

Going back to the Sensemaking course, the objective is to help students identify their own anti-thinking attributes, stereotypes, certainty bias and fears that might hinder their
information gathering. Students need to learn how to become deeply aware of the information filters, in terms of source of the information and in terms of content of the information they collect and use to analyze the context and make their recommendations to potential policy-makers.

3.3 Society Prototyping

Society Prototyping is an evolution of platforming and role-play practices (Staley, 2019; Duchatelet et al., 2019). Platforms, simulation gaming and other low-risk immersion experiences help individuals actively prepare for the future (Johansson, 2007). Building a platform belongs to the futuring techniques and offers a variation of the current economic and social activities, to change the organization culture and design more sustainable products and services (Fry, 2008).

Examples of social prototyping are widely present in design academia, for instance the ‘Social Innovation Journey’, an action format to engage communities developed by Polimi DESIS Lab at the Politecnico di Milano. According to the described practices, design students are meant to collaborate and design with citizens, experts and other stakeholders (Fassi et al., 2013). These participatory experiments are particularly meaningful because they have a direct and concrete impact on real situations, on the other side, for the same reason, they imply a serious commitment, risk assessments should be carefully carried out, and the design outcomes must be feasible.

The Society Prototyping course intends to work on a different level; it’s a staged activity and it’s enacted in the safe space of the classroom; design and political sciences students can dare to promote bolder rules and initiatives, as their choices don’t have an impact on actual communities, except their own.

In this course, the students from these two fields collaborate to build small scale experiments or even full-scale pilot projects where they get a first-hand, tangible experience of what a scenario could be like - within the protected environment of the university - to incubate societies-in-miniature. Society prototypes begin as projections of the future. Students can prototype mini utopias or even dystopias. They can define the features and the rules of their own micro society as a living laboratory. The students enact their scenario and pretend to be resident of their imagined environment. For example, they can set a new tax, a privacy surveillance system, or abolish private means of transportation. Students interact with each other, design new products and services that allow the execution of the scenario, explore how the infrastructures and the manufacturing system might change, and investigate how socio-cultural dynamics might evolve.

The course learning is based on trend analysis, systems thinking, and scenario building. Students are invited to explore issues, such as ethics, sustainability and responsibilities of further development of the prototype. Students shape how they might want to live with
each other in future, practice public participation, policy making and democratic decision making.

3.4 EducationXEducation

EducationXEducation entails the development of pedagogies and pedagogical approaches to create new learning experiences. This course is not strictly related to graduates’ dissatisfaction with their studies nor to the deficits identified by the employers. Nevertheless, due to the general considerations regarding youth employment and skill gaps, this course is proposed to address current technical needs, adaptive challenges and possible future scenarios for the labour market.

This course revolves around the principles of teaching as a science, and more specifically covering the practices of learning through inquiry, learning through discussion, learning through practice and learning through collaboration (Laurillard, 2012). It elaborates on the artistic pedagogical experiments by Bruno Munari and the structural ones by Enzo Mari (Branzi, 2015) to imagine alternative didactic formats. An example of this combination is represented by ‘EDDES Educating Through/With Design’, a research cluster created by the Faculty of Design and Art and the Faculty of Education of the Free University of Bozen-Bolzano, starting with the education-focused studio in Visual Communication (Camuffo & Dalla Mura, 2017), which has eventually originated the joint Academic Master program ‘Design for Children’ dedicated to both designers and educators to rethink the learning experience at different levels.

For the EducationXEducation course, the intention is to use future thinking and imagine possible teaching and learning scenarios. The course requires a methodical process which seeks long-term trends in the education and professional environments. These methods include the access to trend data, comparative analysis techniques and scenarios building exercises to enact the imagination (MacLean & Scott, 2011).

Education and design students collaborate to develop new pedagogies and education formats for any level of education, from kindergarten to tertiary education. Students can elaborate on new pedagogical approaches and are tasked to design both spatial environments and key tangible artifacts to make the learning experience complete and effective.

4. Conclusions

These proposed course descriptions can be read as four ideas to integrate humanities, political sciences, sociology, education and design in Italian universities, and break the traditional academic ‘silo’ system. The ‘studio’ can be adopted as a course environment populated not only by design students but also students from other other areas of study, thus nurturing their critical thinking, complex problem solving, written and oral
communication and teamwork skills, and anticipating what happens in professional environments.

In the introduction the problematic status of tertiary education in Italy is briefly discussed. Universities are often described as “ivory towers into smithereens”(Moscati et al., 2010), and there is a growing public view that questions the belief that everyone who is willing should pursue higher education and recommends that only disciplines that lead to employment should be promoted.

The paper, on the contrary, assumes the crucial role of traditional fields of study but invites academic leaders to reimagine the scope and the teaching methods that these disciplines can adopt to work on projects that go beyond commercial endeavors and contingent social issues, through trans-disciplinary team-work and alternative education formats.

In particular, the four courses proposed in this paper imply a bi-disciplinary approach, as a starting point that combines only one discipline from the humanities/social sciences array, with design, and specifically through a speculative and critical approach. It is understood that these proposals can be seen as fairly timid and limited. At the same time, as the examples suggest, its implementation is rather feasible and only two departments need to agree to overcome predictable academic obstacles (learning requirements, number of credits/hours, teaching setting, budget). Hence, it is meant as an initial blueprint, a marginal development of existing education practices, to influence further development and experimentation while contributing to a wider debate on the evolution of higher education and challenging universities and design institutions to reconsider their curriculum and their instructional design approach.

Speculative design scholars often cite this quote from ‘Dark Horizons’ by Tom Moylan (2003): “The transformative potential of Utopia depends on locating it in the future, on thinking through the process of transformation from the present, and identifying the potential agents of transformation”.

Education leaders are encouraged to speculate about the future of the society, imagine preferable scenarios and adopt a critical design approach to define the agents of transformation and implement these experiments where the same speculative design approach can be embedded into students learning experiences.

References

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Experiments on complex systems mapping around materials

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Abstract | Nowadays, information about almost every topic are connected, accessible and not only bounded into the academic, “disciplinary” field. The need of keeping trace of the collection and elaboration of those information has been manifested through the years by the development of a plethora of different tools, methods and strategies. The proposed RTD experiments have been built upon a common design tool (the mind/concept map), but with a different, lateral approach to the mapping activity itself. By mixing common design tools (maps) directly with “extraneous” platforms to the research practice (social networks), the authors propose an experimentation to keep the mapping activity an iterative, context-dependant and updated tool. Three different experimentations on mapping material related frameworks are presented and discussed, trying to identify a new disruptive approach where people can easily participate into the debate.

KEYWORDS | RTD EXPERIMENTS, GIGA-MAPPING TOOL, SOCIAL MEDIA, COMPLEX SYSTEMS, ITERATIVE MAPPING
1. Introduction

Nowadays, information about almost every topic are connected, accessible and not only bounded into the academic, “disciplinary” field (e.g. the incremental push from European commission in spreading the knowledge towards Open Innovation, Open Access and Open Science pillars\(^1\)). In order to pursue a design task \(^2\) (of every nature: project, research, activity...), the need of keeping trace of the collection, elaboration and interpretation of those information has been manifested towards the development of a plethora of different heuristic and pragmatic tools, methods and strategies (Dorst, 2019). All of these tools are connected by the ultimate goal of bring some order into this complex environment from which design activity takes inspiration (Kolko, 2010), so that it will be easier to organize, manage and re-elaborate those collected information.

This need for information organization and management is directly conductible to a tradition of design reasoning that we can easily synthesize, at its first stage, with the activity of framing the design task itself. This framing activity usually considers all of the following criteria: the disordered nature of design problems (Rittel, 1988); their embeddedness in cultural and social processes (McDonnell, 2015); their dependence of contextual variables that are going to be important to frame the design task (or not) (Dorst, 2018).

Because the ultimate intent of the designers is to control the scope of what they have to deal with, the designer reasoning process of task framing cannot be made in one single step, but by its nature is forced into an iterative, long and variable-dependent creative process (Dorst, 2019; McDonnell, 2015).

So, framing a design task of each nature into a complex context is characterized by the ability of the practitioner in organizing, managing, elaborating a potentially huge amount of information into a context-dependent environment. And this is impossible to make in one shot, an iterative approach is compulsory.

Due to this context/time/social-dependency of design activity, the proposed work will focus on observing if it is possible to collect information for a design task framing by mixing academic and non-academic sources, in order to profit from a complex scenario instead of trying to make order in it, trying to update one of the existing tools.

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\(^1\)Further information on: https://ec.europa.eu/info/research-and-innovation/strategy/goals-research-and-innovation-policy_en

\(^2\) We use the locution “design task” instead of design problem because of the co-evolution of problem and solution concepts in the design activity (Dorst, 2019; McDonnell, 2015)
2. Methodology

2.1 Research through design (RTD) approach

Research Through Design (RTD) approach, is based on the assumption that a typical design activity may play a significant role in generating knowledge (Stappers & Giaccardi, 2017).

It tries to employ methods and processes from design practice as a legitimate method of inquiry, presenting the intrinsic ability of converge different information together through a process of composition and integration (Zimmerman, Stolterman, & Forlizzi, 2010).

With this approach, ‘doing design’ is a part of ‘doing research’ because of the realization of prototypes (usually artifacts) that promote the birth of new interactions, engagements and interrelations that would be otherwise not easy to emerge.

Assuming that the prototype should not be necessarily a physical product, but more a source of data to be analyzed and observed (Savic, Selena Huang, 2014), the proposed experiments have been built upon a common design tool, born and developed with the role of enlightening new interactions and interconnections: the mind/concept map.

2.2 Mind and concept mapping as a design tool

Displaying complex information is an old practice that can be traced back to the ‘70s (I. Nassi, 1973) and ‘80s when flow charts and other visual models (Tufte, 1983) were developed.

Mapping, as a qualitative visualization tool (Eppler, 2006), has become a common practice in the design field. Mind maps, concept maps, (Eppler, 2006) (Davies, 2011) system maps and journey maps (ServiceDesignTools3) are just a few examples of types of node-links maps that could be applied in the design process.

According to Eppler’s classification, the mind map is a radial diagram that represents semantic or other connections between portions of material, while the concept map is a diagram showing the relationships between concepts, including cross-connections among them.

If the mind map could be intended as a note-taking instrument, the function of concept map is to foster learning or knowledge sharing in a constructive and systematic manner.

However, in the field of service design, mind maps are used to support unconstrained thinking starting from a topic, idea or problem put at the centre of a blank surface.

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3 Further information on the website https://servicedesigntools.org/tools
2.3 GIGA-maps: an overview

While the aforementioned examples are characterised by clear and defined shapes and patterns, the structure of the GIGA-map is less rigid, tailored to each specific case.

To introduce the concept of GIGA-mapping, authors rely on the thinking of Sevaldson and his framework of systemic design (Sevaldson, 2018). GIGA-mapping is one among the System Oriented Design (SOD) methodologies that have been developed in the Oslo School of Architecture and Design (AHO) since 2005. Such practices have been introduced in order to cope with the need of teaching design students how to investigate design problems in a systemic way.

Similar systemic methodologies are very useful in design practice, because they help in framing problems that are complex and context dependent. The same problems described in the introduction.

In fact, one of designers' main challenges of these times is certainly the fact that they have to learn how to leverage "causes and effects, trends and dynamics, requirements and parameters" (Sevaldson, 2018) that influence the design process. This is also due to the fact that resulting outcomes, namely products and services, become part of a globalized world where cultures and technologies are in rapid development.

In order for projects to be successful, a consistent inquiry needs to be conducted in collaboration with experts, users and stakeholders. GIGA-mapping emerges organically as a tool for carrying out this systemic co-inquiry.

Differently from other analytical tools with systemic purposes, like the ones developed and used in system engineering or in hard system models, GIGA-mapping draws from design and theory of constructivism (Hein, 1991).

In reaction to a specific problem, it doesn't simply help in understanding the world 'as it is'. Instead, GIGA-mapping is most profitable in pursuing 'what ought to be' and in understanding which are those "courses of action aimed at changing existing situations into preferred ones" (Simon, 1969).

GIGA-maps need to be designed according to the specific situations; therefore, they can present custom and heterogeneous forms. Being visualizations, they usually exploit known models based on hierarchy, time, space/geography and intensity or concept maps, but then GIGA-maps reinterpret such base-layers, mixing them between each other's and providing, for instance, blends between quantitative and qualitative information (Sevaldson, 2011) - Figure 1.
Figure 1. Example of many different GIGA-maps available online. Each one presents a tailored form. Their purpose is process visualization, not visualization for communication.4

In fact:

"the format of the GIGA-map, allowing and encouraging the mix of differing categories, graphic expressions, media, and mixed methods approach, results in a very resilient and adaptive mapping model because they are design constructs and not obliged to follow predefined rules" (Sevaldson, 2018).

It is important to emphasize that the produced visual artifact is just the tick of the iceberg. The most of the value of GIGA-mapping resides in its capability to assist the group of people involved into the mapping with the achievement of new composite understandings and perspectives.

They are result of negotiations and balancing among point of views belonging to people with different backgrounds. Empathy based on knowledge of other perspectives is the precondition for dialogue and the prevention of destructive conflicts. GIGA-mapping helps in building such requirement, by leveraging system thinking with intuitive and flexible visual tools.

4 For high resolution images go to http://bit.ly/gallery-GIGA-maps or https://archive.is/MQASD.
While describing GIGA-maps, Sevaldson mainly refers to experts, users and stakeholders as the people who take part into the process. Epithets of those actors are already clues of the reasons behind their selection. However, the mapping could certainly benefit from the involvement of a critical mass of contributors that are not directly selected by the leaders of the inquiry and that can help in overcoming the saturation of topic that is naturally reached in later stages of the process.

Furthermore, it could be especially useful when dealing with design problems that tackle debated topics. In such cases, important insights derive not only from the understanding of the problem itself, but also from how the general public acknowledge and interact with it.

However, the involvement of such a large public requires explanation of the tasks and other work of communication design. Up to the moment of writing, GIGA-maps do not cope with any of those.

In fact, as described, GIGA-maps proved to be a successful practice, one that is capable of leveraging huge amounts of information. Yet, to accomplish such results, GIGA-maps "break the barriers of information quantity by separating the process tasks and the communication tasks" (Sevaldson, 2011). If the GIGA-map is meant to be understood by its creators only, how can any general public intervene on them?

The presented contribution wants to further explore on the practice of GIGA-mapping by considering it as a hybrid form of mind and concept map applied to the design practice and customized for a research-trough design experiment. In doing this, the authors tried to set up the conditions useful for extending the mapping also to a general public.

In the following experimentation, the GIGA-map, likewise a prototype, is then considered as the expedient also for overcoming natural limitations that concerns to a mapping activity and, more in general, to design task framing:

- Saturation of the contents due to the number of people dealing with the task framing
- Saturation of the contents due to time available for the framing activity
- Saturation of the physical space available to collect, manage and organize all the information necessary to define the frame.

Those limitations will be better presented in the following paragraphs, strictly related to the task framing activity towards the GIGA-map tool.
3. RTD EXPERIMENT ON GIGA-MAPPING

A general approach to the generation of GIGA-maps was introduced during a doctoral course on designing RTD Experiments. In this course, only the first activity was set: the choice of the ideal type on which to set the display. Afterwards independently, different groups of students approached the mapping activity.

In the specific case of the authors, the activities that have been carried out, the results and findings to which they have led will be described below. As previously mentioned, the group's approach to GIGA-mapping has to be considered as an RTD experiment. The main objective of the experimentation was not to provide a complete fulfillment of the concept framing itself, but mostly to explore how to overcome natural limitations of the GIGA-mapping activity.

3.1 RTD experiment activities

- Activity 1: Choosing the ideal type

The base-step to start mapping a concept or framing a task is, for sure, to define the starting point: the ideal type. The ideal type is defined as: “social constructs for empirical investigations” (Fox and Alldred 2017). It must be a single concept idea, without any positive or negative connotation from which expand the knowledge. So, in order to produce a nice amount of information and push the mapping activity to the limit, the authors choose a quite controversial design-themes: plastics, bioplastics and materials selection. In fact, to monitor the evolution of the map itself, the authors tried to choose an ideal type for the map that could be interpret on several, multiple layers and commonly easy to understand.

The following activities have been set up and defined by performing them during the very first experimentation upon the “plastic” ideal type and then they have been repeated for the subsequent two ideal types (bioplastics and material selection).

- Activity 2: Ideal Type Review

The mapping experiments are intended to monitor the gravitating concepts around three ideal types taken from the authors’ research areas that can be easily identified as complex systems related to materials. In fact, the choice of the ideal types was made on research topics of which the authors were experts, to facilitate the research of initial information and data and to analyze with a critical lens the subsequent collected information. Then the literature, the state of the art of research and the market have been reviewed and grouped, ready to be disclosed. The activity was carried out until a feeling of saturation was reached.

- Activity 3: Map fulfillment

As the map started to be populated with several keywords, authors experienced the incoming of the first limitation of the mapping tool: the number of people involved in the
map fulfillment income into a ‘content-saturation’, where new keywords proposed were related to already written ones - Figure 2.

![Image of the pilot mapping activity made by the authors on the “Plastic” ideal type.](image)

Figure 2. Image of the pilot mapping activity made by the authors on the “Plastic” ideal type.

To overcome this first limitation, authors choose to place the ideal type at the mercy of more people, trying to establish co-design and co-building activities.

Authors have not provided pre-knowledge or rules to the new participants to maintain no judgement approach. The activity was carried out within the authors’ home university with the involvement of about 40 students of master course about material selection - Figure 3.

![Ideal types at the mercy of the students.](image)

Figure 3. Ideal types at the mercy of the students.

- Activity 4: Clustering/Layering

A "critical" review of the information collected in Activity 3 was therefore made. Thanks to the knowledge base (Activity 2) and the map enlargement (Activity 3), authors were able to cluster, organize and manage the new information coming from the previous activities - Figure 4.
Experiments on Complex Systems Mapping around Materials

Figure 4. Clustering and layering activity by merging authors’ previous knowledge of the themes and the new information acquired by the co-mapping activity.

Each information collected was therefore clustered in specific thematic areas and subsequently clustered, based on the perceived meaning of the expressed keyword (positive or negative) and the ability of that punctual information to generate debate.

- Activity 5: Design of digital contents

Once that the map reached a new level of “saturation”, due to space and time available to fulfill the map, the enlargement of the map has been promoted by introducing the activity on non–academic social networks. Respecting the approach of mixing sources of information, as suggested by the GIGA-mapping approach, a digital content based on the revised map has been generated.

Social networks allow a diffusion and sharing of contents over space and time. In the academic field, are considered good tools for engaging with one’s peers, enhancing awareness and developing professional connections (Kelly, 2018). In order to exploit those platforms to enrich the GIGA-map complexity and interconnection, authors started to design digital contents specifically for a non-academic social network, taking its formats and potential. In this way, three GIGA-maps profiles have been activated: Giga.Plastic (first), Giga.Bioplastic and Giga.MatSel (then) - Figure 5.
Figure 5. Overview of the GIGA-maps profiles.

- Activity 6: Call to social debate

Above all the contents, the main triggering keywords have been extrapolated to create debate and interest. Thanks to the enlightenment of the most suitable keywords that could provide a debate, audience has been called to comment with several unstructured stratagems (tagging profiles, sharing instantaneous contents and spreading profile contents). The social channels (one for each ideal type selected) periodically disseminated to different communities and checked to manage the debate.

- Activity 7: Update social debate

The profiles are still monitored and an update is planned in the following months to respond to the most active debate topics, so that the GIGA-map can grow exponentially.

In Figure 6 are portrayed the planning of the different actions, stakeholder involved in each, and a flow representing the amount of people called into action for each activity.
3.2 RTD experiment dimensions: overcoming the mapping limits

In Figure 7 it has been illustrated how passing through the different activities can help practitioners to overcome the limits of GIGA-mapping. The first dimension of GIGA-mapping is considered as the starting one, in which a certain individual or research group worked for the visualization of data in an established place and time frame.

Through the third activity proposed (increasing the number of people fulfilling the map) it was possible to overcome the limit of the people involved in the research by bringing the mapping activity to a social level. A second dimension can therefore be reached, it enriches the panorama of possible arguments and expands the mapping point of view.

In Activity 6 (call to social debate), in addition to the limit of people, further exceeded, it can be seen how the space variable can also be surpassed. In fact, there is no longer a defined and controlled space where the debate takes place, but it is a multimedial and potentially infinite space. In this way, the third dimension of mapping can be reached, which goes beyond the context-dependent limits (people and space available).

The fourth dimension can be reached by going beyond the time limit. With the last activity, the seventh, and therefore with an iterative updating of social debating/map-building, the fourth dimension of mapping can be reached. Thanks to this, the mapping can continue to evolve, and it is possible to create and share new contents, strictly dependent and updated to the tenor of the debate aroused or the new research carried out.
Figure 7. Schematic view of the limitation overcoming by dimensional evolution of the map.

3.3 RTD experiment reliability

Therefore, embracing the iterative nature of the design activity and overlapping this iteration with the dynamic environment of social networks, the authors’ objective has been to provide a possible new hybrid scenario. This experimentation opens a view on how to create a dynamic design task framing, by mixing common design tools (maps) directly with “extraneous” platforms where people can easily participate into the debate (social networks). In fact, in potential, the “social-network GIGA-maps” can provide an evolving, context-dependant and updating mapping activity.

In order to maintain a certain rigour and to mediate all the possible information incoming in the social network environment, it is not possible to by-pass the intervention of competent people to have a certain level of contents reliability.

The Figure 6 also focuses on how authors developed the experimentation pinpointing precise moments of review and reflection upon the collected information. In Activity 1, 2, 4, 5 and 6, have been established moments of definition, clustering and mediation of the contents in order to avoid unstructured or too vague information and set the point only on usable concepts. By doing this, all the potential discouraging information can be easily managed by the competent-on-theme people (in this case authors) and the conversation can be carried out by maintaining a neutral view (as much as possible).
4. RESULTS

The presented work has been carried out, however in a limited time span, due to the commitments time span. Nevertheless, with the potentiality offered by platforms such as social networks, it can be easily carried on for a longer time.

So, starting from the main concepts expressed in the Introduction:

- design tasks usually drive practitioners towards a disordered environment and there is a need to put order in it by collecting and elaborating information;
- the embeddedness of design activity into social and cultural processes is something compulsory in the design activity;
- the interdependency between the design activity and its context naturally links to a time-space dependant dimension;

the authors found in the social networks platforms a fertile soil for reinforcing existing tools commonly used by designers to frame their tasks.

One of the most interesting findings of this activity has been to translate the perceivable frustration incoming from the early saturation of the task framing activity into a catchy and amusable one, by using platforms normally addressed to spare time purposes.

In order to maintain a certain rigour and to mediate all the possible information incoming in the social network environment, it is not possible to by-pass the intervention of competent people to have a certain level of contents reliability and some content reviewing and updating steps. So, the social GIGA-map is not an independent reality and must be curated.

The participation to the debate coming from people with unknown and different backgrounds permitted the arising of audience’s doubts and concerns related to the topic. This is a very interesting point in order to familiarise and moderate the communication of design research activities, to promote an efficient divulgation that normally follows research advancements – Figure 8.
Figure 8. Examples of the audience interaction with the social GIGA-map.

The overall audience reached at the end of the expected time necessary to report the results of this experimentation into this context was of about 121 people and 38 new interactions have been registered to the three profiles.

The profiles will be monitored in the next months to understand also if a more-intense intervention about the social media contents could catch the audience attention and inspire a more intense debate on the defined topic.

5. DISCUSSION

In the presented work are still present some limitations and further adjustments are required.

- Some topics are more suitable than others

In example, the first main limitation may occur on the topic definition: in average, in the GIGA.plastic and GIGA.bioplastics profiles audience was more reactive and curious about the topic itself by suggesting new keywords but also expressing several doubts about it, probably because of the contemporary debate upon those topics also on other levels (newspapers, new government directives, etc.).
The audience stops to interact with the map when the topics are more related to a sectorial public (e.g. GIGA.matsel on material selection) and they limited themselves just to observe the phenomenon.

We can assume then that already engaging topics are more suitable for this kind of approach, because the chosen channel is addressed to an unknown public.

- Engaging a well-defined public should be done before spreading the social profile

All along the experimentation, authors found that to address the profile to a ‘probably interested’ public could be more convenient in order to collect a good amount of information. Even if the main objective of this work was not directly linked with the complete framing of the research topics, authors should affirm that the potential of this new approach could be empowered by an accurate a-priori selection of the addressing public (e.g. interacting with already existing platforms that work on dissemination).

- It is necessary to update and constantly nurse the profile itself

It has been noticed during the experimentation that audience reaction was more evident in the immediately following of an updating activity. Exploiting the possibility offered by the social network to post some 24h-lasting contents, authors tried to catch the audience attention by renovating the call to action from time to time - Figure 9.

Figure 9. Examples of 24h-lasting contents to keep the audience focused on the topic

By doing this, it has been possible to enlighten an increasing activity of the audience in completing the map; so the suggestion is to structure the introduction of new contents also in terms of time, considering that the audience attention must be kept high on the debate constantly. Those are for sure only preliminary observations about the results, due to the acerbic state of the experimentation itself, being it a first attempt.
Further works and further experimentations are certainly needed in order to establish if the proposed work could set up the basis for a new methodological approach for exemplifying the design task framing activity, exploiting the mixture of several tools.

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Experiments on Complex Systems Mapping around Materials


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Exploring visualizations of design processes from a design activist perspective – a scoping study

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Abstract | The purpose is to investigate how design processes are visualized in research, with the overall aim to highlight dominant structures from a design activist perspective. The method used is a scoping review of literature and a visual content analysis. The results show that there is no established standard for visualizing design processes. The visualized models are often implicit, creating difficulties regarding the validity and effectiveness. The linear model is the norm when presenting design processes visually. The design requirement of attractiveness in the visualizations seem to be closely linked to the individual expression of the researcher. From a design activism perspective, there is a potential for disrupting existing power structures in design processes by questioning how they are visualized. There is a need for more sophisticated user-centered methodology in order to gain insights from the models presented.

KEYWORDS | DESIGN + PROCESS + METHODOLOGY + DESIGN ACTIVISM
1. Introduction

In this paper, we draw on the design activism perspective representing design’s central role as raising awareness about values and beliefs (Markussen, 2013). Through this theoretical lens, we want to question how design processes are visualized in order to evaluate the effectiveness of the visualization of the research results and their comprehensiveness. In accordance with previous researchers, it is important that visualizations of design processes can be understood cognitively, otherwise it does not generate insights and knowledge of the recipient (Schreder, Windhager, Smuc and Mayr, 2016).

Recently, there has been a wide interest in design methodology and processes (Faiola, 2007; Hall, 2011; Walker, 2017). However, the development of methodology for design-oriented research has been rather limited (Verschuren and Hartog, 2005). Although, in 2010 scholars argued that the transfer from theory to designedly methods had not been fully realized yet (Bredies, Chow and Joost, 2010). Here, Morelli (2011), claims that methodological frameworks inherited from industrial production are adapted to new situations which generates rapidly changing methodological perspectives. In addition, Walker (2017) argues that the research field is well-established, but there remains potential for the development of methods and frameworks. Hence, additional studies in this field are needed (Koskinen et al, 2011). Also, techniques for evaluating the effectiveness of design methodology and visualizations could be improved to provide stronger evidence and validity for models used (Agrawala et al., 2011). In accordance, scholars argue that design scientists must propose new methods and tools that guide and facilitate innovation processes (De Rouvray, Bassereau, Duchamp, Schneider & Charbonneau, 2008). Therefore, it is interesting to raise awareness from a design activist perspective.

In alliance with Escobar (2018), this paper’s view is that design affect people’s way of being, knowing and doing. From an ontological perspective, design matters. How we design affects how we live our lives, consequently it is relevant to investigate how we design our design processes. By having a critical thinking view, this paper strives to raise awareness about values and beliefs on how we present knowledge, to contribute to a disruptive way of thinking regarding accessibility and meaning making.

Against this background, this paper investigates how design processes are visualized in research, with the overall aim to highlight dominant structures from a design activist perspective.

2. Theoretical background

Traditionally, design activism mainly originates within the design field where the solution is an artefact (Bichler and Beier, 2016). Today, contemporary design activism is part of a progress including social design, community design, participatory design and critical design (Julier, 2013). Design activism can be about disrupting existing power structures by
questioning the ways of being in the world (Markussen, 2013), and in some studies, design activism is referred as a design movement (Cetin, 2016; Clarke, 2013; Julier, 2013). According to Seliger (2014), the definition of design activism stands for responsible design. Design activism has been a topic of growing interest and research throughout the past decade (Aiello & Parry, 2019; Escobar, 2018; Markussen, 2013). For example, scholars suggest that design research needs a new framework based on the notion of design activism as a disruptive aesthetic practice (Markussen, 2013). In accordance, we argue that design activism should be seen as having an aesthetic dimension, along with its political dimension.

By designing meaning is created (Ehn, Nilsson & Topgaard, 2014; Escobar, 2018). In this sense, design is closely related to culture (Balsamo, 2011). When we design something, for example visualizing results and design processes, cultural meanings and perceptions is created. A decade ago, Fällman (2008) presented a model of classification of design research, arguing that methods and structure are the heart of the understanding and practice of design. This classification is related to Fraylings' (1993) three concepts: research on design, research through design and research for design as a way of understanding the field. In accordance, this paper contributes to research on design.

To give a brief overview on the topic, the first generation of design methods were based on systematic and rational ‘scientific’ methods and the second-generation methods moved towards recognition of appropriate solutions where designers were partners with the problem ‘owners’ (Cross, 2007). In the 1960s, the development of design methods borrowed approaches from engineering and during the 1980s, important sources of the social context of design were social science, cognitive science attend anthropology (Bayazıt, 2004). Also, the 1980s was the establishment of design as a coherent discipline of study in its own right with its own things to know and ways of knowing them (Cross, 2007).

Additionally, the purpose with design methods are to improve design performance, as a reminder including essential steps with the aim to help the designer to structure the thinking (Daalhuizen, 2014). Studies within this field often have the purpose to model the design process and/or to develop design methods (Tromp and Hekkert, 2016). Visualisation of design methodology is done through models used to clarify results, and thus can be seen as mediators of knowledge (Eppler and Aeschimann, 2009). Models visualizing the design process are usually essentially linear, reflecting goal-oriented problem solving (Ingram, Shove and Watson, 2007). Cross (2007) points out, that design research is struggling to move away from that linear design thinking. Although, it is the model of information transmission by Claude Elwood Shannon (1949), that has influenced design theory mostly, and criticisms of this model have also been developed to several models of design and human communication (Crilly, Good, Matravers and Clarkson, 2008). In 1949, this model was extended to include pictorial arts and more text (Shannon and Weaver, 1949).

Models, which are mental or physical structures, influence our thinking and acting, consciously and unconsciously and describe arrangements of components and their representation within larger systems (Davis, 2012). Furthermore, models are tools that allow us to
communicate abstract concepts and the actuality of using models shows our increased awareness of models' influence and how people make sense, they can also be a basis for what theories that are important for design as a discipline (Ibid). For example, design principles are essentially models predicting how different visual techniques affect cognition and perception (Agrawala, Li, and Berthouzoz, 2011). From a critical aspect, Agrawala et.al (2011) point out that models often are implicit, and it is not easy how to control validity and effectiveness.

In accordance, there are many fundamental design requirements involved in the visualization development of the design methodology to be presented. This paper draws on the theoretical contribution by Vande Moere and Purchase (2011) presenting The Vitruvius triangle including: Utility – described as functionality, usability and effectiveness, Soundness – concerning quality and reliability (for example the visualization technique of the three-map can be seen as robust as it has been widely used), and Attractiveness – which is about the aesthetic of the visualization or the appeal of a given solution. Furthermore, attractiveness is not just about the visual form, it can also apply to the methodology or structure of the solution itself (Fishwick, 2006). As in most design-related fields a balance between the aspects of utility, soundness and attractiveness is sought (Vande Moere and Purchase, 2011).

3. Method

This study draws upon a scoping review of literature and a visual content analysis resulting in a concept map using both quantitative and qualitative approaches (see Figure 1). A study of literature is conducted to identify knowledge gaps and thus motivate researchers to close these holes as well as to create an overview of previous research (Webster and Watson, 2002). According to Mays et al (2001) scoping studies are used to rapidly map key concepts with the aim to explore complex research areas, particularly areas that have not been properly reviewed before. Arksey and O’Malley, (2005) argue that the method is useful when mapping fields of study where it is difficult to visualise a range of material. In the search strategies, the keywords “design + methodology” were used to search and systematically cover the number of models used in the field of design. The initial systematic search strategy resulted in a large number of articles (see Table 3 in the section Results).

To investigate what design elements are used to communicate the design process visually, all articles found were examined in relation to inclusion and exclusion criteria. The inclusion criteria of this study are articles that have visualized the design process in a model. The criteria’s for the articles reviewed; in this study the examined design methodology models are published in the sample of journals 1) titled as figure or model by the researcher; 2) presented anywhere in the published article 3) presented as a visualization of the design methodology or design method or design process. Exclusion criteria is articles that did not visualize the design methodology process in a model (see Table 1).
Table 1. Presentation of the scoping review of literature and sample layout.

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Design + methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample of Journals</td>
<td>Design and Culture</td>
</tr>
<tr>
<td></td>
<td>Design Issues</td>
</tr>
<tr>
<td></td>
<td>Design Studies</td>
</tr>
<tr>
<td></td>
<td>The Design Journal</td>
</tr>
<tr>
<td></td>
<td>Visual Communication</td>
</tr>
<tr>
<td></td>
<td>Visual Communication Quarterly</td>
</tr>
<tr>
<td></td>
<td>International Journal of Art and design Education</td>
</tr>
<tr>
<td>Period of review</td>
<td>2007–2017</td>
</tr>
<tr>
<td>Number of articles found</td>
<td>173</td>
</tr>
<tr>
<td>by using keywords</td>
<td></td>
</tr>
<tr>
<td>Sample</td>
<td>70 articles visualizing the design process</td>
</tr>
<tr>
<td>Exclusion</td>
<td>103 articles not visualizing the design process</td>
</tr>
</tbody>
</table>

The study followed by a visual content analysis and a concept map in order to provide a detailed pattern and categorize the design models found in design research. Concept mapping demonstrates how relationships are visualized between different concepts (Lanzing, 1996). In this study we provide a free form concept mapping including overlapping circles and non-hierarchical connections to organize data and suggest relationships giving way to a more qualitative understanding (Wheeldon and Faubert, 2009).

The coding categories (see Table 2) are inspired by the model of design requirements in the Vitruvius triangle by Vande Moere and Purchase (2011), presented in the previous chapter. Although, we have reinterpreted this model and in the content analysis we have focused on the aspect of Attractiveness (the visual aesthetic aspects) in order to investigate how the design processes are visualized. In consequence, the two other aspects Soundness and Utility are excluded variables in the coding scheme as the former two often are included as evaluation criteria for scientific research (Vande Moere and Purchase, 2011).

Table 2. Box-model showing the coding categories in the content analysis.

| Forms (the most prominent shape in the model) | Triangles, Squares, Circles, Other* (*Other: text, arrows, dotted lines or a mixture) |
| Process (how the process is visualized)       | Flows, Linearity, 2 x 2 - matrix, Other* (*Other: a mixture) |
| Technique (handwritten or made by computer)   | Sketch, Graphic, Other* (*Other: photography or a mixture of above techniques) |
Thus, based on the discussion on the Attractiveness requirement by Vande Moere and Purchase (2011), the categories that underlie the visual content analysis are developed. In order to categorize the models found, we thereby focused the content analysis on the three categories of Attractiveness including: 1. forms (geometrical forms of triangles, squares or circles), 2. process (Flows, Linearity, 2 x 2-matrix) and 3. technique (sketch or graphic), see Figure 1 below.

![Figure 1. Tree-map showing inclusion criteria (boxes with arrows and lines) and exclusion criteria (boxes with dotted arrows).](image)

In the first category, variables of triangles, squares, circles or other was included and the most prominent shape used to visualize the design methodology model was examined. In the second category, the content analysis focused on how the process itself was visualized as a flow or linear process or as a 2 x 2-matrix, even here the variable of other was included. The third category examined the technique used in the visualization of the design methodology model, and here the variables investigated whether it was a sketch or a graphic illustration, or other techniques used.

### 4. Results and Discussion of Results

Linked to design activism, the results indicate a need for more sophisticated evaluation methods when visualizing design processes, to ensure that the results are accessible and understandable. Models illustrating design processes are often implicit, which creates difficulties regarding the validity and effectiveness of the models. None of the examined
visualizations are similar. Hence, every researcher communicates their own model. The initial systematic search in scientific journals of design resulted in 173 articles (see Table 3 below). The analysis resulted in a concept map. Design processes are often visualized as linear processes with square shapes. Circles are common when illustrating design processes that are flowing. The results also show that there is no established standard for visualizing design processes.


<table>
<thead>
<tr>
<th>Journal Year</th>
<th>Design studies</th>
<th>International Journal of Art and design Education</th>
<th>The Design Journal</th>
<th>Design Issues</th>
<th>Visual Communication</th>
<th>Visual Communication Quarterly</th>
<th>Design and Culture</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>2008</td>
<td>7</td>
<td></td>
<td>1</td>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>2009</td>
<td>6</td>
<td></td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>2010</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>2011</td>
<td>5</td>
<td></td>
<td>3</td>
<td>6</td>
<td></td>
<td>1</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td></td>
<td>2</td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>2013</td>
<td>3</td>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>2014</td>
<td>9</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>2015</td>
<td>8</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>2016</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>2017</td>
<td>5</td>
<td></td>
<td>44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>49</td>
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<tr>
<td>Sum</td>
<td>59</td>
<td>5</td>
<td>67</td>
<td>31</td>
<td>2</td>
<td>0</td>
<td></td>
<td>173</td>
</tr>
</tbody>
</table>

By doing a visual content analysis we found that 70 out of the total 173 articles have visualizations of design methodology processes. In comparison, 103 articles seemed to focus on design methodology since these articles matched the keywords, but they turned out not to have any visualization of the processes. By that means, these articles are excluded, and we
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call these nonvocalized design methodology processes. One example of an excluded article is Dong and Vanns (2009), who presents the design methodology with an inclusive design and user-centered approach without visualizing the process. An example of an article that is visualizing the process and thereby is included in the result, is a study by Bredies, Chow and Joost (2010) where they present a design process model evolutionary phases mapped across design and use. The results indicate that a substantial body of work has grown around design methodology in design research during the last decade. For example, in 2017 there are 49 articles found compared to 2007 when it was 9 articles. This could be seen as a sign of an increased interest in design methodology and design thinking. Interesting though, is that there are no matches found by using the keywords “Design + methodology” in the Journal of Visual Communication Quarterly, and only two articles found in the journal of Visual Communication. This might be an expression of that design methodology is not commonly occurring in the field of visual communication, so far.

4.1 Visualised design elements

In the following section we discuss what design elements are used to visualize the design process by using a concept map. The results are categorized into three fields and the categories discussed are related to the code manual in the content analysis in order to map the attractiveness of the models found by their visual Form, the visualized structure of the Process and Technique used (see Table 4).

Table 4. The quantitative results from the content analysis. N-value: 110.

| Forms          | Triangles = 2 pieces  
|                | Squares = 38 pieces  
|                | Circles = 23 pieces  
|                | Other = 47 pieces    
| Process        | Flows = 32 pieces    
|                | Linearity = 36 pieces  
|                | 2 x 2 - matrix = 8 pieces  
|                | Other = 34 pieces    
| Technique      | Sketch = 15 pieces   
|                | Graphic = 80 pieces  
|                | Other = 15 pieces    

Forms

The most prominent forms in the models are squares (38 models) and one example is Methodology for context-sensitive system design by mapping internal contexts into visualization mechanisms by Jung (2010) where the researcher visualizes roles of context in a time sequence. Also, circles are commonly used (23 models) and an example is Students’ responses
to inclusive design by Herriott and Jensen (2013). The study visualizes design activities and finds patterns that are behind a process that is perceived chaotic. There are hardly no triangles in the visualized models (2 models). Triangle-based models are found in The Interaction Design Research Triangle of Design Practice, Design Studies, and Design Exploration by Fällman (2008) and A Design Approach by Artifacts and Projection presented by Chow and Jonas (2010). Also, the result show that there are many models consisting of a mixture of squares and/or circles, arrows and text boxes, these models are coded as Other. One example is in the study the roles that artefacts play: technical, social and aesthetic functions by Crilly (2010) where classifications of functions are defined in a table and then into a function matrix showing how different functions are combined. Another example is the study Cognitive Activity-based Design Methodology for Novice Visual Communication Designers by Kim and Lee (2016) where a model includes text blocks visualizing a linear and chronological process with the purpose to give help to more effective cognitive activities during the design process.

Process

In a study by Bousbaci (2008) there is an overview model on how the models have evolved over time from linear to circular and at last reflective. The results show that it is most common for the researcher to visualize the process as a line with a start and an end, either from left to right or top to bottom. This type of design methodology processes is categorized as Linear, and here the result shows that 36 models are visualized as a linear process. Here, we see a parallel to the statement by Crilly, Good, Matravers and Clarkson (2008), that design methodology is highly influenced by the linear model of Shannon and Weaver from 1949. One example is a model published in the study Sketching sounds – Kinds of listening and their functions in designing by Nykanen, Wingstedt, Sundhage and Mohlin (2015), where the results shows that sound design is a listening process and the authors argue that there is a need for new tools and methods when sketching sound. Another example is the study Are Inclusive Designers Designing Inclusively? An Analysis of 66 Design Cases by Herriott (2013), which compares an authoritative model with the aim to reach a special type of design goal with the practitioners working towards that goal.

Another common way of visualizing the design process, is through flows (32 models). One example is a model published in What makes software design effective? by Tang, Aleti, Burge and van Vliet, (2010) where the researchers have explored decision making in the design process and how designers can design more effectively. Another example is The design of implicit interactions: making interactive systems less obnoxious by Ju and Leifer (2008) where a model shows the structure of design problems through signs from different layers, not in a linear order. One last example of visualizing the process in a model with flow is Designing for the unexpected: the role of creative group work for emerging interaction design paradigms by Pirhonen and Murphy (2008) where the method draws on structural semiotics to emphasize the design when visualizing the design process.
Only eight models consist of 2 x 2-matrix, one example is a study by Pierre Johnson, Jen, Thorup and Brooks (2017,) where models are developed as dialogical tools in the shape of design discussion posters used when discussing design solutions in the design process. Also, the results show that there are many models that are difficult to interpret as there is no clear or explicit form or process, these models are coded as Other. One example is a model with five steps in the article Assessing methods for effect-driven design: Evaluation of a social design method by Tromp and Hekkert (2016) where the researchers study the effectiveness of the effect-driven design method Social Implication Design (SID) presenting improvements.

**Technique**

The results show that the technique used to make visualizations are mostly made by computer using a graphic technique (80 models). Here, a model by Vezzani and Gonzaga (2017) statutes as an example of this phenomena as they try to define an educational model for the good of society. Also, there are models based on sketches, and in these 15 models a hand-drawn technique is used. This is for example illustrated in a model in the shape of a 3D conceptual map by Bidault-Waddington (2017), including strategies toward urban development with the aim to notice design thinking and the role of critical designers in organizations. Another example is Connecting Values: Teaching Sustainability to Communication Designers by Benson and Napier (2015) where the researchers work with visualizing individual values and mapping the activities into the design process connecting to sustainable frameworks.

15 models are categorized as Other and these models contain either both graphic and sketching techniques or/and photographs. An example is a model using photographs and a 2 x 2 matrix deduced from the 4 Stagioni method in the study Active, Local, Connected: Strategic and Methodological Insights in Three Cases by Morelli (2011), arguing for a need for new methods related to sustainability. Another example is a model with six criteria containing both sketches and photographs used in a model in aesthetic design methodology (McCardle, Storer, Torrens, Whitehead, Mailley and Farrell, 2011).

*Figure 2. The picture above shows the results of the concept map.*
4.2 Concept map

The results of the concept map include examples of models containing squares and circles visualizing the design process with flow and linearity, in nonhierarchical connections (Figure 2 above). This was further developed into a free-form concept map (see Figure 3 below).

![Free-form concept map with overlapping categories summarizing models containing circles and squares in flow and linearity, in nonhierarchical connections.](image)

The free-form concept map shows that design processes often are visualized as linear with square shapes. Also, there is no standard model among the published models. This indicates that there are different views among researchers on how to visualize design methodology processes in a model. Notably, squares are a commonly used to visualize the design process linearly. At the same time, circles are a common when illustrating the design process as a flow.

It is also interesting to reflect upon the phenomena of the great amount of nonvocalized design processes found in research. Out of 173 articles, 103 did not visualize the design process, and this could indicate that there is a visual territory to further develop in design methodology research. In accordance with Shneiderman (2014), we agree that visualizations are cognitive processes with the aim to gain insights and looking upon the result from this point of view, many of the models in the category of Attractiveness can be developed using more...
images, and less text. This result goes along with Puwa and Sharma (2012) pointing out that images are easier to address than words and by visualizing design methodology processes even more people can absorb and understand complex research. Although, Drucker (2011) argues that that there is a problem associated with validity and how reliable visualizations are, and this issue is present in the results.

6. Conclusions

This paper investigates how design processes are visualized in research, with the overall aim to highlight dominant structures from a design activist perspective. Linked to this perspective, there is a need for more sophisticated user-centered methodology when visualizing the design process in order to gain insights from the models presented. There are several types of visualizations of design processes, but several of them can be perceived as being too complex. There is a potential for disrupting existing power structures by questioning how results are visualized. Models should be explicit for increased understandability, accessibility and validity.

This study shows patterns of linearity processes when visualizing design methodologies, and this can be an indication of that the heritage of the transmission view presented in the Shannon and Weaver model from 1949, even now is present. This confirms that the linear model still is the norm when presenting design methodology processes visually. Also, the linear process is closely related to the squared format and this shows that it is attractive to visualize design process in a cubistic form and on a clear line, either from left to right or from top to bottom.

The design requirement of Attractiveness in the visualization is closely linked to the individual expression of the researcher, and a conclusion is that none of the visualized models are entirely similar. Instead, this study shows that many researchers communicate their own model. In this context we would like to emphasize the potential fragility of the process and that this pluralism of models could generate a lack of stringency and a weakness of opacity. In order to improve design processes in research we suggest that the concepts of validity and reliability should be taken into account when visualizing design processes. A reflection related to this is that many of the examined models could be seen as not being explicit, i.e. implicit models require a deeper reading to be understood.

Finally, this study underscores the potential of having a design activist perspective when looking upon these visualizations; this perspective can broaden our understanding and raise awareness about existing structures in design processes.
7. Further research

Exploring visualizations of design processes arises several questions related to design activism. It would be interesting to further study for example, how design research can become even more innovative in developing models that are understood cognitively and communicative? This aligns with the conclusion that the visualizations of design processes often are too complex. Therefore, knowledge of universal design principles and attractiveness needs to be developed, and how to evaluate the functionality and quality from a user-centered approach. We are also looking forward of future studies to come focusing on Utility and Soundness in The Vitruvius triangle.

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Abstract | The fashion industry is a highly pluralistic and diversified context in which material and intangible products, cultural capital and human resources merge together. As the outcome of a complex integration process among different methodologies and areas, fashion contributes to a new reading of the cultural changes which shape our present. By drawing on various codes fashion is capable of generating a narrative which bestows meaning on the relationship between references, materials, technologies, products and processes. Given the need to rise to modernity's challenges and to be innovative, the forms of cross-fertilisation in the contemporary world are becoming ever more daring, while the number of disciplines involved is steadily growing, and the skills required are becoming increasingly specialised. Nowadays, the fashion system is linked to technological progress. Fashion-Tech sector is originated in the interplay among fashion design and digital technologies and is a special disciplinary niche, as it is marked by elements which are unprecedented in history in terms of revolutionary impact. This process of hybridisation has opened up new possibilities in terms of innovation, and it has generated products and services with enhanced performances, whereas technological advancements have been given the chance to enter consumers’ lives and bring them innovation. From design to retail, from product to communication, fashion and technology are interconnected and the shift from craft to industrial production, from an analogue dimension to a digital one involves not only all stages of the production process, improving them and making them quicker and more efficient, but also the design practice, changing its meaning and purpose.

The paper aims to trace and define the revolution taking place within the fashion world, those avant-garde movements which are experimentally operating on the boundaries of different disciplines, describing realities that are sometimes in contrast with the traditional practice. In particular the research investigates how these dimensions, resulting from the intersection between fashion and technological progress, are impacting on human beings, on their relationships with the garments, with their bodies, with the environment and with other people. The paper will analyse the changes induced by the fourth industrial revolution in the field of fashion and the impacts on processes, products and languages.
Moreover, it will analyse the technologies currently employed in the fashion landscape, along with their possible applications in future scenarios, referring to the most relevant case studies in the field. Cases will be introduced combined into clusters, according to the subject areas involved, that represents Fashion-Tech innovation tracks:

- **Artificial second skin:** body equipment with embedded sensors able to monitor human body parameters that are critical for healthcare;
- **Hyper-body:** products are becoming increasingly connected with the body, becoming part of it;
- **Fashion-Tech takes care:** sustainability – intended as efficiency, recyclability, transparency, mission orientation and ethical upgrades – can cover the entire fashion supply chain;
- **Physical avatars:** digital beauty in real layers.

These are not intended as market trends, but rather trajectories, at a different stage of development, orienting the design practice within the Fashion-Tech field. They result from observation, analysis and interpretation of emerging issues in the Fashion-Tech context, conducted by desk research.

The paper concludes with a reflection on the role of design in guiding technological innovation, highlighting how fashion design, within the Fashion-Tech paradigm, can accomplish, or at least offer, the possibility of bringing the results of the most daring scientific progress closer to a human and tolerable dimension.

**KEYWORDS | FASHION-TECH, HYBRIDISATION, DISRUPTION**
1. Introduction

“The avant-garde is the symptom of a new situation ... The arts of our century are characterized by the tendency to move towards borderline areas where each art touches the boundaries of the other, often invading its territory.” (Spatola, 1969)

The worlds of design and fashion are inextricably linked to the temporal variable. Indeed, the historical context integrally and intimately defines objects: not only does it determine their reason for existing in relation to needs and functionality, but it influences the stylistic, material and technical choices.

The complexity of the fashion sector, its intrinsic and communicative value, and its relationship with time can be well exemplified through the linguistic paradigm.

Clothes, like words, cannot exclude the comparison with time. In linguistics, the sign—the word—is formed by the arbitrary union of a signifier and a meaning (Ferdinand de Saussure, 1979). The signifier, or expression (Hjelmslev, 1991), can be a sound—in the oral sign—, or a handwriting—in the written sign—. The meaning instead is the content, which the sound or handwriting wants to convey, and the concept embodying the mental notion of an object. Meaning makes it possible to understand or express the sense, value or content of a sign. In communication, the sign has a dual function: one of a referential type, that is to tell something about the world; the other one is an aesthetic one—to communicate something self-related.

Like words, objects can also be traced back to this model. They have a tangible dimension which can be experienced through senses. They have also an intangible dimension of content, a referential meaning which refers to reality. Lastly there is an aesthetic meaning that refers to imagination, more or less similar or dissimilar to the representation of reality. The link that binds meaning and signifier is not natural and necessary, but arbitrary, as a cultural product that exists in a certain historical and geographical moment.

It is precisely in this arbitrariness, in this mutual bond between the parties of which the space-time component is a fundamental variable, where the concept of 'contemporary' resides.

In the world of design, we can define 'contemporary' not only as what has been designed and produced in the present time, but also as what is aware of being contemporary, therefore able to fully express the Zeitgeist, the spirit of the time (Blumer, 1969; Vinken, 2005): the collective taste, the general moral, ideal and cultural climate that characterises a particular historical period. Therefore, only some of the objects produced and made in the current context can be considered in all respects contemporary: the fact of being able to trace their genesis back to the present time is therefore a necessary but not sufficient requirement to be defined as such.

Clothes, like other categories of artefacts, are balancing a dualism of difficult reconciliation: on the one hand the cyclical re-proposition of tradition, its enhancement and the maintenance of ties with the past, on the other the push towards innovation, the search for a language compatible with the complexity of the present and the ongoing digital revolution. The paper is
particularly interested in analysing those Avant-guard (Szabolcsi, 1971) realities breaking the cyclical re-proposition of tradition, instead taking new directions to explore other territories and generate innovation, proposing not only a new aesthetic, but also a new vision of the world. But where do they head?

2. Hybridisation and Innovation

“Who are we, who is each one of us, if not a combination of experiences, information, books we have read, things imagined? Each life is an encyclopaedia, a library, an inventory of objects, a series of styles, and everything can be constantly shuffled and reordered in every way conceivable.” (Italo Calvino, 1988)

In his Six Memos for the New Millennium, Italo Calvino (1988) listed multiplicity among the six values that were to underlie the new millennium’s literature. He envisaged the novel of the future as a large network in which different kinds of knowledge and diverse codes could generate a new and multifaceted vision of reality. The multiplicity value anticipates aspects which were subsequently to characterise both the internet and the structure of unsolvable complexity inherent in the contemporary world, a ‘system of systems’ based on integrated links and the coexistence of diverse elements which inform everything (Gadda, 2007).

Indeed, the world nowadays is becoming increasingly complex and interconnected; thus, the challenges of the modern times require the cooperation of various actors who avail themselves of different types of knowledge and skills, thereby integrating them and making them complementary. Our present is propelled forward by rapid changes which have affected every area of knowledge. In the meantime, the vast availability of information has blurred our perception of points of reference once embedded in our history, such as the analytical, linguistic and cultural ones.

In a context such as the present one, a dialogical approach shifts an individual and partial perspective to a choral, inclusive one, and may therefore enable the creation of shared and integrated solutions based on multilateral participation.

The boundaries between various branches of knowledge are not closed, but rather allow for constant infringements, and in fact present themselves as areas open to contamination and mediation (Lozupone, 2015). Indeed, modern disciplines are best seen as a complex interaction (Pizzocaro in Bertola & Manzini, 2004) among a plurality of systems (Von Bertalanffy, 1971): the various empirical sciences may therefore be reduced to conceptual models, each of which relies on interdependent elements that intersect one another.

The reasons behind such hybridisation, or cross-fertilisation, among different branches of knowledge with little in common are numerous. The first of these is the possibility of
generating innovative solutions, as knowledge transfer is indispensable to give rise to new ideas.

This blend among diverse fields has led to noticeable innovations across a number of them. Therefore, in a contemporary perspective, the ability to innovate appears to be largely dependent on various forms of cooperation among numerous areas of knowledge.

Fashion as a discipline has always been characterised by the intertwining of complex trajectories based on thematic references, borrowed methodologies and the appropriation of various unrelated fields of expertise, with the clear aim of generating innovation.

In the course of history, fashion and technological advances have often influenced one another. This process of hybridisation has opened new possibilities for fashion in terms of innovation, and has generated products and services with enhanced performances, whereas technological inventions have been given the chance to enter consumers’ lives and bring innovation to them.

The fashion system is entirely affected by technological progress nowadays. Consequently, the Fashion-Tech sector, which originated in the interplay between fashion design and digital technologies, is a special disciplinary niche in the contemporary world, as it is marked by elements which are unprecedented in history in terms of revolutionary impact. Indeed, digital technologies have wholly pervaded the fashion system in its processes and products, have altered the DNA of traditional paradigms, and have changed the role of the actors involved (Testa, 2019). The interplay of various sectors is attracting a growing number of actors and businesses both from the fashion and the technology sector.

The introduction of digital technologies and ICT has marked a revolution in the fashion system (Testa, 2020). This modern revolution has led to more flexibility in the classic design paradigms, especially those concerning processes, codes and materials, and has mellowed former dichotomies into a seamless spectrum. Natural elements and man-made materials, analogue and digital technologies, standardisation and customisation, the artisan’s and the engineer’s approach, the outward appearance and the essence, the shape and the function, have all ended up coexisting in this context, and have merged with one another.

Today the fashion industry is a highly complex pluralistic and diversified organism in which material and immaterial products, cultural capital and human resources merge together. As the outcome of a complex integration process among different methodologies and areas, fashion contributes to a new reading of the cultural changes which shape our present, and by drawing on various codes it is capable of generating a narrative which bestows meaning on the relationship between references, materials, technologies, products and processes. Given the need to rise to modernity’s challenges and to be innovative, the forms of cross-fertilisation in the contemporary world are becoming ever more daring, while the number of sectors involved is steadily growing, and the skills required are becoming increasingly specialised. Fashion’s boundaries are open to the boldest forms of research and experimentation. They are the result of the interplay and mutual integration of highly diversified and specialised fields, which
range from medicine to aeronautics, from engineering to city planning, and from biology to cosmetics. It is these mergers which supply the lifeblood of creativity and innovation. Contemporary fashion designers are forced to operate on more levels in increasingly complex contexts, and to harmonise diverse elements which are in contrast if not in outright diabolical opposition. They therefore show a shared inclination to a high degree of flexibility which conjugates the cross-fertilisation of different kinds of knowledge and know-how and experience a similar need to experiment materially and to reach a developed vision of the technology they apply. Such modus operandi strives to seek and define original scenarios and presupposes a special ability in audaciously stretching the designers’ initiatives beyond the comfort zone, thereby challenging and breaking the limitations derived from traditional paradigms such as matter, codes, and processes (Cappellieri, Tenuta, Testa 2018).

3. Future Scenarios for Fashion-Tech

3.1 Methodology

The following part of the paper will address the peaks of innovation and will describe future scenarios for Fashion embracing the digital shift through the identification of future possible directions in regard to new Fashion-Tech products, consumption habits, markets conducted with the scope of evaluating and identifying opportunities and requirements for development of main topics within the areas of Fashion-Tech.

These scenarios may be referred as ‘Design Orienting Scenarios’ (Jegou and Manzini, 2000) as they allow the exploration and description of promising innovations involving a set of relevant actors. The scenarios are then visualized through a Cartesian coordinate plane, producing a ‘Design Plan’—design directions for the development and refinement of innovative body equipment in the field of Fashion-Tech—.

Starting from the idea that a trend is a direction of movement or change in an observed value (Thomsett, 2015), information is the common denominator among all the emerging future directions that are described in the following sections. These are not intended as market trends, but trajectories, at a different stage of development, orienting the design practice within the Fashion-Tech field. They result from observation, analysis and interpretation of emerging issues in the Fashion-Tech context.

This process proposed by Jegou and Manzini (2000) was particularly useful as it helped us approaching in a systematic, coherent and organised way a complex situation with a large quantity of variables. The followed process started with a desk research, with an overview of the state of the art in Fashion-Tech through literature search and review, case studies analysis and interviews.

We then identified main macro trends within the field of interest. A macro-trend can be defined as a change in the context of the current system that may have a potential effect on its
development (Manzini et al. 2009). For the field of Fashion-Tech we found as a relevant and discriminating element the degree of interactivity of a product (autonomous interaction/controlled interaction) and its scope in relationship with the body (functional/expressive).

It was created a Cartesian coordinate plane according to the polarities:

- the scope on the abscissa axis: on one side functional body equipment and on the other one expressive body equipment;
- the degree of interactivity on the ordinate, based on autonomous interaction and controlled interaction.

Lastly, we used the Cartesian coordinate plane to map the case studies and we built different alternative scenarios exploring potential reconfigurations of the current fashion system. The scenario building methodology we followed made use of a polarity-based approach, represented within a Cartesian coordinate plane. Polarities show possible variations along one dimension of a piece of body equipment, between opposite directions.

**Figure 1. Fashion-Tech Design Plan, case studies mapping. Source: Authors.**

### 3.2 The Four Macro Areas

Four macro areas emerged from the Design Plan methodology that may represent a direction of future development and potential applications of the products for the Fashion-Tech.
The four scenarios are:

1. Artificial Second Skin: body equipment with embedded sensors is able to monitor human body parameters that are critical for healthcare
2. Hyper-Body: products are becoming increasingly connected with the body, becoming part of it
3. Fashion-Tech Takes Care: sustainability – intended as efficiency, recyclability, transparency and ethical upgrades – can cover the entire fashion supply chain
4. Physical Avatars: digital beauty in real layers

For each Fashion-Tech scenario, most of the products, technologies, fabrics or techniques come from worlds apparently far from that of fashion and are only the result of the meeting of different disciplines and fields. Medicine, architecture, gaming, robotics and automotive are just some of the areas where most of the innovations we are seeing are being implemented.

The examples contained in the following paragraphs are presented in an order that is not intended to highlight the state of diffusion, marketing, or development process of the product, but to picture and highlight general common trends, the existence of some avant-garde sectors, generated by contamination and integration with areas other than fashion. It is in fact a transversal research towards the approach to innovation in the field of fashion.

Figure 2. Fashion-Tech Design Plan, scenarios. Source: Authors.
3.2.1 Artificial Second Skin

The first scenario concerns body equipment behaving like a second skin, from one side monitoring or intervening on body parameters and on the other side acting as body prostheses to control external environments or smart devices.

It features products whose interaction activation is controlled: they can be activated either by the environment or by the users, enabling them of enhancing their performances, opening the possibilities of spreading new behaviours. For this reason, this category of body equipment is mainly purely functional.

While health and wellbeing products had previously been focused on providing information on the users’ vital signals for a quantified self to improve lifestyle and control it, wearables and smart textiles with embedded sensors can monitor physiological, neurological and body kinematic parameters, critical for healthcare (Cho, 2010). Body signs, such as heart rate, respiration and motion patterns, can provide data to detect behavioural changes and health risks, diagnosing issues at early stages (McCann & Bryson, 2009; Cho, 2010). Fashion and product designers, and textile, electronics and material engineers are the main professionals involved in this first macro area. It is a mature and marketable scenario, that involves robotic, automotive, military and medicine fields.

Within the medical field, GS[3], designed by Snezhana Paderina and Nikita Replyanski, is a graduated spine support system providing dynamic back support. It is addressed to patients suffering from medical conditions, which cause joint hypermobility and chronic musculoskeletal issues requiring daily spinal support. Using data assessed by an integrated neural network, the lightweight cable mechanism of the graduated spine support system can easily and precisely be adjusted to the wearer’s rigidity and support level. Within the same field, VTT Technical Research Centre is interested in creating wearable sensors and technologies to understand human movements and behaviours, while CCT Group is developing protection sensors and actuators, artificial muscles and second skin interfaces.

Moving to the field of safety, the main target group for protective wearables is mostly sick or elder people, who are statistically not highly familiar to digital technology. This instead may be helpful to predict possible future accidents or health problems. According to a study published in Smart Clothing Technology and Applications, people in general are keener in welcoming in their daily body equipment smart items that would satisfy physiological and safety issues (Cho, 2010), which are placed at the base of the Maslow’s pyramid of human needs.

Thus, the need for protective garments is further proven. Protection is not only connected with monitoring the body but also with safety. Hövding 3 is an airbag for cyclists that is worn around the neck such as a collar. In the event of an accident, the airbag inflates and covers head and neck as a protective hood. Sensors inside the collar read the cyclist’s movement pattern 200 times per second. In the event of an accident, the airbag inflates in 0.1 second.
The UV sensor by L’Oréal and Yves Béharto fits into body equipment designed with safety purposes, as it protects the wearer against melanoma. It is a small UV Sense device which works without the need for a battery: its dimensions are so small that it is possible to be worn on a nail. The device tracks sun exposure, as a way of lowering the risk of skin cancer.

Finally, the last case study deals with a piece of body equipment directly applied on the skin. Designed by MIT Media Lab, DuoSkin is a fabrication process that enables users to create customized functional devices which can be attached directly on their skin, as metallic jewellery-like temporary tattoos. Using gold metal leaf, a material that is cheap, skin-friendly, and robust for everyday wear, DuoSkin is designed to allow three types of on-skin interactions: sensing touch input, displaying output, and wireless communication. DuoSkin devices enable users to control their mobile devices, display information, and store information directly on the skin.

### 3.2.2 Hyper-Body

Hyper-body concerns body equipment designed with a high aesthetic and expressive value and not fully controlled by the user’s will.

In the relationship between technology and fashion, the body plays a crucial role. While on one side technologies are becoming autonomous, contactless, wireless, on the other side products with embedded technology are becoming increasingly connected with the body and the skin, in some cases becoming part of them.

Starting from medicine, engineering and military fields, artists, fashion and textiles designers together with electronic engineers explore how to develop new body languages, through wearables and smart textiles.

Some projects are working on designing wearable items with behavioural attitudes, able to respond with a certain degree of autonomy to body or environmental stimuli. Some products are able to react thanks to the properties of the smart materials as My Own Show by Formafantasma. This head piece moves from the idea of preserving the privacy of the wearer and works against facial recognition. Hacked flashlights mounted on a golden radiating wire construction will flash as a reaction to other cameras, resulting in overexpose of the face of the wearer. The headpiece questions the thin borderline between the private and the public, and the way we daily ‘sculpt’ our own image on network communities.

Some other more radical projects investigate instead the capability of a garment to assume the behaviour of animals.

The Spider Dress 2.0 by Dutch designer Anouk Wipprecht, for example, well shows the power and beauty of technology when integrated into body equipment. The 3D printed item features animatronic mechanical limbs with sensors, that protect the wearer’s personal space.
Conceived to respond to external factors through proximity and respiration sensors, the piece extends or retracts its limbs once the sensors are stimulated.

Another project that explores the relationship between people is Intimacy by Studio Roosegarde. These high-tech garments are made of smart e-foils able to track and respond to the wearers’ life signals, such as heartbeat. The e-foils become more or less transparent based on the wearer’s interactions with people, creating a sensual play of disclosure.

Within the context of project exploring the behaviour of the human body, Bodyscape focuses in particular on highlighting and enhancing the wearer’s movement through light. As the wearer moves, the garment lights up thanks to embedded LEDs. The lights are controlled by a gyroscope that tracks the shoulder movements of the body. Bodyscape is not only a technologically advanced fashion item produced using 3D printing technology, but it also raises fashion to the poetic dance of light and human movement: it amplifies the performative qualities of the body in motion and creates an enchanting, illuminated choreography of the movements.

In this context of Fashion-Tech performances it is simply not possible to overlook the work of Hussein Chalayan, one of Fashion-Tech’s visionary forerunners, who began experimenting with the application of wearable technology to haute-couture right from the establishment of his brand in 1994. He has amazed the public of his fashion shows with clothing that changed shape by means of microchips, dresses with countless embedded LED lights which reproduced the same effect as pixels on a screen, and tables that turned into gowns. For his SS 2017 collection he cooperated with Intel on a line of technological clothing that was showcased at Paris Fashion Week. As models moved along the catwalk, images relating to their stress levels were being projected on the wall behind them, something that was made possible by the biofeedback which the accessories they were wearing kept sending. Glasses powered by the Intel Curie module gathered biometric data from three different sensors. Combined they were able to infer stress in real-time. That data was then communicated to a belt via a Bluetooth and then translated into the visualizations displayed on the wall as the models moved down the runway.

It goes from products to services able to store data and working through artificial intelligence.

Echo Look is the device launched in 2017 by Amazon that acts as a virtual stylist giving fashion advices. It is a smart camera that reacts when the user awakens its smart soul, invoking Alexa the Echo products virtual assistant. Once the outfit is worn, Alexa is asked to take some photos in different positions and from all angles. Having collected the data, Alexa compares the outfit with other ones already stored in its database, giving a preference based on algorithms. Thanks to these smart devices Amazon can collect an infinite amount of data and information about its users extremely quickly. These data are useful to better profile consumers’ tastes with ever greater precision, to propose items that we might purchase on its platform.
3.2.3 Fashion-Tech Takes Care

Sustainability goes across design, production and retail covering the entire supply chain and it is intended as efficiency, recyclability, transparency, mission orientation and ethical upgrades. Involving mainly smart textiles and digital manufacturing, the level of maturity of this trend is very high as well as its marketability. Usually the presence of technology is behind the scenes and it is managed by material and textile engineers, biologists, computer scientists and fashion and product designers.

Due to the fashion industry’s high impact on the environment, investing in technological solutions to decrease its negative effects is crucial (Forbes, 2016). While digital technologies, such as ‘see-now buy now’ concept or digital solutions offered by companies such as Berge and Teko Solutions can decrease waste by producing only what is in demand, involving microbiology and biotechnology into fashion to produce biodegradable garments can close the cycle of production, disposal and re-use (Seymour, 2010). Thus, some realities, such as BioCouture and Bolt Threads, are advancing sustainability working with sustainable fibres and production techniques. While BioCouture’s aim is to grow garments from bacterial cellulose (Seymour, 2010), Bolt Threads is brewing spider silk protein to then spin it into yarn (Forbes, 2016). According to Danielle Wilde, Associate Professor at the University of Southern Denmark, designers should learn from biology in order to shift their design process to more sustainable practices. On the other hand, a sustainability related issue requiring attention relates to different theoretical life spans of textiles and the electronics utilized in wearables (McCann & Bryson, 2009), which can be challenging for a workable integration of the two (Seymour, 2008).

Moon Parka, developed by Spiber together with The North Face, made from artificial spider silk, is designed to endure the harsh conditions and intense cold of the South Pole. Spiber staged a five-step innovation cycle in order to produce ever better qualities of artificial spider silk. It starts with molecular design: designing amino acid sequences, on the basis of bioinformatic analyses, that deliver better tensile strength, elasticity and heat tolerance. The second step is gene synthesis: syntheising genes that produce the desired amino acid sequences. Then, microbial fermentation. The synthesized genetic DNA is introduced into microorganisms. Test spinning can begin as soon as 10 days after gene synthesis is complete, once fermentation and refining conditions have been fine-tuned. The fourth step is spinning. The fibroin proteins produced through microbial fermentation are refined and formed into fibres. Spiber established a scalable spinning process that paves the way for mass production of artificial spider silk. Finally: prototyping. Spiber produces textiles and composites from their new materials; they assess their productivity and functionality. They feed back this data into the next generation of molecular design, after which a new cycle begins. The result of all this hard work is enormous: compared to when they started in 2008, they have dramatically increased productivity and decreased costs, bringing us to a place where large scale adoption of protein materials is finally becoming a reality.
Sustainability is becoming a trend, and this is demonstrated by the interest to the topic by the fast fashion giants. H&M group have partnered with Swedish company re:newcell, whose unique technology recycles used cotton, viscose and other cellulosic fibres into a new, more sustainable dissolving pulp. The pulp can be turned into new textile fibres and be fed into the textile production cycle. The partnership is another step towards H&M’s goal to use 100% recycled or other sustainably sourced material by 2030. Also, the birth of the first global retailer in fashion launching Gold level Cradle to Cradle (C2C) Certified T-Shirts. C&A produces in consideration of the environment, in a way that does not create excess waste, uses only safe chemicals and dyes, produced in a socially responsible way and is designed for its next life.

Sustainability also includes all those products that foresee an 'apocalyptic' vision of the world, in the event that there is no action in time with sustainable solutions.

Some products for example are designed to assist us in the act of breathing, such as Aō Air Atmōs. Consumer concerns regarding air quality are increasing on a global level due to the high levels of pollutants found in urban areas, which is seeing new products like the Aō Air Atmōs wearable air purifier be developed. The purifier works by being worn over the face and creating a light seal over the face to let the user enjoy purified air throughout the day when commuting or exercising. The unit doesn’t focus on creating a tight seal around the face in order to not cause discomfort and allow the skin to breathe instead of feeling hot or constricted.

Other projects instead explore alternative territories, such as life in space or on other planets. For the future - the fourth revolution - Neri Oxman predicts the arrival of what she calls the Biological Age, in which microorganisms, living matter, and wearable micro-biomes will be designed that nourish the skin or photosynthetic buildings will be built that convert carbon into biofuel.

3.2.4. Physical Avatars: Digital Beauty in Real Layers

In the last scenario, the user-controlled product becomes a purely ornamental interface to create new digital-experiential levels within the physical world.

The body can be counterfeited as with CV Dazzle. CV Dazzle explores how fashion can be used as camouflage from face-detection technology, the first step in automated face recognition. The name is derived from a type of World War I naval camouflage called Dazzle, which used cubist-inspired designs to break apart the visual continuity of a battleship and conceal its orientation and size. Likewise, CV Dazzle uses avant-garde hairstyling and makeup designs to break apart the continuity of a face. Since facial-recognition algorithms rely on the identification and spatial relationship of key facial features, like symmetry and tonal contours, one can block detection by creating an ‘anti-face’.

In other cases, the body can be revealed according to the type and intensity of interactions.
X.pose for example deals with digital data production. Since we have already ceded control of our digital data emissions, X.pose broadcasts the wearer's data for anyone and everyone to see.

Users can directly control the aesthetics of their items, customizing them and adapting them to their taste. TagoArc is a bracelet featuring a full E Ink display that can change according to the user will. Thanks to a smartphone app it is possible to change the displayed pattern on the item an infinite number of times.

Another layer that can be created is that of memory taking a digital form. Design studio Artefact Group created a conceptual smart locket that wirelessly interacts with social networks to display a digital memento of friends or family. Intended as a benchmark for how fashion and technology can complement each other, Artefact's Purple is a proof-of-concept locket that wirelessly receives images and messages from the wearer's social networks, offering a 21st century update to the traditional keepsake. The locket is able to connect to social networks, but rather than swamping the wearer with every possible update, the user first selects the people they'd like to receive notifications from. An accompanying app enables further options like creating personalised keepsakes with filters and effects, or adding and removing people from the update list.

The added layer can also be haptic to amplify the musical experience. Subpac by M2X is a tactile transducer to be worn on the back that conveys to wearers a physical impression of sounds just as if they were in a real club.

4. Conclusions

“As we move deeper into the twenty-first century, it becomes ever clearer that the ultimate, most intimate territory for design is not electronics, or interiors, or furniture, or the web. It is us—our own living, breathing, biological selves.” (Rick Poynor, 2013)

For a long time, digital innovation applied to body equipment has been mostly carried out by the technology industry.

Engineers and scientists have moved their research mainly in function of an improvement in terms of quantifiable performance, data and mathematical results, with the aim of pushing humanity constantly beyond its limits.

Contemporary society is markedly based on performance, on overcoming borders, breaking records, in the incessant pursuit of the myth of the super-human. The fantasy that nourishes the common imagination is that new technologies applied to the body and clothing have the aim of becoming functional prostheses capable of improving human performance and therefore, as a direct consequence, his quality of life. But is this really the case?
In this regard, the reflections of Sobchack are interesting. Through her essays, she deals to varying degrees with the theme of the ‘techno-body’, a personal and stringent question following the surgical amputation of one of her legs as a treatment against cancer. In her 1995 essay on computer theory, Sobchack criticizes the “delirious liberating rhetoric of technophiles” and does so from the position of someone who is “technologically enabled in the most intimate way”, but who is not and does not feel, however, a cyborg. In particular, she addresses Baudrillard (1991): “(...) Unlike Baudrillard, I have not forgotten the limitations and finitude and naked capacities of my flesh – nor, more important, do I desire to disavow or escape them” (Sobchack, 2004, p.172). While not a ‘technophobe’, Sobchack argues that a critical emphasis on the ‘lived body’ is crucial to providing an ethical basis for issues relating to the intersection of technology and the body (Sobchack, 2004, p.172). This is why performance for those who live with the need to use bodily prostheses is no longer a priority, but the priority becomes the possibility of ‘normality’. And this is precisely the crucial point. The theme of innovation and performance, whether or not enabled by digital technologies, is approached from a different point of view from engineers and scientists to designers. Progress has long been a monopoly of science and this has led to its being associated over time with values linked to performance and functionality.

Today, an increasing number of designers are working in the field of biological research, creating speculative and critical design projects, in an attempt to encourage the public to actively participate in the discussion of scientific advances and ethical issues surrounding them.

The growing interest in these hybridizations is evidenced by the inclusion of degree programs in design that intersect with scientific disciplines, from Design Interactions at the Royal College of Art in London, to Contextual Design at the Design Academy in Eindhoven, to the Master courses dedicated to Fashion-Tech at Politecnico di Milano.

In this territory, design and fashion have the task, or at least the possibility, to bring the results of the most daring scientific progress closer to a human and tolerable dimension.

What is urgently needed is to initiate a substantive discourse on the role and contribution of designers when collaborating with scientists and engineers.

References


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From the product to the object. The speculative design practice as instance

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Abstract | Switching from the function-object to the speculative-object transforms the meaning of the object, in so far as it is no longer a passive element of the discourse, but the triggering actor of an embodied reflexive process. In this perspective, the object transforms itself, from a functioning commodity to an open minded "thing" full of meaning. (Bodei, 2009). Understanding it as a device of thought, the speculative-object, becomes the narrating subject for a cultural reflection on humankind and it definitively changes its ontological status. (Harman, 2018). It imposes itself as a cognitive trigger of emancipation compared to a predeterminated thought, toward a deconstructive logic that does not give absolute solutions. In this context, the designer transforms himself from the one who solves problems (problem solver) to the one who identifies problems (problem-finder), through an investigative approach oriented towards evolving scenarios. Speculative objects therefore connect subject and thought and the more they exhort a disruptive vision, the more they demonstrate their intrinsic capacity to produce change.

KEYWORDS: RESEARCH THROUGH DESIGN, SPECULATIVE DESIGN, PROBLEM-FINDING, CRITICAL MAKING, MATERIAL CULTURE.
1. At the roots of Speculative Design.

In a post-industrial scenario as the current one, where the production system is increasingly converted into new configurations, the concepts of function and meaning of the product need to be reanalyzed. The transition from the functional product to the speculative object - understood as the ability that design has to consolidate a critical vision of the world into an object - is now being strengthened at a global level, not only through the emerging designers that implement it, but also the research conducted in the more institutional places of education.

In the essay *What is criticism?*, Renato De Fusco analyses different meanings of "criticism", from an etymological, philosophical and historical point of view. In many definitions found, criticism indicates the ability to examine, through a sort of judgment, the results of particular notions, doctrines or works, in order to understand their contents and evaluate them appropriately. "Criticism's definitions are followed by those of "criteria", which are to be considered as the constructive elements of criticism, sharing the same root, *kpivo* (distinction). (De Fusco, 2002). The criterion is the parameter that guides the choice of a specific critical interpretation. However, over time it evolves continuously, in relation to the changing cultural and social sensitivity and subjective taste.

But the critical approach also indicates a particular analytical attitude that aims to build an elaboration of a certain thing or event. Traditionally, this term has been closely related to disciplines such as art, history, philosophy and only in the last few decades this term has been strictly related to the culture of the project, to the point of identifying a theoretical and applicative specific field.

Referring to the intellectual aspect of the project, Thomas Maldonado argues that his vocation par excellence has been "to disagree, to think differently", and that his expression somehow is a form of heterodoxy. "Heterodox are to be understood as all those who, in one way or another, act in opposition to dogmas, doctrinal bodies, models of behaviour, symbolic orders, and even existing power structures [...] Rebels, oppressors, antagonists, transgressors, and in some cases openly revolutionary. The tradition of the heterodox is certainly the tradition of intellectuals." (Maldonado, 1995).

Through the description of intellectual figure by Maldonado and De Fusco's definition of "criticism", it is clear that a speculative design approach leads to a breakthrough in the creation of new meanings and relations between object and user. This premise helps us to understand the typology of approach that led to the birth of Radical Design between the late 60s and 70s in the cities of Milan, Florence, Turin and Naples. By collecting the main experiences of those years - counter-design, conceptual architecture, poor technology, eclecticism - Radical Design starts to spread thanks to the theoretical and practical work of Archizoom, Superstudio, UFO, Global Tools, leaded by architects and designers as Ettore Sottsass, Gauni Pettena, Andrea Branzi, Ugo La Pietra, Riccardo Dalisi.
The term “radical”, coined in 1966 by the historian Germano Celant, indicated a position of change with respect to the social, political and industrial system in force. Among the themes supported by the movement, there was a return to a process of "making design" closer to mankind, in opposition to the current industrial de-humanisation and rigid functionalism with a rationalist imprint.

By promoting social interaction, spontaneous creativity, free individual expression, far from stereotypes and pre-established systems, Sottsass argued that "all the terms, relationships, controls, classical organizations had crumbled, had been overthrown, to give way to the new images which turn on and off here and there, caused by vital explosions where there are, by sexual activity, by heroic ambition, by frenetic activity, by repentance, by selfishness, by terror, by insolence, in a sort of chaotic, confused, overwhelming and overflowing landscape. (....) What does my furniture have to do with all this? It is trivial and does not matter. But the idea would be to invent new unlimited possibilities, new forms, new symbols: to seize the things that are dying to see if it is possible to inject more energy, more life, more dynamics into people's lives." (Sottsass, 1965). Perceiving utopia as an initial stimulus on which to build the desired reality, and so tracing alternative ways of living and dwelling, the user participated in a wider social project that included an awareness towards the consumer's society. In this perspective, the hypothesis of a perfect industrial world, made of many perfect and functional products, homologated for everyone, was dropped.

Following the economic boom of the 1980s and the widespread interpretation of design as a mass product, the theoretical legacy of Radical Design found new life in 1999 in the Anthony Dunne's book Hertzian Tales, further developed in Design Noir (2001). In opposition to an affirmative design that can give absolute answers, Dunne & Raby's Critical Design consisted more in "an attitude than anything else, a position rather than a method [...] Naming it Critical Design is simply a useful way of making this activity more visible and subject to discussion and debate." (Dunne and Raby, 2001).

If comparing the two movements, despite the different historical moments, there are several common aspects: the corrosive attitude, the intellectual inclination, the will to deconstruct an existing system, the speculative and questioning approach. Another analogy derives from the fact that both had fertile ground for development from two different periods of crisis: on one hand the energy crisis of 1970s, on the other the early economic recession of 2000s. The spread of divergent thinking in these two precise historical moments is not accidental, but testifies the evident need to react, through the elaboration of an alternative cultural proposal, capable of unhinging an obsolete system.

In 2013, drawing up a series of parameters of the "speculative" project, Dunne and Raby publish the A/B manifesto. (Figure 1). The decalogue parallels a design as it is traditionally recognized, consistently with the market logic of a contingent functionality, to a design as it could be, influenced by the needs of society, beyond the market's logic. Therefore, A "Design for production" corresponds to B "Design for debate", A "Applications" corresponds to B
"Implications", A "Consumer" corresponds to B "Citizen", in a dialectic of total transformation that involves the entire design process.

In *Speculation Everything*, published in 2013 by MIT Media Lab in Cambridge, Raby and Dunne state "how this is an intentionally eclectic and idiosyncratic journey through an emerging cultural landscape of ideas, ideals, and approaches. [...] to explore the idea of "speculative everything" and design as a catalyst for social dreaming." (Dunne and Raby, 2013). The field of research is, therefore, strongly connected to the design of what is possible, not yet imagined. It is about to temporally place the research in a projected dimension, adopting the design project as a functional element to a destabilization of acquired certainties. In this sense, speculative elaboration is configured as a "political" choice that in turn creates new ways of expression and unexpected fields of action. Its aim is to pose a question mark on the world, encouraging new types of behaviour. It moves consciences. It becomes a concrete stimulus in reality, taking possession of every means available.

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**_DCs Figure 1. A/B Manifesto._** In Dunne, A., Raby, F. (2013). *Speculation Everything*. CA: MIT Media Lab.

**_DCs 2. Problem-Finding approaches._**

In a civilization invaded by the dimension of goods, the design of an object plays a crucial role. Relating to the object-industry connection, what has been happening in this last decade is that, without waiting for a specific company commission, the designer has started to move independently in order to intervene directly on the social, political and cultural demands of society. It is quite a radical change in the way of designing and producing, which leads to the
creation of objects that do not perform specific and closed functions in themselves, but, provided of “a different spirituality” (Branzi, 2006), take on new appearances and purposes. For the designer, it is practically a matter of working on the object for its cultural value and intrinsic capability to sensitize the thought, destabilizing it. In this scenario, a new “designer-thinker” figure emerges - someone who accepts the challenges of the contemporary world, putting together complex inventive processes.

Referring to the theory of Speculative Design, among the most relevant characteristics of an object, there is the fact that there is no tangible and predeterminated industry for it. These objects do not have a circumscribed market, but are linked to a visionary dimension, a work in progress creation. Indeed, by not turning to a traditional market - through the staging of a sort of anti-industry - the divergent thinking and the critical reflections that derives from it, are devoid of any immediate economic purpose.

By implementing this operative modality, the designer acts with a strongly intellectual approach, transforming himself from the one who builds perfect models (problem-solver), to the one who instead identifies problems (problem-finder) in a constant investigative logic towards non-definitive solutions. It is evident that the problem-finding activity, in contrast with the traditional concept of design as an outcome of problem solving, opens the discipline to a different theoretical approach. In this case, the value of the project is determined by its ability to actively relate to mankind, imposing itself as a device for a cognitive process, oriented to a deconstructive logic, far away from reassuring solutions.

Closely connected to contemporary art practices, speculative objects acquire, in man’s life, aims that the functionalist spirit of the last century had always looked upon with distrust. Far away from basic functions, their use is overturned compared to a past conception for which the consumption of an object took place through an exchange of physical type. Beyond a rationalist logic, the speculative object embraces a complex sensibility and leads to a disorientation on the part of consumers, stimulating broad and deep reflections. With the construction of objects so conceived - through operations of an aesthetic, material and sensory nature -, the difference between intellectual and physical consumption vanishes, highlighting a whole series of emotional and conceptual components that exist in the man-object relationship.

In this vision, the dialectic between project-industry-object transits through different modes of investigation that free design from the sole "industrial" denomination, towards other more inclusive interpretations, since the crisis of industrial products - in relation to its "ontological" change and areas of research - opens new perspectives to a more independent design. It’s an openness witnessed by the frequent use of new production methods such as, for example, the numbered series, the unique piece, the adoption of hybrid materials and techniques, the spectacularisation of the process, performance, the use of digital devices. Even visual design, indeed, takes on a central role and becomes a "common space to facilitate processes of understanding, approach and management of the fragilities of our time. [...] It becomes a cultural device to dismantle prejudices by acting as an intermediary for the construction of
cultures of civilization and life scenarios that are sustainable, solidary and fair. [...] The designer, in this sense, has an enormous responsibility, because in his being a measurer of what exists, he records and keeps track, reads and interprets, conveying an idea of the future [...] and affecting reality”. (Piscitelli, 2019).
By highlighting unexplored fragilities and desired possibilities, the speculative approach makes the object a strategic vector for new dialogic processes. The aim, at the end, is to open questions and to understand what role design could play in the immediate future, acting first of all in the perspective of change.

_DCs 3. The transversal instances of contemporaneity._

The industrial supply chain has now become fragmented and it’s not been considered anymore as a monological reference for the development of design. In an challenging and not yet decided reality, in this sense, the speculative object can address a myriad of possibilities, constantly renewing itself through the contribution of diversified knowledges. According to the asynchronic evolutions of contemporaneity (Agamben, 2008), in a highly experimental investigation territory, design hybridizes with heterogeneous knowledge such as, for example, electronic and materials engineering, biotechnology, natural, social and economic sciences, philosophy and human-studies in general. The transdisciplinarity of the project is therefore a fact from which to understand the future horizon, the interweaving of fields, their specific interdependence and therefore the nature of design itself.

In the acceptance of this multiple encroachment vision between the fields of knowledge, the seed of a deeper nature of design - intended as an intermediate and binding agent - is hidden. (Langella, Ranzo, 2013). This transdisciplinary perspective responds, indeed, to the complex relationship that binds nature, man and the things that surround him, in an anti-hierarchical and anti-speciesist vision (Haraway, 2016), conform to the growing complexities of the world.

As the anthropologist Eleonora Fiorani states, "boundary fields do not limit themselves to opening or cutting out new fields, contaminating concepts, categories, methodologies, procedures, models, experiments, knowledge taken from separate differentiated disciplinary fields, but they elaborate and develop them from within their own methodologies, articulating them into models, experiments, devices, with effects of translating meaning and opening up new perspectives of methodologies, which are decontextualized and contextualized differently because they then have repercussions in the same disciplines of origin". (Fiorani, 2012).

Feeding from more branches of knowledge, belonging both to scientific and humanistic culture, the speculative approach reinterprets reality, implementing "migrations" of thought beyond the traditional disciplinary dichotomies, for an interconnected dialogue between object and man.
From the spaces of science and art, between architecture and politics, fashion and new technologies, combining the digital and the organic, design culture has slowly built its own identity, autonomous compared to other disciplines. In this sense, the relationships between designers, engineers, scientists and researchers must be read in an inevitable perspective of collaboration. According to a speculative approach, dealing with real issues - such as environmental sustainability, political debate, social emergencies, the relationship with new technologies - designers make objects in the broadest sense of cultural devices. Among the most urgent topics, the design project also addresses a series of complex themes such as geopolitical phenomena, gender equality, technological body, robotics, synthetic sciences. To understand this language and the new action fields, among the most emblematic examples, we can refer us to the exhibition Broken Nature, curated by Paola Antonelli and inaugurated at the Milan Triennale in 2019. Here, the objects exhibited were designed to the survival of man on earth, the preservation of living species, the care of the territory and biodiversity, the coexistence of digital technologies and organic materials. The exhibition was practically devoid of design products intended as industrial, in conformity with a mass market. Installations, videos, study maps, material experiments and technological devices create a science fiction landscape where it is impossible not to ask questions about the current role of the designer, in the acceptance of how the discipline is radically changing, once again. (Fig.2, Fig.3).

In many cases, these objects are the result of self-produced collaborations and co-funded research within a trans-disciplinary empirical-experimental practice. The storytelling of the process is as important as the final result: the works are always accompanied by critical texts, photographs of work in progress, interpretative scenarios, which reveal their complexity and demonstrate their singularity. A singularity that is inextricably linked to the vision of the individual designer or the work team. Through the staging of these objects, the positivist vision according to which the designer is a problem-solver vanishes definitely, affirming himself instead as the one who identifies fragilities, questioning them, without absolute solutions. In this perspective, speculative objects have the ability, through both their physical and narrative existence, to act within reality by raising awareness aimed at new behaviours and human-world interactions.
Figure 2. XXII International Exhibition Broken Nature 2019 – The Room of Change (on commission) Giorgia Lupi, Gabriele Rossi, Nicola Guidoboni, Giovanni Magni, Lorenzo Marchionni, Andrea Titton, and Alessandro Zotta of Accurat. 2019. Photographs of two work details, by the Author.

Figure 3. XXII International Exhibition Broken Nature 2019 – View of two different exhibited works. Photographs by the Author.
The never-ending crisis of today's society has made us aware of the limits of industry and economic development and it has brought to light countless reflections on a design related to a mankind integrated with the macrocosm. (Caffo, 2017). In this context, the task of design is to produce objects capable of being instruments for a concrete and aware exploration of the real. Acting against an industrial overproduction without logic or meaning, the objects resulting from a speculative approach express a point of view of reality. Therefore, they are not passive observed objects but objects that observe: both because they condense within them the world expressed by the designer, and because, considering themselves as subjects (Harman, 2018), they reaffirm the ability to communicate, to give meaning, to shape the world.

A speculative "research through design" that investigates the object as a thinking device poses itself halfway between an intellectual elaboration and a technical exploration of the artefact, understood as a dual possibility of design investigation of the object. In the transition from the functional-object to the speculative-object, the relationship with the material could play a fundamental role. With the integration of thought into matter, it is possible to introduce a different way of making design that acts in the interstitial space that exists between the conceptual elaboration and the material experimentation of an object. In the laboratory space, far from a design fiction logic, a material approach of a critical object can use concepts and visions simultaneously with instruments, techniques and machinery. Similar to the alchemist, the designer transforms materials and workshop experience into knowledge, since the ability to transform materials also transforms thought. This modality is the more necessary the more research will focus on issues related to manufacturing production and physical construction aspects of the object. An innovation of these logics can only take place from the inside and through a reconfiguration of spaces, tools and materials used for the practical realization of the objects. Within this dynamic, the place in which manufacture is carried out evolves from a space outside of thought, to a space within which speculative elaboration takes place, in a total symbiosis between thought, material and object. In order to do this, innovative materials, advanced manufacturing techniques, self-built instruments, are combined with reflexive processes and experimental methods for the production of the artifact. This type of research, hybridizing digital and analogical, if left to the exclusive digital instrument, it would be impossible to implement. "The tactile, the relational and the incomplete are part of the physical experience that is lived in the manual act of drawing. Drawing symbolizes a wider range of experience [...] as well as the act of playing an instrument, the infinite exploration of the mysterious qualities of a certain chord. The difficult and the incomplete should be positive events in our intellectual activity; they should stimulate us, just as simulation and facilitated digital manipulation of already complete objects cannot do. (Sennett, 2008).
With the adoption of these trans-disciplinary modes, it is possible to see an evolution of design practice capable of distorting the constructive systems of objects from the depths. Reinforcing the methodology of “design through design” with a speculative investigation that includes a conceptual-practical double track, it is possible to highlight the connections between the critical-intellectual aspects and those of an experimental nature. Reclaiming the meanings of matter, substance, process, the laboratory activity is therefore intended as an expansion of speculative activity, for a reduction of design barriers between thinking and doing. In this operative space, matter can be understood as a "hyper-contemporary" instrument of the project. The workshop space, on the other hand, takes on the meaning of a place of knowledge through senses, with a continuous feedback from and to new theories and methods. In this perspective, the critical approach holds together both strictly scientific and humanistic elements, through an unconventional aesthetics and new ways of interaction with the objects. The essay wants to affirm the conclusive thesis that it is precisely through a simultaneous critical/physical approach to the production process, that a deep innovation of the object, in its speculative and technological innovation, can be achieved.

By investigating structural logic from the inside, reconstructing processes, materials and possible interactions, it is evident how speculative-material research can be configured as one of the most evocative areas, for its ability to open horizons and explore new possibilities of being for the objects. Every time an object expresses a new technological challenge, with its presence it offers the viewers a reflection on what and how it is possible to exist in the world. In the context of a theoretical-critical culture of the contemporary object, it is necessary to reflect on the relationship between the metaphorical capacity of the object to evoke something else and its material or technical connotation. Object, subject and thought are connected to the extent that there is an exchange of energies and a mutual influence. In this sense, the implementation of these workshop processes takes on the meaning of a precise choice by the designer of whether or not to explore a certain sensation, for a not merely functionalist purpose, but one that is above all cognitive. Technology and materials are not only used for an aesthetic or functional optimization of the object, but they themselves are an instrument of knowledge, capable of establishing a new mental relationship with the human beings.
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Uninterrupted making processes, where the functional object is replaced by the speculative object, understood as a tool for critical reflection, outcome of a never-ending evolution.

References

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From trustful empowerment to overwhelming guilt: pedagogy in current activism practices.

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Abstract | This paper seeks to unpack the pedagogical value of environmental activism as a practice within the context of a medium-sized Danish city. The approach of an empirical field study, conducted as through immersive observation and combining knowledge from activism theory, communication design and ethnography, led the research to deepen a behavioral understanding of design practice through sensory ethnography, workshop and interview. The findings showed the role of trust as a base for growing a powerful community. A design experiment was carried out to recontextualize, reflect and test the previously observed elements out. Understanding this behavioral logic could create knowledge for empowering communication assets. Acting as observer, objective interviewer, activist-facilitator, the author highlights activism as a multifaceted empowering platform that tends to create social meaning among citizens and develop knowledge for all, but which could eventually, on the other hand, stimulate guilt and rout if the message formulation misses its audience.

KEYWORDS | ACTIVISM, ETHNOGRAPHY, COMMUNICATION DESIGN, PEDAGOGY
1. Introduction

Protest is an ancient practice, predominantly concerned with the correction of injustice (Beder, 1991). Protest actions such as demonstrations, blockades, protest marches and meetings are the traditional method for groups of people to communicate to the wider public. It is used as:

"a method for involving people in a meaningful experience in challenging unjust laws or actions; a way of demonstrating to others the depth of commitment felt by a group about an issue; a means to obtain publicity and apply pressure on politicians" (Martin, 1984; Beder, 1991).

Activists are daring citizens willing to raise their voices and get involved in public life. This paper investigates insights for the pedagogical quality of the mediation of activists in the community. Visual communication is built around the purpose of conveying messages and, in this case, communication works as an exchange between activist as designer and the audience to create response-ability and engage a conversation (Martin, 1984; Bush, 2003).

This paper is about observations of a four-month-old pacifist volunteer group, Food:Re:Formers, (also referred to as “FRF”) in a medium-sized Danish city. Organized as an informal egalitarian grouping, the volunteer base is composed of local students and young activists. With very limited financial resources, they rely mainly on the active participation of their supporters (Pickard, 2019). Focussing on the local area, the group aims for the reduction of food waste and the engagement of local stakeholders, centering their work around the value of sharing. They engage with citizens as well as policy makers through workshops, events and discussions in order to raise awareness around the issue and what is required to address it. The empirical focus of this dissertation is shaped around the ways in which the Food:Re:Formers share knowledge and shape their stakeholders’ relationship. The study concerns the quality of the activists’ workshop and its effect on citizens’ involvement. The question was whether and how the teaching experience facilitated by the activists from Food:Re:Formers caused a change in the audience’s behavior.

2. Methodology

Through action research (Checkland et al., 1998), the effect of an activist informative experience on an “inactive” audience was studied using the following methodology: participatory observation (Allen, 2017), sensory ethnography (Pink, 2019), visual data collection such as photo ethnography, drawing; audio recording, surveys, formal and biographical interviews (Levinson, 1978) with volunteers and stakeholders. This dissertation analyses how the sender and receiver of a message interact and learn from each other, within a realist environmentalist context (Hasler et al., 2019). Through this blend of data collection the author tried to comprehend the way the Food:Re:Formers use pedagogy and inclusion to achieve understanding and spark action amongst their audience (Sauvé, 2017).
Firstly, a literature review into activist practice and environmental pedagogy was conducted. Observational research in the field was then used to create knowledge through immersion into the FRF’s organization. This took the form of a group discussion and was documented through notes and photography. Conducted in parallel, an ethnographic interview of the two co-founders was operated, alongside with sensory ethnography methodologies. The first interaction with the group lead to participatory observation, putting an end to our contextualizing phase and beginning an empathic understanding of our area of concern which would, in an action research perspective, develop our framework of ideas. In order to gain further access to the teaching intentions as well as experiencing direct contact with the audience (Kolding citizens), we completed our participatory observation of the event with a research planning survey. The gathered insights helped finalize a research participant map coupled with a user-groups definition to understand the variety of stakeholders involved in or revolving around FRF.

The preceding observations lead to a grounded conception, by way of the generation of design principles and of an experience simulation coupled with field activity. These worked in combination as a design experiment and helped to explore the role of facilitation within an educational sustainable food picking concept. By this means behavior patterns were observed and insights gained. The ladder intervention was purposely held outside the Food:Re:Formers’ context in order to implement the knowledge of action previously collected into the real world, while addressing a similar audience (Sanders et al., 2012). In essence, and to understand how FRFs work, the workshop modelled on their approach was carried out by the researcher, at a school, for lunch time, involving a similar audience and topic.

![Figure 1. Sanders et al., 2012.](image)
3. In action: recipe for knowledge sharing

Three main situations were observed during a two-week time frame: (1) the volunteer meeting, (2) the Dumpster Dinner and (3) the Smørrebrød workshop. The first two instances were organized by the FRF. The aim in the first session was to get an understanding of their inner organization and their point of action; and for the second session, the aim was to observe their interaction with stakeholders. The third session was a design experiment created in order to put into action the collected knowledge and comprehend its components outside the context of the activist group. So: first the author observed the FRF activities, developed a model of them and then set about testing this model by simulating the FRF approach.

3.1 Preparation

This section explains the FRF’s organization (internal organization and relation to the community) and action plan for the event to come (the Dumpster Dinner).

The first part of preparation is the volunteer meeting: a closed working day where the agenda is decided. It helps ensure everyone has the same information. Based upon observations and corroboration through an ethnographic interview, there appears to be no leader in the group; the organization seems horizontal (Pickard, 2019). Every participant is invited to pick a role which suits them best in terms of time and skills. The meetings take place in the new headquarters offered by the municipality (Hasler et al, 2019). Equipped with a brand-new shared kitchen, the area resembles a living-room: a large “family” table, around which participants take part, is set out with a large amount of food.

The food is provided by a local anonymous collaborator shop as surplus food (items which cannot be sold due to superficial damage of the packaging or contents). The items were collected by the volunteers as the main resources for the upcoming Dumpster Dinner. The process of sorting (items past the sell-by date), cleaning and preparing the food is a chance for the volunteers to get to know each other and to share tips and recipes, increasing the collective knowledge of the group, and testing out the recipes which will be served during the next event.
3.2 Cook!

This section explains the FRF’s facilitation role during the event (the Dumpster Dinner), as well as the setup for it.

The FRF’s competence sits in raising awareness and creating events to inform about the issue of food waste. By these means, they aim to activate their local community. The main “external” monthly action, the Dumpster Dinner is a three-hour event where fifty people are served with a meal made from surplus food. The event is inclusive, free, open to everyone and created in collaboration with Tobber’s, a well-known local restaurant. The dinner is thoroughly planned and cooked in a team-effort. In the dining room, the guests snack on appetizers, socialize and learn. A lecture about the new local recycling system is given, followed by a “conversation starter” activity where strangers from the same table are invited to share knowledge from their (un)sustainable daily practices. After this hour of extra-activity, the buffet is presented. To find out what kind of citizens this event attracts, research planning surveys were handed out. This data collection was meant for the participants to express their “before” and “after” impressions and thoughts of the event. 52 questionnaires were distributed and 35 collected.
Figure 3. Volunteers cooking for the Dumpster Dinner.

Figure 4. Participants of the Dumpster Dinner evening.
3.3 The Smørrebrød workshop

A design experiment was held as a method to determine the relationship between factors affecting the FRF process and its output. This section explains the design experiment inspired from observing FRF actions. The facilitation role was intentionally removed and replaced by textual content, presenting the ecological footprint of the showcased ingredients. Here, the author wanted to test the importance of the facilitation wrapped up within the experience.

Inspired by Shameplane.com’s approach to showing data upfront (Müller, 2018), this workshop was an attempt to move the audience through informative content. Inspired from previously collected insights from the FRF modus operandi (Kimbell, 2012) such as: inviting participants, building a trust ground, using food as a conversation starter, providing the participant with freedom of choice and information about their consumption. It was organized without input from FRF. The workshop took place at a higher-education school. It was aimed at local Kolding citizens and internationals (six participants, aged from 21 to 54). They were invited, during their lunch break, to create their smørrebrød (typical Danish lunch composed of a slice of bread and a selection of ingredients on top) in two stages.

First came the smørrebrød creation, then, an individual written questionnaire. The participants received the following materials: plates, cutleries, their regular canteen environment, a variety of the most regular components of smørrebrød (rye bread, tomatoes, salmon, cucumber, pâté, cheese, boiled eggs, hummus, mayonnaise). Key component of the workshop, data sheets bearing further information about the environmental cost of each of the dietary pieces. Designed to be as visual and fast-to-read as possible, the ladders were placed next to their related piece of food. During the second phase, participants were provided with a questionnaire so they could reflect on their actions. They were asked to respond, without interaction with other participants. The researcher played a very light facilitation role, directing participants from phase 1 to phase 2.
Figure 5. Participant of the workshop making smørrebrød.

Figure 6. Participant answering the Smørrebrød Workshop’s survey.
4. Taste as result

Though recent, the organization of the FRF is settled. With a core of about 30 activists from various backgrounds, the group has started onboarding local stakeholders and created a bridge with their audience, raising awareness through creative and engaging platforms. Their will to teach and share is assumed, the co-founders mentioning their wish to make a change from the bottom by influencing behaviors through criticality. Though efficient, their gathering concept, collecting citizens from various levels of eco-engagement, remained, as from the results of the research planning survey, fairly superficial. Succeeding in raising awareness, there seem to remain a weakness in action taking from the audience side. As an attempt to explore the facilitation role, the Smørrebread workshop was designed to encourage action taking and criticality by inviting the audience to act by themselves and follow their judgement. Our model might not be accurate as the length, type of food & context differs. But this brief experience helps us comprehend by collecting insights. It was observed in participants’ behaviors and reflected in their answer to the reflective questionnaire, that some of them were distracted or uncertain, when their decision process seemed to be disrupted by the presence of data sheets; while others navigated peacefully in the buffet, picking ingredients “eyes closed”. The majority of participants expressed guilt as a result of their food choice in relation to their sense of sustainability.

5. Discussion of the research

Often comprised of a blend of political participation, civic engagement, and compromises (Diaz Romero, 2013), activist movements are a peer-to-peer platform of interaction as well as a bottom-up voice which attempt to be heard among numerous other groups both local and global. They are actors campaigning for environmental protection, seeking to confront and disrupt governments and corporate power. These environmentalists -classified as greens, from the light negotiators, to the dark provocateurs- exist in multiple shapes (Beder, 1991; Hasler et al., 2019), and act both against and with the states as seekers of a working relationship with policy makers (Hasler et al., 2019). Nevertheless, even activists of the lightest green complexion are, by their actions, confrontational in some way and for a person or group to choose such a strategy generally demonstrates a lack of faith in society's decision-making structures or a lack of access to formal communication channels with decision-makers. Protest action is the resort of the weak. It is the action of those outside of the power structure and, as such, protestors are only weakly able to influence the way governments will respond to the pressures placed on them (Beder, 1991).

From the field study, three targeted stakeholder groups have been identified: volunteers (active citizens), (inactive) citizens, policymakers. For volunteers, who already possess a level of sustainable education, FRF wants to be a platform for sharing and developing their sustainable involvement, as well as networking. Assuming citizens lack sufficient knowledge about the environment, the aims of FRF are to inform them, get them into action, to
provoke and to inspire new habits. The aforementioned stakeholders are very likely to spread the word and onboard their community, reaching policymakers as a consequence of the demand to come. The third stakeholder group, also directly targeted by FRF, includes the municipality, stores and local businesses. These empowered actors are the only ones able to make a global-scale difference and are of a key interest in the action.

“Ground trust” is basic for encouraging coordinated action with each one of their stakeholders. None of the FRF ingredients of action is chosen without consideration. First, the FRF only uses invitations and never forces interactions. Second, the activist always talks eye-to-eye, in a day-to-day manner, which emphasizes equality, inclusion and transparency in the conversation. Third, the chosen medium, food, is an inexhaustible topic of discussion, incredibly creative and non-confrontational. It is a social mediator, a daily routine, a shared and relatable community value (McCoy, 2003); donated by familiar supermarkets and selected with care by expert activists. Finally, the context, Tobber’s restaurant, is a safe and known place for Kolding residents. The chef is known for his quality food, and the environment is cozy. The event has gained a good reputation and has been recommended by relatives or the local news. The participants of the dinner are not perfect strangers, but familiar faces who can be met around town. To put it in a nutshell, the very local context of Kolding community as well as the FRF methodical modus operandi plays a strong role in trust building and invites knowledge sharing. Trust is a soil for growth.

Picking from the previously cited ingredients, we have attempted to mimic the activists’ action but reduced the role of the potentially essential part: the facilitator. Regretting a lacking bridge between the food prep and its eating phase during the Dumpster Dinner event, we have decided to take it as a pretext to empower the participants of the Smørrebrød Workshop. This was under the assumption that consumers would be happy to get more knowledge about the provisions they are used to buying for themselves and will take more considered decisions, which would make them reflect on their usual pick. Unexpectedly, and probably because of the purposely removed facilitation action, when presented with such an amount of information, some participants experienced confusion and felt overwhelmed. All of them were affected by the information but responded in different ways. One group would ignore the information notes, while the second one would consider them but would feel guilty about their selection. There is an interesting bridge we can create here, resulting from this last observation: guilt seems to be the result of the overwhelming feeling created by the weight of the content. On the contrary, during FRF activities, it seemed like the volunteers’ facilitation eases the burden of serious of the topic, making it more digestible for the audience. There is here a clear, mappable pattern of guilt contrasting with empowerment and trust drawing at the horizon as our research led us into deeper feeling observation (Sanders et al., 2012).
6. Conclusion

This empirical study was to explore the sharing mechanics of pedagogy, the bridge between this activist group to their direct environment. Observations show their use of a variety of methods: the volunteer welcome day, the Dumpster Dinner. Further insights were gained through artefacts and experiments: interviews, surveys, documenting on site, workshop. The gathered knowledge seeks to map out an understanding of the pedagogical approach of activism.

It was my objective to participate as much as feasible in the FRF actions and call up my communication skills and knowledge in the sender-receiver exchange process, in order to understand the needs. My role as a researcher was multifaceted, interchanging from spectator to participant.

Design is about the recognition of the human element in communicating. FRF’s methods are intuitively dealing with this through the facilitation. The message is in part the medium (MacLuhan, 1964). The researcher intended through the workshop to explore this facilitation role by removing and replacing it with informational sheets. Providing to the participant the same informational content, the inanimate bit was designed graphically to improve its accessibility (time and content). Attempting to compensate the role of facilitator, the designer acted here as a visual translator and information designer. Whether or not the role facilitator could be reshaped into raw facts delivered through a graphically optimized medium was explored. The ladder experiment resulted in an unexpected answer from the audience, a raise of conscious provoking a feeling of guilt so far unperceived and unexpressed during the two first sessions.

FRF is a key platform, bridging citizens as well as the rest of their stakeholders towards the reality of facts. Leader of their community, they want to spark action amongst citizens as well as local representatives of power (stores, municipality, local businesses, etc.). Most of the time senders of messages, the FRF is also an open space for sharing, from citizens to stake-holders, and the other way round; but most important, FRF is opened-ears as well and flexible enough to support and learn from their community. This learning-from-each-other dynamic is helping the community grow towards sustainability and inclusivity.

Observed at every stage of the activists’ action when presented with facts to process, we can identify two responses from stakeholders: empowerment, often resulting from a pattern of trust-building followed by an invitation to acting and/or share an experience; on the other hand, confusion looms when a pattern of overwhelming information coupled with a shaming tone of the message. At the extreme we have noticed in that case of decision making, confusion leads to the feeling of guilt for the participants.

Activism bears many interests from a communication design perspective, I have focused my interest on the educative quality of the activist’s message, in all the various forms it could take (content, meaning, medium). The safe space of interaction they created as well as this strong ground of trust make them distinguished game-changers amongst their community.
References


About the Authors:

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Guilty Materiality: why we play down material relations.

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Abstract | In a recent conference keynote, a key researcher on influencing product lifetimes through product design presented her current hierarchy of strategies for the implementation of a circular economy. Not surprisingly at the top of this list are refuse (do not buy) and reduce (consume less), closely followed by reuse, repair and refurbish. Moving to a circular economy involves paying attention to, and prolonging the lifecycle of the material artefacts we use. While material relations are at the centre of the consumption habits we now need to modify, there are many reasons why engaging with materiality may be avoided. As designers we don’t tend to look systematically at the different reasons why attention is not paid to a large part of material relations. Therefore this paper aims to present and discuss, in a more systematic way, the different factors that generate what could be termed ‘guilty materiality’.

KEYWORDS | MATERIALITY, PERSON-PRODUCT RELATIONSHIPS, SUSTAINABLE CONSUMPTION, KEEPING HABITS, ENTANGLEMENT
1. Introduction

In a recent conference keynote, the co-author of a seminal article (van Nes & Cramer, 2005) on influencing product lifetimes through product design spelled out her hierarchy of strategies for the implementation of a circular economy (Cramer, 2019). Not surprisingly at the top of this list of ten points are refuse (do not buy) and reduce (consume less), closely followed by reuse, repair and refurbish. Moving to a circular economy involves paying attention to, and prolonging the lifecycle of the material artefacts we use. While material relations are at the centre of the consumption habits we now need to modify, there are many reasons why engaging with materiality may be avoided. As designers we don’t tend to look systematically at why, as a society, we avoid paying attention to a large part of material relations. Therefore this paper aims to present and discuss, in a more systematic way, the different factors that generate what could be termed ‘guilty materiality’.

Identifying the different themes that negatively influence the way we consider material objects is a somewhat subjective issue. For this reason, the selection of possible themes presented here cannot be considered exhaustive. The aim is therefore to explore a certain number of themes which could potentially modify our relations with material artefacts.

Insights from addressing this subject with master’s level design students and from wider research into longer product relations support this discussion. Out of eight different studies into longer product relations carried out between 2012 and 2019, three in particular (see Table 1, below) highlight ambiguous aspects of material product relations and reasons why we may tend to overlook or avoid these relations. This research involves two different cohorts and research protocols: design students on one hand in an inventory based study, and two different groups of (non-designer) adults aged between 40 and 71 in an inventory-based study and a cultural probe based study (Gaver, Dunne & Pacenti, 1995, Mattelmaki, 2006).

Table 1. Overview of 3 studies into longer product relations

<table>
<thead>
<tr>
<th>study name</th>
<th>content</th>
<th>participants</th>
<th>main instructions given</th>
<th>output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. DAILY STUFF THAT MATTERS</td>
<td>Mini-(memory) inventory</td>
<td>35 18 - 25yrs</td>
<td>think about and note down ten everyday objects that matter to you and that you plan to keep/keep using</td>
<td>sketched list with notes and comments</td>
</tr>
<tr>
<td>2. WHAT I SEE AT HOME</td>
<td>Virtual + in-situ recorded oral inventory</td>
<td>3 45 - 55yrs</td>
<td>a) describe all the objects you see when you visualise your kitchen, b) other objects visible in kitchen not mentioned in a)</td>
<td>audio recording transcribed, researcher notes + photographs</td>
</tr>
<tr>
<td>3. probe of everyday things</td>
<td>Probes, starting with all I touch in a day inventory</td>
<td>8 40 - 71yrs</td>
<td>note everything you touch, at home, from morning ’til night. Don’t note big furniture and fixed objects, nor single use items (eg: paper hanky, food)</td>
<td>Self-report notes in different formats, story-telling, photographs</td>
</tr>
</tbody>
</table>
2. Some problems with material object relations

“By their number, their redundance, their superficiality, the lavishness of their forms, by playing with fashion, by everything about them that goes beyond their pure and simple function, objects do nothing but simulate the essence of sociability - STATUS...That is what generates this madness, this frenzied world of trinkets, of gadgets, of FETICHES which try to mark eternity with value, and in the absence of salvation by grace attempt salvation through things.” (Baudrillard, 1970, p77 - 78)

Beyond the sphere of design, in everyday life, a certain number of themes can distort the way we look at material objects, and by extension distort our relations with them. The quote above from French sociologist, philosopher and cultural theorist Jean Baudrillard was written fifty years ago, but remains appropriate today and does not encourage us to have positive vision of our relations with objects. Starting this overview with a quote from the 1970s is also a useful reminder that negative attitudes towards material things and thing-relations are not a new phenomenon. In the design sphere attention is generally focused on the objects and products being created and their desirability, but there is perhaps not much attention paid to what makes us avoid products, objects and object relations. For this reason, it may be useful to try to identify themes which may negatively influence material object relations and perhaps contribute to making us avoid looking at things and the reality of our material relations.

2.1 Overflowing

A useful start-point is a theme that could be named “too much”. Faced with the scale of the current environmental crisis, a natural reaction is illustrated by the words of Claudia Dona (1988, p152): “we live in a world overflowing with our own productions, a world in which objects besiege us, suffocate us…”

According to an article in the L.A. Times in 2014, the average American family possesses 300,000 things in their home. A detailed and widely cited study by a team of researchers at the UCLA, between 2001 and 2004, on 32 middle class Californian families noted even in the smallest house studied (90m² with two bedrooms and a living room) 2,260 objects visible. As an illustration of the profusion of things in every part of the homes, the study mentioned that each of the families on average had 55 things stuck to the surface of their refrigerators.

In the last twenty years there has clearly been a growing awareness of the number of objects in our homes. There has also been considerable communication around the subject, for example Graham Hill’s (2011) TED talk entitled “Less Stuff More Happiness”, or James Wallman’s (2016) talk on “Stuffocation”. Daniel Miller (2008) comments that “we live today in a world of ever more stuff - what seems a deluge of goods and shopping”.

Even if these commentaries are a reflection of reality, looking at objects in terms of an undetermined mass or an incessant uncontrollable flood may also be a way of not
addressing directly our relations with these things. In a more recent work by Miller, the author notes that

“Stuff is ubiquitous and problematic. But whatever our environmental fears or concerns over materialism, we will not be helped by either a theory of stuff, or an attitude to stuff, that simply tries to oppose ourselves to it…” (Miller, 2010, p5)

In study 2., in the form of virtual then in-situ inventory of what could be seen in their kitchens, the three participants (working mothers aged between 45 and 55) each overlooked a large majority of the things in their kitchens during the virtual recollected scan of their home space. Notably in each case the things overlooked and not mentioned were pots of kitchen utensils and cutlery, stacks of chopping boards and water jugs and bottles. This “stuff” simply didn’t register in a vision of their kitchen at a distance, so while being problematic, some stuff is managed by being not seen.

2.2 Transitory

The stuff concerned by the ‘deluge of goods’ is perhaps mainly what Stuart Walker (2017) calls the “unremitting production and marketing of short-lived, unrepairable and often relatively trivial products...that arouse feelings of dissatisfaction and stimulate consumption and waste.” There is a tendency to separate certain objects carrying meaning from the mass of trivial, cheap objects destined to become waste. The “Significant Objects” project of Rob Walker and Joshua Glenn illustrates this idea. The authors bought a variety of trinkets without value, and then gave them value by asking writers to create stories about them, before re-selling them with the stories attached. The authors wanted to test whether adding “meaning” could artificially transform the value of an otherwise worthless artefact.

Chapman (2005) writes that 90% of material resources extracted today will become waste in less than three months. This suggests that there is a large percentage of “stuff” that never reaches the status of ‘object’ and transits directly and invisibly to the status of waste. This theme sees objects as something transitory; goods that don’t reach the status of relation and go directly from acquisition to rubbish. Fromm (1976) describes the vicious circle of “consumer-buying” as; “Acquisition → transitory having and using → throwing away (or if possible, profitable exchange for a better model) →new acquisition.” The goods are considered, from the start, as transitory, perhaps like the plastic toys described by Roland Barthes twenty years before Fromm: “chemical, in substance and colour, the material itself introduces a gut feeling/sensation (cénesthésique) of use, not of pleasure. These toys die by the way very quickly and, once dead, have no posthumous life for the child.”

Chapman (2008) comments that many people detest our “throwaway society in which lack of quality is taken for granted”. Walker (2004) writes that “all physical artefacts will sooner or later decay and be discarded, but their meaning and value can remain relevant” by associating utility, poetry and symbol. A more recent example of selecting objects by
meaning could be the “spark joy” test suggested by Marie Kondo, in the highly popular Netflix series (Chamberlin & Callmer, 2019).

Opposing meaningful and meaningless stuff might seem an unsatisfactory strategy considering the sheer quantity of things encountered. As Barthes suggests, a majority of things are probably unconsciously registered as transitory, and only in terms of their immediate use.

The ambivalent status of everyday use things can be illustrated by part of the verbatim in study 2. In the virtual scan, one participant thinks out loud “and then on the right-hand side there’s various things that we use quite often, so, kettle and pestle and mortar and tea and coffee jars”

When asked if any of these things matter, the participant, rather reluctantly says “The um, we’ve got a Bodum kettle, which is also probably the least annoying kettle I’ve ever had (laughing), so that’s quite good” The kettle, despite being “least annoying ever” didn’t really count as something that mattered, and needless to say, was replaced less than 3 months later.

2.3 Materially inept

Many of the objects in the “stuff” category don’t have a problem of material quality and adding meaning is not always a pertinent response. The comments in the previous section perhaps illustrate another theme that could be named “material ineptitude”. The example of the toothbrush is a good illustration of an object which is very durable but that we are meant to change every three months. It is in fact an object with too much material quality, for which we are only today starting to look for more environmentally relevant solutions. On this subject, it can be useful to add a comment of Barthes (1957, p172) on plastic as material, “…sublimed as movement, almost inexistent as a substance...entirely swallowed up in its use”. The use of certain materials (perhaps certain plastics) reinforces the invisibility and transitory nature of things and thus represents an inept material choice.

The case of toothbrushes concerns generally a combination of two or three plastic materials (polypropylene or polyethylene, nylon and sometimes silicon) but a clearly a product like the smart-phone contains nearly all the elements of the periodic table (Chapman, 2008). The question of material choices is highly complex, and may generate confusion, rejection or avoidance behaviour.

2.4 Toxic (materials and behavior)

Beyond simply inept or unadapted materials, actual toxicity is another theme that could generate negative object relations. If smart-phones represent one of the most visible examples of toxic materials, toxic forms of product and even behaviour that we could qualify as toxic, an example dating from the beginning of industrial design is also quite relevant. The
place of William Morris in the history of design tends to be in relation to using design and by extension well-designed products to improve lives, with for the person behind the production and the consumer. But even in the Victorian era, his wallpapers were suspected of making both workers and buyers ill. It is even more ironic that the colour responsible for poisoning was the colour green. Even after having stopped the use of arsenic in the pigments, in the 1870s following public pressure, Morris himself didn’t believe in the toxicity of his products, writing to his dye manufacturer in 1885 “As to the arsenic scare, a greater folly is hardly possible to imagine: the doctors were being bitten by witch fever” (Kirby, 2003). The fact that pigments containing arsenic were already criticised for clothing in the 1860s (Hawksley, 2016) show the paradoxes and slow reactions around toxic products.

While toxicity might be a valid reason for negative opinions towards products, the cases of Victorian wallpaper and of today’s smart-phone suggest that the influence is probably more ambiguous and more complex.

Individual research and presentation exercises with a group of final year product & service design masters students on the question of negative connotations of product relations drew attention to problems around plastic water bottles. Discussions within the class very quickly generated considerable interest and a certain anxiety, as none of the students (in 2019) were familiar with plastic leaching, and advice not to re-use old or damaged bottles.

Two insights from study 2 illustrate more ambiguous positions. One participant commented on a set of old plates “we’ve washed them so much, all the varnish is coming off. And I don’t know if it’s dangerous or not, because earthenware’s got metal in it, but anyway, I’m attached to those plates, but I say we should stop using them because of that…” Another participant jokes about a vintage style toaster that doesn’t have an on/off switch so is potentially quite dangerous “but at the same time it’s very slim, it’s small, it doesn’t take up much space, so I can’t bring myself to get rid of it”.

The student reaction, as well as the two insights highlight that perhaps rather than toxicity, the key issue is perhaps lack of material knowledge.

2.5 Anti-social

The themes mentioned above may influence the way we think about (or don’t think about) material objects. It is useful to also keep in mind themes not yet evoked that could be qualified as reasons for considering that relations with objects are in themselves a problem. Claudia Dona (1988, p152) writes that objects “very often distance us from one another both physically and mentally...they make us forget how to feel, to touch, to think”. Miller (2010, p5) confirms that a common view is that “stuff somehow drains away our humanity” and that (Miller, 2008) our relations to things come at the expense of our relationships to people. Miller (2008) aims to prove the opposite view that at least in some cases “the closer our relationships are with objects, the closer our relationships are with people”, but insights from all three studies suggest that people are often not comfortable admitting object
relations. A typical response in Study 2. commenting a favourite orange coloured mug: “it’s nice and big... I just like that one, it must be my autistic side”.

While directly admitting attachment to everyday objects appeared to initially be unnatural for many participants in the studies, identifying a social meaning was a very frequent and perhaps more acceptable first reason given for an object attachment.

2.6 Morally reprehensible

The arguments put forward by Erich Fromm in his book To Have or To Be (Fromm, 1978) illustrate why object relations may be seen as morally unacceptable. Citing Buddhism, as well as the Old and New Testaments, Fromm describes two fundamentally different modes of existence that are reflected in our daily lives. The “being” mode “means aliveness and authentic relatedness to the world. In the “having” mode the relation to the world is “one of possessing and owning” and Fromm (p65) signals that in this mode of existence,

“All that matters is my acquisition of property and my unlimited right to keep what I have acquired. The having mode excludes others; it does not require and further effort on my part to keep my property or make productive use of it.”

Beyond the notion of relations to objects at the expense of relations to other humans, Fromm also details what is wrong with these relations: we should not be bound, tied, chained to what we own and what we have...things “are not in themselves “bad”, they become bad; that is when we hold onto them, when they become chains that interfere with our freedom and block our self-realisation.”

2.7 Entrapping

Fromm’s arguments evoke the difference between the static and enclosing nature of “having” and the movement, productivity and activity of “being”. Accumulation is seen as leading to being imprisoned and becoming a servant to our possessions. François Châtelet (1992) comments “those we call primitive peoples have a very good understanding of the problem that accumulation creates. The fact that it can enslave us and that it is not a crime to consume our stocks.”

In relation to themes of entanglement and dependence between humans and objects, Ian Hodder gives an explanation of the notion of “Hau” first described by Marcel Mauss:

“Enchainment is created because of the “hau” of things—that is their need to be moved on, to be mobile. Gifts are treated as responsibilities that are to be quickly got rid of—it is wrong, impossible, for something to be stationary.” (2014, p22)

Another form of entrapment by objects is suggested by Bruno Latour (2000). In networks where humans are linked with objects, it is possible to question whether the control or mastery is in the hands of the humans or the (technical) objects, and this questions the distribution of power to act between different actors (human and non-human) within a
network. In many situations clearly things make us do things, and Latour gives these things the name “faïtiches” - linking the verb “faire” (to do), and fetiche, highlighting how things in mediation can be seen as problematic.

A related point was raised by the group of master’s students, who suggested adding the theme of objects-that-spy-on-us, and objects that collect information on us, which is clearly an issue of growing relevance.

In economic terms, the acquisition of goods (and the acquisition of income) generates a certain number of treadmill effects which in effect tie people down and thus limit freedom and movement. Binswanger (2006) notes four different kinds of these treadmills: a positional treadmill, a hedonic treadmill, a multi-option treadmill and a time-saving treadmill.

2.8 Materialistic

The positional treadmill proposed by Binswanger is related to the acquisition of goods as a means to acquire and keep social status. This theme can be linked to the idea of conspicuous consumption, described by Thorstein Veblen (1899). Ostentatious consumption of luxury goods was identified by Veblen as a means for gentlemen of leisure to gain respectability.

“The superior gratification derived from the use and contemplation of costly and supposedly beautiful products is, commonly, in great measure a gratification of our sense of costliness masquerading under the name of beauty.”

This form of consumption corresponds to the idea of terminal materialism, the fact of desiring objects for themselves (Belk, 2001). A more general definition of materialism given by Belk (2001) is the belief that possessions bring happiness. Belk also notes that in most studies more materialistic people are less satisfied with their lives than less materialistic people. The clearly negative image of materialism contributes to the fact that it can be difficult to admit many material object attachments.

Valerie Guillard (2009/2013), researcher in marketing and management science, identified a tendency that she differentiates from, but links to, materialism. Named the “tendency to keep everything” (TTG/ tendance à tout garder), this behaviour is defined as follows:

“The chronic tendency to keep everything is a personal determinant which manifests itself with certain consumers in a stable and recurring fashion. It concerns useable objects, for which the consumers no longer have any use and are not worth selling.”

Guillard suggests that our current consumption society is torn between excessive accumulation and rejecting waste. An interesting aspect of Guillard’s research is the very negative description of this tendency. The author suggests effects may be dysfunction for the consumers and their social environment as well as restrictions to mobility. The notion of keeping things is seen as obviously problematic and strange, and the author expresses surprise at certain “TTG” consumers using objects right up to the end of their useful life. On
this point it might be useful to gauge whether ecological questions have modified opinions on this type of behaviour.

In the probe based study (3), completed in 2018, the notion of “keeping” things generated surprising results. Participants were asked to make a list of everything touched in one day, then refer back to the list and mark the things they planned to keep and continue to use. On average participants only marked 21.8% of things touched during the day as being for keeping. Participants were also asked to note things for replacement in the near future. Very few things were marked in this category, which seemed to suggest, in the context of the study, that daily objects are not consciously for keeping or replacing, or rather that the lifespan of the objects is not something that is thought about. It can be useful to note that what is seen as critical in the Marie Kondo method of decluttering (Chamberlin & Callmer, 2019) is helping people to focus on what they love and want to keep, shifting people’s attention away from feelings of guilt and loss.

2.9 Compulsive

In certain cases keeping objects reaches dangerous or pathological levels. Compulsive accumulation or “hoarding” is defined as; “the habitual practice of accumulating obsolete objects privately and the inability to dispose without clear conscious motivation or control” (Cherrier & Ponnor, 2006). The authors signal that the term hoarding initially referred to the behaviour of rats, collecting and transporting an immense variety of things. This extreme version of keeping things is likely to be familiar to many people. Two to five percent of the American population may have this pathology according to Frost and Steketee (2010), and two-thirds of people interviewed for their study of the phenomenon personally knew of a significant case of hoarding. Frost and Steketee illustrate how some examples of hoarders, like the Collyer brothers in New York become forms of urban legends, and are used as a threat by generations of parents to get their children to tidy their rooms.

On a more familiar scale, an essay on clutter (Baker, 1995) raises some useful points around everyday accumulation. Once it is named clutter, material is identified as a problem, as matter out of place. It is the impulse to collect then hating this trait in ourselves. Clutter is also “unstable and volatile” and the revenge of objects on design. Baker calls clutter

“Disordered things that impede movement or reduce effectiveness ...That part of our “self” that escapes “our” control, “proper” control, and is all the more galling for being represented by dumb objects, disobedient objects.”

These points made in relation to clutter are an effective conclusion. Our stuff and clutter is a reflexion of our behaviour, and is also in many ways out of control, and our relations with material objects are also unstable and complex.
3. Conclusion/Implications

The aim of this presentation of themes that may generate forms of “guilty materiality” is to show the diversity of the question. The breadth of the subject means that this presentation cannot be considered exhaustive, and the scope of this article does not allow for detailed development. The table below (Table 2.) gives an overview of the themes mentioned. While the ethnographic studies cited here can confirm the possible influence of some themes on object relations, these findings are as yet only indications.

Table 2. Themes that may negatively influence relations with things

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<table>
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<tbody>
<tr>
<td>1</td>
<td>too much</td>
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<td></td>
<td>things overflowing, flooding, becoming unmanageable</td>
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<td>2</td>
<td>stuff</td>
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<td></td>
<td>unidentified material, unseen</td>
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<td>3</td>
<td>waste</td>
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<td>things without value</td>
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<td>4</td>
<td>short lived</td>
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<td>seen as transitory</td>
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<td>inept materials</td>
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<td>unadapted to life-cycles</td>
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<td>6</td>
<td>material confusion</td>
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<td>and lack of material knowledge</td>
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<td>7</td>
<td>toxic materials</td>
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<td></td>
<td>and lack of information and reaction</td>
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<td>toxic behaviour</td>
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<td>and behaviour dictated by things</td>
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<td>9</td>
<td>anti-social</td>
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<td>object relations detract from human relations</td>
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<td>morally wrong</td>
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<td>we should aim for “being” rather than “having”</td>
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<td>11</td>
<td>entrapping</td>
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<td>objects can entangle or trap us</td>
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<td>12</td>
<td>restrict movement</td>
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<td>treadmill effects, restricting personal mobility</td>
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<td>13</td>
<td>materialism</td>
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<td>desiring things for themselves</td>
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<td>14</td>
<td>spying</td>
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<td>objects can spy on us, and collect information</td>
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<td>15</td>
<td>hoarding</td>
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<td>pathological behaviour</td>
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<td>clutter</td>
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<td>matter out of control, reflecting our lack of control</td>
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Further research on the above themes would be useful to better understand negative biases linked to material relations. Stigmatising and ignoring material relations is probably not useful in environmental terms, and may contribute to inappropriate behaviour. Understanding these biases can help to rethink and inform design for more responsible material relations.

This study aims to introduce a question that deserves further exploration, and also identify a number of possible directions for that research. The negative connotations linked to material relations constitute an important study area for the influence they may have on appropriate sustainable material-related behaviour in the near future.

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MANIFESTO! Now: Game Design for Revolutionary Thinking

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Abstract | This paper presents recent work designing and testing a card game for manifesto writing, including a new edition that focuses on the “Future(s) of Europe” as well as a digital edition. The game began in 2019 with a “Tech Edition” and has since been tested in classrooms and grassroots organisations across Europe. Beyond the basic rules, each trial has brought about significant modifications: in terms of content, timing, number and type of cards permitted, and other aspects of gameplay. In our game the manifesto is conceived of as a revolutionary genre - a tool for activists in challenging and complex times. By developing a new set of “provocations” for our European edition, on themes like climate action, countering extremism, the need for unity, action against racism, and finding empowering uses of digitalization, our aim is to help rebuild the commons and encourage consensus on the most difficult issues we face.

KEYWORDS | MANIFESTOS, GAME DESIGN, ACTIVISM, CREATIVE SUBVERSION
1. Come, comrades

This paper presents recent work designing and testing a card game for manifesto writing, including a new forthcoming edition that focuses on the “Future(s) of Europe” and a digital edition. The game, which began with a “Tech Edition” created for a conference on human-computer interaction (Hanna, 2019), has since been tested in university classrooms and grassroots organizations in locations across Europe. Beyond the basic rules (described in Section 3.1), each trial has brought about significant modifications: in terms of content, timing, number and type of cards permitted, forms of collaboration, and other aspects of gameplay.

Figure 1. MANIFESTO! the game. ©Words in Freedom Project.

At its most basic, a manifesto may be defined as a public declaration issued by a group or individual with the purpose of declaring principles and aims. In our game the manifesto is conceived of more specifically as a revolutionary genre - a “tool for change” (Hanna, 2019) that by “defining and enacting the identities of radical groups, individuals, and parties ... has galvanized revolutionary movements” for centuries (Lyon, 1999, p.1). In the digital age manifestos have been present since the beginning, for example in declarations made by hackers, cyberfeminists, and techno-utopians. Manifestos are arguably timelier now than ever; while they hold great potential for constructive change, they also reflect the dangers of extremism...
and a fragmented populace. The return of a form that was so ubiquitous in periods of crisis is symptomatic of our present upheaval. On balance, however, the manifesto will be presented as a unique and indispensable tool for activists in challenging and complex times. Drawing on our experience collaborating with the Collective Intelligence Unit of the UK innovation organization Nesta to create a “manifesto toolkit” (Section 3.2), we will argue that helping people to articulate their views and crowdsourced common principles on key topics is a worthwhile activity.

2. Games for political change

Games by their very nature present a certain ideological worldview, and the rules of the game normalize that worldview. A chess player can only win by defeating the enemy through violence, and by implicitly accepting a system of hierarchy and class centered on the monarchy. Popular children’s games such as The Game of Life and Monopoly reinforce culturally specific, often conservative values, for example that the winner is the person who accumulates the most capital by whatever means necessary. Golf enshrines class privilege through the relationship of caddy and player, and through the levying of costly membership fees for use of privately owned land. Under the pretense of innocent fun, games, like all designed objects, tend to reproduce the social relations and ideology of the society in which they were created.

How then do we create games that give players new frameworks in which to think, challenge entrenched ideas, and support meaningful social critique? The French Marxist theorist Guy Debord’s Le Jue de la Guerre, in which opponents wrestle with “contesting interpretations of the topology of physical space under spectacular capitalism”, offers one interesting example. It not only contains a critique of Western capitalist society but also offers itself as a training tool for the means of changing it (Barbrook, 2015). Under the auspices of “gamification” there have been many attempts to directly leverage games to modify behaviour. In 2007, a game called World Without Oil placed 1,700 players in a fictional oil-scarce world. In the three years that followed, it was reported that most players kept up the fuel saving habits they had learned in gameplay (McGonigal, 2010). Evoke, a game deployed by the World Bank in over-exploited economies, asks players to solve major natural catastrophes and epidemics, largely using profit and market-driven solutions (Waddington, 2013). Games like The Day We Left seek to raise awareness: at the height of the Syrian war, this game placed players within a Syrian family trying to escape the war zone. Its aim was to act as a counter-narrative to stories promoted by privately owned media corporations that Syrian refugees in the West were part of an undercover invasion by Islamic State (Wong, 2016).

Like games, manifestos seek to structure reality. However, while games generally create a reality separate from and in parallel to our own, manifestos attempt to (re)structure actual reality through revolutionary speech acts (Puchner, 2006, p.23). Most games leave the “real”
world unaffected, at most changing a player’s perspective on the world, whereas a manifesto ideally lays out a path towards or provokes a rupture leading to actual change. By bringing the two together, what we have done in the various editions of our game is to create a system, either open or closed, in which the larger system can be questioned and reimagined (and even, in the closed system, safely smashed). The outcome of the game is a manifesto. Players are permitted to act as revolutionaries, but they are also encouraged to create lines of reasoning and critique that can extend outwards, beyond the limits of the game, to address and unsettle real world systems and institutions.

3. MANIFESTO!

3.1 Tech Edition

MANIFESTO! is a card game for individual or group manifesto writing. While it stands alone as an analogue game, it also serves as a design probe for the Words in Freedom project. The first iteration (the “Tech Edition”) was developed in 2019 and first deployed at the annual CHI conference the same year (Hanna, 2019). We wanted to use the game to engage players around issues affecting all of us within technology-related disciplines (and the wider world we live in), in order to: 1) take the temperature of colleagues in the field on adopting a more activist stance, 2) test our notion of manifesto writing as a key activity in pushing technology in a more progressive direction, and 3) test our game for subsequent iterations, and as a design probe for inspiring new collaborative authoring tools, both analogue and digital.
The rules are as follows: it is a game for individuals or groups of 2-6 players. In each round, player(s) are dealt one random card from each of four categories: Provocation, Orientation, Opening, and Tone. One card substitution is allowed per round. The categories each define a different parameter or constraint of the overall objective. Provocation suggests a broad topic or theme (e.g. “Better for whom?”); Orientation designates the type of manifesto players will create (e.g. “Declaration”); Opening offers the initial phrase (e.g. “We declare”); and Tone is the rhetorical register to be used in addressing the subject or audience (e.g. “Hopeful”). Players use these four constraints as a prompt to write or draw their manifesto individually or collectively. Each round can be timed (we suggest 10-15 minutes per round) or open-ended. When a round is complete players vote for the “winner” - the most persuasive manifesto - and are encouraged to disseminate the text either publicly or privately as a means of continuing the discussion. Having players take turns performing their manifestos in an exaggerated dramatic style is also recommended.

MANIFESTO! was inspired in part by The Thing From The Future (TTFTF), Stuart Candy and Jeff Watson’s design fiction game, which was made to be “hacked and customised” (Candy, 2015). Like TTFTF, MANIFESTO! is distributed under a Creative Commons (BY-NC-SA) licence. Beyond the simple prompt-based game structure, there are significant differences between
MANIFESTO! and TTFTF. While TTFTF encourages players to create an everyday object (e.g. a postcard) that tells a story about a possible future, MANIFESTO! seeks to focus players on thinking about real possibilities for change in the present. In this first edition, MANIFESTO! featured roughly half as many cards (53 instead of 108), a modified game sheet with combined text/image authoring space and room to place actual cards, and colour-coding on card backs to indicate the four categories, which were also different: Orientation, Opening, Provocation and Tone in place of TTFTF’s Arc, Terrain, Object and Mood.

In designing MANIFESTO! we sought to allow for productive dissonance between the four cards of a given hand, inspired by the anarchic and chance-driven processes of 20th century avant-garde movements such as Dada, Surrealism, and Fluxus. After all, the avant-garde manifestos of the last century serve as positive models of disruption through noisy provocation, creating new realities on the fly, as R. B. Kitaj does in his *First Diasporist Manifesto* (1989):

> “Diasporist painting, which I just made up, is enacted under peculiar historical and personal freedoms, stresses, dislocations, rupture and momentum” (qtd. in Caws, 2001, p. xxix).

Or as Tristan Tzara declares in his effervescent Dada Manifesto of 1918: “Dada: abolition of prophets: Dada: abolition of the future: Dada; absolute and unquestionable faith in every god that is the immediate product of spontaneity: Dada; elegant and unprejudiced leap from a harmony to the other sphere; trajectory of a word tossed like a screeching phonograph record” (Danchev, 2011, p. 144). Manifestos embody impatience with the old ways, and a push to imagine and realise new ones as quickly as possible: here, now, today.

We encouraged players to subvert the rules of the game if they wished, and in testing many players took advantage of this opportunity to co-create the game with us. These “creative subversions” fell mainly into two types: taking back control, and trying to make the game more democratic. There were several instances where players seized control of various aspects of gameplay to make the game more interesting or better suited to their needs. For example, some players wanted to choose cards that reflected issues they care about, rather than having them dealt at random. In terms of making the game more democratic, one group chose to give every member a chance to lead rather than nominating a single leader. Another group chose not to have a leader at all, while a third group decided to split into two smaller factions because they could not agree on a single set of principles.
3.2 Nesta Collective Intelligence Edition

In late 2019 we repurposed MANIFESTO! to help stakeholders produce a mission statement or list of guiding principles for collective intelligence, in collaboration with a leading UK innovation institute. Working closely with Nesta, we developed a manifesto writing toolkit - a new edition of MANIFESTO! with accompanying rules and materials - to help researchers and practitioners articulate ideas for change, define a set of shared values, and create a sense of community around the idea of collective intelligence.
Over the course of two workshops, we introduced the game, played one hand of cards, facilitated discussions around the topic, and gathered the resulting manifestos with five points each from the seven groups that participated. We then extended the discussion to a wider online community interested in collective intelligence using the polling platform Sli.do, allowing anyone interested in the topic to vote on the most important or compelling principles. This crowdsourcing process helped us winnow the original 35 principles (total) down to the top ten. After a week of voting, the following list emerged of the most popular principles (in order):

1. Ask yourself, how can you prevent bias from being replicated? Collective intelligence needs collective diversity.
2. Collective intelligence should serve an equitable distribution of power.
3. Let’s use collective intelligence to build empowerment, ownership, and agency.
4. Seek the intelligence of the many; in all its diversity and forms.
5. Imagine if everyone could use, access, and benefit from collective intelligence.
6. Enable change and ensure research has societal impact.
7. Give the unheard a voice, and give that voice power.
8. We believe in sharing tools and thinking.
9. Re-imagine and build new tools - based on the experiences of the many, not the few.
10. AI currently works in the interest of capital - let's use collective intelligence to drive social change. (Grobink, 2019)

Figure 6. Nesta Collective Intelligence Edition cards and game board.

The rules of gameplay for this edition were significantly different from the original version. The main reason was the shift in purpose or desired outcome: in this case we wanted players to come together and write a manifesto on a common, predetermined theme (i.e. collective intelligence) rather than focusing on a particular, randomly chosen issue (e.g. gender, surveillance, access, machine learning, etc.) on the subject of technology and ethics. In this new edition there were only three categories rather than four - Orientation was unnecessary because everyone was writing the same type of manifesto, i.e. a list of principles. Players were handed one Tone card, and three each of the Opening and Provocation cards, which they used for inspiration rather than as strict constraints. They were permitted to draw additional Provocation cards if they needed more ideas. The game was also slightly longer than...
usual, being timed at 20 minutes. The materials - cards, gamesheet, and board - were all re-designed to suit the theme and context, as were the phrases on the cards themselves. We learned from this edition that MANIFESTO! can be successfully tailored to address a specific topic and fulfill a practical goal, and that multiple group manifestos on the same theme can be combined and voted on to produce a single crowdsourced “master” list of principles.

3.3 Future(s) of Europe Edition

The latest physical edition of MANIFESTO! will focus on the possible futures of Europe, where our group is based, to encourage discussion, engagement and envisioning at a time when faith in politics is at an all-time low and hope in the future is collapsing under the weight of the pandemic, the spread of conspiracy theories and false news, grim predictions of environmental and economic collapse, and dystopian visions of society in the vein of Black Mirror. By crowdsourcing a new set of “provocations” for our Future(s) of Europe edition, on themes like sustainability, climate action, countering extremism, the need for unity, action against racism, and finding positive, empowering uses of digitalization, our aim is to help rebuild the commons in Europe and encourage consensus on some of the most difficult issues we face. We want people to see that their words and ideas matter, that they have something of value to contribute to crucial debates, and that everyone living in Europe - north,
south, east or west, center or periphery, rural or urban - has an important role to play in deciding our collective fate. Fortunately, we are not alone in this pursuit: we have drawn inspiration from a number of recent projects and publications seeking to build new commons and enrich our visions of possible futures (e.g. Bowles, 2018; Candy & Potter, 2019; Latour, 2020; Smith & Ashby, 2020; Staszowski & Tassinari, 2021; as well as the SpeculativeEdu project).

We have begun to assemble a list of new provocations, including some nods to dissenting or discordant voices, with the aim of crowdsourcing dozens more using Twitter and other social media platforms. These initial provocations for our Future(s) of Europe edition include:

- Denial is not a policy
- Our house is on fire
- Stronger together
- Stronger apart?
- Europe is not a choice, it is a necessity
- Sharing not the burden, but the responsibility
- Every country needs a Minister of the Future
- Economic growth through inclusive growth
- Inequality is by design
- GDP is not the only measure of well-being
- We need a revolution of values
- We are not prisoners of fate
- Progress or stability?
- The new commons

Once again, we will redesign MANIFESTO! to suit the new circumstances and context. For example, the card design will use the official EU colors of Pantone Reflex Blue and Pantone Yellow as well as a stars motif. Gameplay will be based on random prompts as in the Tech Edition in order to generate discussion on a wide range of topics. It will also be important to reach new audiences - not only students and urban professionals, but also (for example) school children with an interest in imaginative games and drawing, newly arrived immigrants with a stake in Europe’s future, workers fed up with politics as usual, or older people playing cards and trading gossip in the local park. Manifestos are for everyone!

### 3.4 Digital version and online platform

We are also expanding the Words in Freedom online platform to host a digital version of MANIFESTO! the game (currently accessible on GitHub), along with the existing Manifesto Machine and Moving Type Machine digital authoring tools (Ashby, 2018; Matos; 2019). The digital version (see Figure 8) mirrors the analogue card came, with the addition of a “SPIN” button for randomly dealing card hands. The online platform will make it possible to crowdsources and share new Provocation cards and game editions to accommodate multiple domains and themes, while ultimately enabling the infinite expansion of prompts, agile experimentation with new variations, the ability to link to existing examples of online digital manifestos, and smoother integration of social media sharing. Some of the potential new
crowdsourced game editions we envisage include: communities, design, higher education, and science.

The online platform will also serve in publishing and showcasing manifestos generated using our analogue and digital tools, with additional functions for facilitating ongoing discussion in the form of comment threads. This is an important new feature that is in response to feedback received from MANIFESTO! participants, who want to know that their manifestos will be visible to a larger public. It also picks up on Latour’s invocation for a more dynamic approach to manifesto writing that prompts individuals towards modes of discussion, debate and reflection (Latour, 2010).

Figure 8. MANIFESTO! the game web app.

4. In the future

We are currently testing the cards, along with our existing suite of online tools, in secondary school and university classrooms in Europe. Additional improvements to the next analogue iteration of MANIFESTO! will include: providing two options per Provocation card (doubling the choice of themes); and introducing variations to gameplay instructions, including embodied dramatic techniques, such as the tableau vivant.
Continuing on the Future(s) of Europe theme, our long-term vision involves the design of an interactive multimodal public installation that invites participants to give their voice to a constructive, collaborative and iterative form of manifesto writing on imagining a range of possible and preferable futures of Europe. Installations will be in a select number of European cities and towns (e.g. in public squares, museums, etc.). Some potential modalities we have been considering broadly include: a large visual display, synthetic speech, kinaesthetic interaction, and use of analogue artefacts.

The main idea is to engage Europeans (broadly defined) and anyone living in Europe in talking openly about values, beliefs, anxieties and concerns in a creative and positive space, away from private chat groups and outside of filter bubbles. What does it mean to be European? What does it mean to live in Europe in the 2020s? We want to support the growth of a new commons in Europe and encourage consensus-building on some of the tough issues we face, while at the same time allowing for the healthy divergence of views and productive friction within a respectful and stimulating public setting. The manifesto provides the soapbox and the megaphone — the chance to reflect on our value systems, where they clash and where they overlap — the chance to offend but also to unite.

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Ph.D. Admission System Based Comparative Study in Design Discipline under Chinese Context

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Abstract | With the appearance and development of graduate school at Johns Hopkins University in the end of the 20th century, the emerging doctoral program and cultivation paradigm was established. At the same time, the doctoral training system pays more attention to the training process and gradually incorporates general knowledge. Also, the general trend of doctoral education is to shift from the ‘European model’ to the ‘American model’. On the other hand, the design doctorate emerged in North America in the 1950s, after which the Chinese design doctorate establishment in 1982. This study comparatively analyzes the existing 19 design doctoral admission systems in China and puts 29 criteria indicators into 3 categories with the help of literature study, field study, and expert interview. Finally, based on the ‘application-assessment’ system, the researcher proposes several enrollment suggestions for institutes and applicants to refer to, which helps to figure out what are these two stakeholder groups’ hope based on the current situation.

KEYWORDS | DOCTORAL EDUCATION, ADMISSION SYSTEM, COMPARATIVE STUDY, DESIGN EDUCATIONAL INSTITUTION, CHINESE CONTEXT
1. Introduction

There have been approximately 30 years since prof. LU Yong-Yi gained her doctorate in the industrial design field in October 1990, which witnessed the very first doctorate awarded to the field of design discipline in mainland China, and it also marked the very first Ph.D. in design cultivated by Chinese independently. Although at that time industrial design was still operated as one of the research directions of architecture in Tongji University, it provided preliminary educational and research materials to people who work in the related fields. After 25 years of Dr. LU’s graduation, Tongji University set up Ph.D. Degree in Design in 2015.

During almost 40 years’ iteration, it seems that higher education in design discipline has accumulated from specialty to doctor degree. However, the design discipline in China is still in the initial phase. For example, the title of the discipline and degree change every five to nine years at bachelor or master level to cater to academic and political needs, which in turn affects the robustness of design discipline. To some degree, the turbulence reflects the uncertainty of goal and mission in design as a discipline compared to other fields. Moreover, the legitimacy of the existence of discipline generally depends on its knowledge, research construction, and some other factors, which directly refers to its researchers’ contribution. Professionals and practitioners, therefore, begin to wonder what kind of educational system may cultivate competent design researchers who will be in charge of knowledge generation and discipline construction. In addition, the admission system is the most direct and efficient access to influence the audience group, which is also the inevitable way to select doctoral candidates (Wang, 2018). For instance, China’s ‘application-assessment’ system was established in 2013 to supplements the examination-oriented education system. However, due to various reasons, application-assessment had not attracted sufficient attention in the field.

2. Methodology

Methods used in this study include literature research, field study, comparative study, expert, and doctoral student interview. Combined with experts’ review, students’ feedback, research outputs, and practical proposals, this study will give corresponding conceptual doctoral admission suggestions and hope decision-makers to adjust the existing system in design. To be exact, these suggestions cannot directly be made available to the practical situation, but they may help to correct the guidance.
3. Literature Review

2.1 Research on the Admission System Based on Universal Experience

Chen (2019) summarized the existing problems in the ‘application-assessment’ system for doctors in China from the 5 aspects of application qualifications, tutor power, selection standardization, selection scientificity, and selection effectiveness, and suggested that from the history and experience of ancient Chinese civilization and foreign higher educational practice and modern talent assessment theory draw on ideas. Finally, it is recommended that employers select professional researchers that meet the standards based on the principles of fairness, science, and effectiveness. These three principles also correspond to the first, middle, and third procedure of the doctoral recruitment stage.

Gong and Yang (2018) have discovered the problems from the general experience of the doctoral admission systems in China, such as low quality of doctoral students, insufficient investment in doctoral education, single selection mode, inadequate admissions motivation mechanism, and incomplete quality assurance system. Secondly, the author proposes to improve the existing doctoral admission system from the aspects of admission mode and evaluation system.

Zhao et al. (2018) and others compared the similarities and differences between Chinese and American doctoral admission systems from application conditions, application materials, and selection process, and pointed out the harsh registration conditions, informal expert recommendation letters, the absence of standardized examinations, and the limited admission autonomy of supervisor are issues that affect the admission system for doctoral students. Based on the status quo, the author proposes that the doctoral colleges improve the mid-term assessment mechanism to extend the quality supervision cycle of doctoral students, discover the transferability of doctoral students, and empower supervisors’ autonomy.

2.2 Research on College Admission System Based on Empirical Cases

After briefly introducing the background of the ‘application-assessment’ admission system, Wei Li and Yu-Qian Yang took Harbin Institute of Technology as an example, focusing on the application qualification, application materials, foreign language requirements, and subject assessment in details (Li & Yang, 2017). The author then compared the enrolment data from 2012 to 2015 to illustrate the effectiveness of the Harbin Institute of Technology’s implementation of the ‘application-assessment’ system. Finally, the applicant’s comprehensive evaluation form was designed based on the four optimization measures of standardizing the application materials, improving the review and evaluation system, refining the mentor evaluation index, and trialing the review and scoring mechanism to make the reform opinions concrete. Yao et al. (2019) first introduced the college’s Ph.D. admission and interview from the perspective of the international education reform of the
School of Pharmaceutical Science and Technology of Tianjin University. They emphasized that the candidate’s academic foundation, academic literacy, academic potential, and personality qualities should be explored in a short interview process. Subsequently, the author introduced the general principles of doctoral admissions in the United States and the United Kingdom, abstracted the US doctoral admission tests into an index system consisting of 8 items and 6 abilities, and listed 19 common questions in 4 major categories, covering applicant background, future planning, school selection, etc. Finally, the author suggests that the interview of doctoral admissions in China should adopt a standardized question system and pay more attention to discovering the potential qualities of applicants.

Based on the current situation of insufficient high-quality students, uneven distribution of students, shortage of admissions programs, and excessive administrative power interference, Wang (2018) horizontally compared the ‘application-assessment’ of doctoral admissions in China with the ordinary admissions system. Then the author illustrated the possibility of operating the two admissions system under different conditions by regarding Nanjing Normal University as an example, such as applying for ‘application-assessment’ in the science and engineering colleges with a small number of applicants to achieve accurate selection, and enrolling in a liberal arts college with a large number of applicants in the form of ordinary recruitment to raise effectiveness. The author advocates that the two forms of examinations run in parallel to ensure the diversity and accuracy of selection.

2.3 Literature review summary

In the process of literature research, the researcher found that the existing academic studies on the doctoral admissions system are mostly based on researchers’ own sensory experience, and there is no evidence for empirical research. On the other hand, the study of the admission system is essentially a type of research based on practice. The lack of empirical research data will cause the dilemma of abstract research conclusions, reduced reliability, and weak reference directivity. Therefore, this study will analyze the existing doctoral admission systems based on 19 cases of design educational institution who have the authority to award a doctorate in China, then discover the common regularity when they make decisions on admission. Finally, the author proposes resilient suggestions on doctoral admission strategy which adapt to design discipline’s educational philosophy, subject attribute, and development trends.

4. Discussion

This study selected 19 design doctoral admission systems as research objects from 19 design educational institutions. There are 4 of them located in Beijing, Beijing Institute of Fashion Technology(BIF) (Beijing Institute of Fashion Technology, 2019), Beijing Institute of Technology(BIT) (Beijing Institute of Technology, 2019), Central Academy of Fine Arts(CAFA) (China Academy of Fine Arts, 2020), Tsinghua University(THU) (Tsinghua University, 2019); 4
located in Jiangsu province, Jiangnan University(JNU) (Jiangnan University, 2019), Nanjing Normal University(NNU) (Nanjing Normal University, 2019), Nanjing University of the Arts(NUA) (Nanjing Institute of the Arts, 2019), Soochow University(SU) (Soochow University, 2019); 2 located in Shaanxi, Xi’an Academy of Fine Arts(XAFA) (Xi’an Academy of Fine Arts, 2019), Shaanxi University of Science & Technology(SUST) (Shaanxi University of Science and Technology, 2019); 4 located in Shanghai, Donghua University(DHU), Tongji University(TJU) (Tongji University, 2019), Shanghai University(SHU) (Shanghai Academy of Fine Arts, 2019), Shanghai Jiao Tong University(SJTU); 2 located in Zhejiang province, Zhejiang University(ZJU) (Zhejiang University, 2019), China Academy of Art(CAA) (China Academy of Art, 2019); 1 located in Hunan province, Hunan University(HNU) (Hunan University, 2019); 1 located in Jiangxi province, Jingdezhen Ceramic Institute(JCI) (Jingdezhen Ceramic University, 2019).

By studying admission documents of 19 institutes, the researcher classified 29 index items into three categories, administrative examination, research quality, and professional appraisal. The three categories can be seen correspond to successive three periods of each candidate. The administrative examination involves applicants’ master thesis, transcripts, recommendation letters, and others, which proves the previous achievements. Secondly, most of the research quality requires applicants to provide research outputs, design works, or awards in the last few years; these would reflect their current quality. Lastly, the essence of a professional appraisal is to discover applicants’ academic potential, for example, which requires them to write papers on related topics in three hours combined with interview and defense. The following three tables will present the concrete performance of each institute on 29 items.

### 4.1 Administrative examination

Besides academic activities, administrative management is one of the key elements in the educational system. Investigating administrative requirements will not only help to learn applicants’ previous competence, but realize the governor’s vision toward doctoral education. Table 1 describes the required administrative documents. The researcher will interpret typical items according to the following statistics.

**Table 1. Statistics of administrative examination requirements.**

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Curriculum vitae reflects a person’s general competence and logical organizational capability. Among 19 institutes, only Zhejiang University requires this curriculum vitae.

There are 12 of 19 institutes requires proof of foreign language proficiency, and all of them are comprehensive university. In addition, the rest 7 institutes include 6 art colleges, which indicates the various educational goals. From bachelor level to doctoral level, Chinese comprehensive universities focus more on all-round quality, which parallelly cultivates as many abilities to make well-balanced citizens. When graduated, these people are supposed to engage in extensive careers. On the other hand, art colleges are more practical and equip students with special talents, such as fine arts or dance. Traditionally they spend more time strengthening these talents to be qualified, while this narrows down their career after graduation. Thus, that is why English as a communication tool seems less indispensable to art college students.

Compared to undergraduates, the graduate transcript and master’s degree earn more attention. Firstly, masters’ courses are based on research skills cultivation, which is similar to doctoral study requirements. Secondly, the performance of the master level reflects applicants’ research quality to some degree.

The master thesis presents a general academic quality. According to Table 1, 13 institutes examine the master thesis, including 7 comprehensive universities. However, art colleges pay less attention to this part, for they pursue special talents.

Tsinghua University is the only institute that does not require a recommendation letter. On the other hand, the other 18 institutes require two recommendation letters. Besides, diversified graduation assessment indicates a transformative tendency in Tsinghua.

The tutors’ group consists of a group of supervisors, which is a new model to do the tutorial. Compared to one on one supervision, tutor group provides suggestions from diverse
perspectives, which not only releases supervisors’ burden but offers more opportunities to do defense for students. Also, acquiring confirmation advance with supervisors will improve the efficiency of enrollment and leave space for applicants to do subsequent plans once failed. Table 1 shows that only Wuhan University of Technology and Hunan University request the confirmation of acceptance from the supervisor in advance.

Based on statistics, the most valued document is the master’s degree certificate, which is requested by all institutes. Then are the registration form and recommendation letters. The most unvalued document is curriculum vitae and the Ideological and Political Situation Questionnaire, each of which is only required by one institute. Secondly, Wuhan University of Technology requests most documents, and Tsinghua University and Jingdezhen Ceramic Institute request the least documents, 12 and 3 respectively. Thirdly, Jingdezhen Ceramic Institute is the only institute that has not to employ the ‘application-assessment’ model in the admission system, of which details will be discussed in the following texts. Lastly, third-party evaluation tells applicants’ quality from the side, such as recommendation letter. For lacking censorship, third party evaluation can be subjective and need to balance justice and authenticity.

4.2 Research quality

Unlike compulsory administrative examination, most of the research quality requirements are optional. However, this part is also the key to widen the gap among applicants. Then, points and ranking will be evidence to selected people for the next round.

*Table 2. Statistics of research quality requirements.*

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Almost all the institutes request awards, papers, projects, monographs, and patents. These 5 items reflect applicants’ achievements and are easy to be quantized. For example, the account of the published paper or award certificate can be scored. However, portfolio, self-evaluation, and research plan suggest applicants studying experience, which is harder to examine immediately but will expose logical construction and thinking process. For academic research, the thinking paradigm is more essential than other qualities.

Self-evaluation is similar to a personal statement, which requests applicants elaborate growth experience, interests, academic background, vision, etc. On another side, self-evaluation reflects one’s communicative competence and self-promotion ability, both of which belong to transferability. Also, as an increasing number of doctors choose not to do research work, their employment appears diversified.

Jingdezhen Ceramic Institute follows a traditional examination system, which uses written examination to test applicants’ quality. Thus, no research quality material is requested.

### 4.3 Professional appraisal

Table 3 explains the details of how institutes organize further examinations.

**Table 3. Statistics of professional appraisal requirements.**

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*Legend: 26. foreign language. 27. professional test. 28. professional retest. 29. comprehensive interview.
As is shown in Table 3, most institutes combine the foreign language examination and the professional tests, which is to ensure applicants’ quality during the examination paradigm transition period. Generally, Soochow University, Tongji University, and Zhejiang University have neither foreign language tests nor professional tests, but these institutes request proof of foreign language proficiency and research quality evidence before the preliminary test. Besides, the Central Academy of Fine Arts, Tsinghua University, and China Academy of Art offer diverse foreign language examinations to applicants, including English, French, German, and Japanese.

It can be seen from the comparison that all of the institutes have either professional test or retest. This reflects professional quality is as valued as a professional interview. Professional quality is examined by design theory, design creation, or writing, which the details will be discussed below.

According to the admission system, all institutes ask for professional examination except Tsinghua University. Besides, only Nanjing University of the Arts, Shaanxi University of Science & Technology, Zhejiang University, China Academy of Art, and Jingdezhen Ceramic Institute explicitly give reference book lists. Then, Central Academy of Fine Arts, Tsinghua University, Nanjing University of the Arts, Soochow University, Xi’an Academy of Fine Arts, and Jingdezhen Ceramic Institute ask for writing tests under limited time. Next, Beijing Institute of Technology, Central Academy of Fine Arts, Xi’an Academy of Fine Arts, Jiangnan University, Shanghai University, and Jingdezhen Ceramic Institute ask for professional creation. Among them, the Central Academy of Fine Arts, Xi’an Academy of Fine Arts, and Jingdezhen Ceramic Institute request all of the three examination models.

As for the interview, it is requested by all institutes, and most of them explore applicants’ professional foundation, research, and creative potential, communicative, and interdisciplinary capacity. Sufficient time is compulsory if juries are willing to discover applicants’ potentiality. However, only Soochow University points out the interview should not be less than 30 minutes; Tsinghua University and Shanghai University request around 30 minutes of an interview; Jiangnan University, Shanghai University, Zhejiang University, and the Wuhan University of Technology provide 8-15 minutes presentation with applicants.

According to the conditions mentioned above, the researcher considers more kinds of foreign language examination should be given, or with which combined professional test, because the essence of foreign languages are communicative tools and should not be a limitation to the future researchers. Then, the professional test ought to reflect the educational vision of each institute, which is to promote institutes to cultivate their educational idea and avoid homogenization. Next, interview and discussion guarantee applicants’ quality, so time is mandatory. Lastly, the official cultivation plans help applicants to realize the educational experience of the learning period, and this inquires administrative efficiency and inclusion. On the other hand, the hidden information implies confusing educational ideas, which leads to resource waste.
5. Conclusion

5.1 Research summary

The ‘Application-assessment’ admission system aims to break the limitation of traditional examination, which comprehensively examines applicants’ quality. On the other hand, transferability earns increasing attention along with educational paradigm transition from European mode to American mode, so institutes should also consider applicants’ undergraduate knowledge structure (Melles, 2009). In addition, institutes should give priority to the efficiency with due consideration to fairness. Confirming with supervisors before selection may increase efficiency, but this also narrows choices and even aggravating injustice.

With increasing consideration of the transferability of doctoral students and multiple doctorates, design discipline ought to make customized admission systems bases on the educational vision of each institute (Hamilton & Carson, 2015). For instance, Beijing Institute of Technology, Jiangnan University, and Hunan University provide a successive master-doctor program to design doctoral applicants, starting from the department of science and engineering. This cultivation mode pays attention to explore the further depth of the field, and institutes mentioned above take advantage of their goodness on science and engineering to introduce this program to the design field.

Doctoral education is different from compulsory education, which should put quality before quantity (Durling, 2002). However, the condition is that most institutes make enrollment plan based on administrative governance rather than practical educational capacity. For example, Wuhan University of Technology publishes a point system and selects candidates based on point ranking at the interview round. On the other hand, Nanjing Normal University releases resilient space to discuss special cases in order not to leave out potential talents in the first round, which set an example for others.

Human beings are ends, and do not use them as means. Information symmetry shows respect for individuals, especially in the education field. To adequately value students’ rights, a cultivation plan should be published on official platforms and open to everyone, which also engages the public to supervise and advise the education career.

5.2 Reflection

Based on existing published 19 admission systems, this paper organizes a comprehensive criteria index to analyze and provide the design education field with reference and data. The researcher suggests four aspects should be taken into consideration during doctoral enrolment.

1. Physical health is the basis of scholarship. According to statistics, only 4 institutes request health checks during selection, so health risks exist in doctoral students and even institutes.
2. Moral quality guarantees researchers contribute their outputs to human well-being. For instance, juries may examine applicants’ experience in community work, volunteering, etc.; they can also examine this with the help of the third party appraise.

3. Professional foundation provides practical experience and materials to researchers in the future, in which portfolio, patent, or exhibition certificate will be ideal evidence. Cross-disciplinary applicants should also prove related capabilities.

4. Academic quality reflects not only in methodology but also in academic sensitivity, which helps a lot for junior researchers. At the same time, institutes should make customized selection criteria to clarify the educational vision.

Last but not least, this study is the start point of design doctoral educational system research, which will be followed by curriculum comparative research, transferability research, and other related academic issues in the future.

References


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Author 1 Fan CHEN is a PhD candidate in Tongji University. His PhD research focuses on the doctoral education system under Chinese context. He has published several academic papers on design education and design practice on Cumulus, IASDR, DRS.

Author 2 Jing-Yi YANG mainly focuses on the research of sustainable design, educational architecture design and design strategy and management. And she has published two papers related to the research of architecture in Tibetan areas of Sichuan.
Politics by design

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Abstract | Digital transformation and biotechnologies offer powerful means, through which autonomy and automatism could lead to new governance models. As institutions failed to timely grasp their profound implications, a concerning disconnection grows between political and social life. As design moves towards social and political gaps, it now participates in social transformation by challenging current habitus. Whether in a contesting or reforming attitude, design agency generates pressure in and out everyday life, impacting the way politics is thought and practiced. Guided by a correlational approach, the contribution aims to frame a field of research in which design acts politically as a “vector of the present” to cope with instability. Embracing the unfinished character of societal artifacts, design fuels contradictions as vital functions of the democratic discourse, pushing for new conceptions about politics and democracy themselves.

KEYWORDS | DESIGN ACTIVISM, AGONISTIC POLITICS, SOCIAL INNOVATION, SOCIAL ARTIFACTS, EXPERIMENTATION
1. (Re)directions for the XXI century

We live in a time of exceptional turmoil and, at the same time, of dramatic disorientation. This is the time of posteriority of great events that shaped history, returning a vague, undefined present and foretelling an uncertain future as well: it is “a natural habitat of legitimate hopes and expectations, [that] becomes home for nightmares” and widespread nostalgia, ending up framing an exclusive dimension of reality, the “retrotopia” (Bauman, 2017). It appears to be the perfect time to act.

An informatics and technological revolution has been unceasingly shaping the world over the past twenty years: although its achievements comforted the world with an optimistic message, it now gives rise to a sense of shared fear and concern. Acting as a force of change, such a revolution is going to shake the historically consolidated status quo significantly. However, it would not be the first time: as Fulvio Irace (2014) says, “every progress in science coincides with the proposition of new technologies, which certainly produce tools for use, but also, and above all, new lifestyles and new worldviews”.

Technological progress goes on at an unparalleled pace now, making it even harder to keep up (Kurzweil, 2004). The fertile combination of the technological and biological front is going to shape tomorrow in a new, radical way: a powerful interweaving that will blur the already thin boundaries between the digital and organic/physical worlds (Schwab, 2017). Such a scenario unfolds the opportunity of designing products and services by borrowing adaptive and evolutionary behavioral patterns directly from biology. The resulting outputs would benefit from an “organic intelligence” (Gerasimov et al., 2019), wherein algorithms will evolve their processing and predictive models through adaptive and combinatorial patterns, proper to organic beings. Such hybrid technologies offer powerful means to support alternative development models, where autonomy and automatism could lead to new governance models: their first implications foretell an unprecedented cultural and economic impact, such that “acting” in the XXI century will mean operating within cybernetic biomes, machine-to-machine systems, where digital transformation requires careful and thoughtful intervention by political actors in primis, historically charged to guide their transition and consolidation.

However, even if governments and institutions have traditionally provided tools and models to secure the complex balance among the biosphere-technosphere-sociosphere, on the other hand, it is important to remember that design itself has always acted as a catalyst for innovation aimed to bend technology towards preferable futures. Moving from “making stuff” to “making something” (Sanders & Stappers, 2013) for people and their lives, design offers the sensitivity to research and take action in a moment of a historical transition, marked by deep global issues.
The paper aims to trace how design enters the political dialogue, as a source of constant...
destabilization, generating solutions that consent, compete or even dissent with the established order, offering new chances of dialogue among the society-market-institutions system, wherein digital transformation suggests and promotes the (re)shaping of worldviews and the formulations of new governance paradigms for men and things. Today design enters the whole societal context, engaging with “politics” and the “political”, a distinction theorized by Mouffe (2005), which triggered a significant debate in political philosophy over the last decades: designers are participating in the debate too, whose practices, discourses and intents happen to raise “questions about their agency and potentiality to challenge our habitus, generate alternatives and create positive societal change” (Fuad-Luke, 2015).

2. A technological challenge to politics

The context framed so far in terms of technological advance will produce profound implications on the political dimension, as long as digital technology offers new enhanced tools to deal with complexity, generating new perspectives about dwelling in the future world. The forces of change acting today feature asymmetrical evolutional rhythms, so that the deep connection between technology and politics is not easily detected. Nevertheless, there is a growing need for political theory to investigate and address the radical effects of emerging technologies (Susskind, 2018), now more than ever. Institutions today react to technological innovations with either slow, outdated measures, or short-term solutions, constantly overlapping and contradicting the older ones. Contemporary conceptual, methodological, and instrumental apparatus result unsuitable to properly frame and understand the current technological actor (Accoto, 2019). This troubling scenario can be read on a deeper level, where the present is the field where the clash between future and past paradigms unfolds: technology is laying a posteriority character on democracy (Bartlett, 2018), wherein politics misses to embrace the digital within its domains, because of an outdated perception of the “technological” as other from “the political”. However, as Susskind (2018) writes, the digital is inherently political. Digital technologies naturally fragment and spread power to all the nodes of its deeply networked structure (Naím, 2013), affecting significantly communication and information systems: the digital transforms the political because it targets political life at its foundations, altering the way politics is made and how and where political action takes place. Current political systems missed a timely grasp of the incoming digital disruption, triggering a growing disconnection between political life and social life: on one hand, the technological front progressed undisturbed, on the other, society proved to be extremely receptive, facilitating the absorption and diffusion of technological innovation. Runciman’s (2018) “technological takeover” is challenging indeed, since he recognizes a strong participation of digital technologies in the failure of current political systems, democracy included. However, while the very idea of failure is anchored in outdated conceptions, it is undeniable that technology is hardly pushing for a mutation of political thought and action. The term
“politics” suffers from outdated conceptions too, especially when they stem from institutional discourses. The meaning of “politics” is not a question that resolves in a single take, but a site of ongoing contestation, where any shared assumptions tend to be relatively local and temporary. Embracing its dynamic nature is crucial, because it encourages the stance to discover new theoretical and practical spaces for alternative discourses and functional conflicts. This resonates with the various interpretations that literature offers, among which Mouffe’s (2005) work about democracy as agonistic pluralism stood out, tracing a discourse about democracy as a form of collective life that involves unresolvable differences and conflict. Rancière’s (2015) work also enters the conflictual theme, agreeing with the agonistic struggle among adversaries, where the instability of the resulting order is vital for conflictual political relations to reemerge. Mouffe (1993) calls this potential “the political” and Rancière (1999) uses the term “politics” or “democracy”, but both understand the political friction, disagreement, and disruption as the essence of democratic politics: as a result, whenever the agonistic attitude is missing or consensus overcomes political difference, democracy is lost.

Conflict and dissensus display in an environment where political action is a collective activity expressed in the public realm. Technology is enhancing such expression, thanks to the empowering and auto-organizing effects offered by social platforms and community-oriented services, in which the involvement of institutions to answer social problems does not coincide with a primary need. Acting politically as well as acting through designing in these times means thus moving in a space of possibilities, where freedom and creativity is experienced in a way that can never happen in private, thus embracing the political sphere by giving it new dimensions.

3. Design as catalyst: from value to power

Ubiquitous design relies on digital technologies as accessible means through which people’s capability of voice is amplified and extended to a wider range of individuals and communities. Such empowerment gives the chance to self-organize and deal with societal- and political- problems acting within everyday life. This cultural shift has been possible thanks to a broader diffusion of design culture and attitude in the past decade, besides its evolution and subsequent politicization. In fact, design culture has experienced a continuous transformation as historical phenomena of change gradually disclosed new domains for its theories and practices (Jones, 2014).

Assuming a designing approach - “using human power to conceive, plan, and realize products that serve human beings in individual or collective goals” (Buchanan, 2001) - means promoting better living conditions in a counter-intuitive perspective over reality. Moving from material to human systems (Buchanan, 2001) and from affirmative to critical practices, design culture deeply engaged in social systems, resulting in new operational fields like experience design, organizational design, and service design. These approaches aim to tackle
complex problems by gathering various stakeholders - end users, citizens, employees, partners - in charge of “experts of their experiences” (Sleeswijk Visser, 2005 in Sanders & Stappers, 2008), in order to conceive better outputs to improve lifestyles.

Thus design becomes ubiquitous, as the many-to-many approach involves an extensive range of social players, from professionals to citizens, who happen to apply design thinking, processes and approaches finding themselves managing the designed output directly (Fuad-Luke, 2013; Manzini, 2015).

This leads to the growing fields where design is deployed for social transformation: new social demands match with governmental “inaction”, where grass-rooted movements and initiatives aim at filling the resulting social gaps. This trend gains particular relevance in those developing countries, where human rights are not fully recognized². Such design practices, however, intensify even where democracy is a historicized condition.

The structural crisis of the neoliberal paradigm calls for new expressions for social, economic and environmental sustainability: such critical scenarios offer design culture the favorable terrain to renew itself and to address its efforts in the production of artifacts within social movements, experiencing a shift in its aims and methodologies. According to Julier (2013), crisis in the neoliberal paradigm coincides with a spark of activist impulses in designers, so that they embed their practices “into everyday life through intervention with real people in real places” (Julier, 2013), lending their “power of resistance from being precisely a designedly way of intervening into people’s lives” (Markussen, 2013).

The efforts underlying co-design and social innovation practices are a whole new way in which design channels positive results in the attempt to “design for democracy³”. These are recent challenging practices, relevant in triggering new approaches to power through design. By expressing stronger activism, design culture appears to be charged with growing awareness and responsibility, thanks to its strong contribution in the fundamental processes of reality production: given the ubiquitous presence of designed outputs and systems, including the possibilities that digital technologies offer, design activists are challenging the “distribution of the sensible” (Rancière, 2015) to bring light on new perceptions and actions, opening up the public sphere to active participation.

Moving from design culture to design activism, designers participate and amplify an “agonistic revolution”, as they enter into various modes of action starting from the free choice of which power structures to work with, for or against: their pluralist and agonist

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² Design Studio For Social Intervention and Design that Matters provides few examples of a strong design action to support social justice within disadvantaged communities and developing countries. Retrieved February 6, 2020, from https://www.ds4si.org, https://www.designthatmatters.org

³ In their “Open Letter to Design Community: Stand Up for Democracy, Ezio Manzini and Victor Margolin state the need for designers to conceive, develop and connect new possibilities to support democracy and all that it should embody. Retrieved February 6, 2020, from http://www.democracy-design.org/statements/
agenda is the product of a non-alignment, pushing for a participatory concept of democracy (Fuad-Luke, 2015). Acting as a social compass, design activism ensures an extended participation, encouraging responsibility while disrupting and diversifying the existing habitus. Fuad-Luke (2015) traces the levels of the teleological force in design activism propositions, setting them within agreement, agonist or even antagonist attitudes. (Re)orienting systems and local realities is thus possible thanks to design’s stimulation of common will and responsibility, channeled in a path toward radical change of institutional and cultural practices and languages.

3.1 Reframing design practices: a political view

Since innovation lies also in the perspective chosen to observe problems within the hosting system, it is worth recalling Fuad-Luke’s (2015) framing of social design as the “weaker” form of design activism, due to its roots in the current neoliberal representative democracy. Here, he argues, designers are constricted in a consensual agenda, pursuing public good to reshape the system from within. Perhaps this is also the reason why there is a widespread tendency to depoliticize most of the social design practices - especially from the outside -, where it is often shrunk to a humanitarian inclination: “the ability of this type of ‘do-gooder’, socially oriented design to address questions of social justice and inequality is very limited (Chin et al., 2016)” Although these authors refer to some specific humanitarian designs, this perspective has helped to cast a shadow over the actual connections between politics and social design. Basically, design is designing something for someone. Starting from everyday life, design has always been conveying values and messages aimed at (re)defining reality: design can be persuasive as designing a chair is a matter of defining what “sitting” would be like (Redström, 2017). Thus, design is a participating actor in the production of worlds and, as such, “operates in the space between poietics and politics” (Redström, 2017).

Today social design expresses its poietic ability to support democracy, which now lives in a sclerotic condition. However, despite the “weaker agonistic character” traced by Fuad-Luke

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4 Fuad-Luke (2015) lists some case studies working as “spatial agency” and offering counter-narratives, counter-dialogues and counter-actions in public spaces. As for the agreement section the pedestrian bridge designed by Zones Urbaines Sensibles is an example of participatory crowdfunded urban-making. Agonistic approaches are traced in Collectif Etc works, whose built interventions, street furniture or even conferences serve as propositional artifacts, raising questions about public issues. Antagonism is found in Recetas Urbanas by Santiago Cirugeda, a project offering downloadable models to trigger political negotiations with exercises of urban allegiances.  

5 Several NGO’s are working with designers in this sense. MigrationLab is now running projects in six european cities. The goal is co-creating opportunities with and for migrants, refugees and locals to meet, interact, inspire each other and collaborate through the transformation of urban spaces. Retrieved February 6, 2020, from http://www.migrationlab.org
(2015), social design plays a strategic role for democracy as-is since they share the same structural language: *incremental* change. This is the case of Helsinki City (Berglund, 2013) where several design interventions were later absorbed, adopted and adapted by the city municipalities themselves⁶. Such social progression is supported by a *prototyping-suggesting* attitude of social designers, a stance which seems to facilitate the permission of design intervention into urban and civic environments by those municipalities who are open enough to let the experimentation take place.

Gazing into the future, looking for “preferable” scenarios (Fry, 2010), design implements practices that generate positive alternatives to the current status quo. Social design as a political action stands for this purpose, occurring as a form of activism which “rather than being resistant, is mostly generative” (Thorpe, 2011). Far from an opposing and protesting approach, such design interventions feature a reformist action of the present, or, rather, of all those approaches and perspectives that have contributed to generate the unsustainability of today’s world. In fact, social designers enact reflections through the direct involvement of institutions or by addressing their structural issues to return better opportunities of dialogue. Improvement pushes institutions forward, so that urban and civic environments, as well as public services, will look for more creative processes to innovate themselves.

Carl DiSalvo’s contribution (2010) on adversarial design offers arguments for further discussion on such design approaches, establishing a meaningful connection among digital technology, society, and institutions. Following Mouffe’s discourse (2005), DiSalvo traces a field for design action intercepting both “politics” and “the political”: the former stands for the means by which cohesion within a state, organization or social order is achieved; the latter refers to a condition of social life, whose experience and expression no longer occur according to the old models of protest and debate. The distinction between politics and the political in design practice leads to different kinds of design outputs, depending on their combination and final goals:

- design for politics⁷, focusing on improving structural transparency and functioning;

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⁶ Helsinki’s DIY-urbanism, urban tactical experimentations and prototyping show as practices where design engages with official urban policy, fueling an “urban vibe”, where citizen-led initiatives inspired by degrowth economics met administration - sometimes cautious - support. Such results were meaningful to activists as their actions were rewarded with an empowering institutional acknowledgement.

⁷ Horizon 2020 Framework Programme of the European Union founded several laboratories aiming to design open government strategies to improve the governance culture. Here is provided an example of toolkits designed to ease this kind of innovation. Retrieved February 6, 2020 from https://oecd-opsi.org/guide/open-government/design-an-open-government-strategy-or-initiative/
- political design in the agonistic approach\(^8\), aiming to reveal and confront power relations;
- design for policy\(^9\), where public administration is led with a service innovation approach.

DiSalvo’s (2012) analysis helps provide design criticism about the relationship between political expression, computation and the processes/products of design. Such experiences can be traced in a “reformist attitude” of the political system as-is, where design works within the current paradigm. Despite the “weaker” impact on the system - not a disruptive one -, these kinds of interventions gain a character of “feasibility”, which designers use as a means to trigger an internal innovation. Here consensus produces a meeting point between realities that suffers from distance: political and social life. In this way social design exploits certain conditions of neoliberalism - where it stemmed -, to recycle and reprogram them: it is worth noting that this concept aligns with Julier’s (2013) concept of design activism, so that applying design to politics to improve its structural issues is still a contestation, as it intercepts a problem needing a solution that conventional approaches to political issues have not offered yet. Thus design activism occur in different theoretical and practical spaces, seemingly fueled by two complementary tensions: the activist-disruptive and the social-incremental one. Together they discover new meanings for democracy.

4. Politics by design

Design as a significant driver in building future realities seems to embody a new kind of political force, defining a promising field in which it would be possible to implement “the transformation of the entrenched cultures of unsustainability towards pluriverse practices” (Escobar, 2018). By creating “worlds within the world, mutually transforming each other” (Fry et. al, 2015), design discovers itself capable of generating not only new entities and interactions within political life, but also new political entities and interactions.

The paper relies on the complementary interplay between the agonist revolution and the reformist attitude of design acting politically as a promising path leading to the expansion of the conception of politics, compared to the current one.

\(^8\) The sweden city of Malmö instituted a dedicated laboratory for participative initiatives to perform social innovation. Activities are carried out through a design practice-based approach which entails long-term engagements with different social actors, leading to significant impacts on city’s settings. Retrieved February 6, 2020 from http://medea.mah.se/malmo-living-labs/

\(^9\) Italian studio Oblo Design, part of government’s digital team, provides a quick example of design for policy performed with the direct engagement of citizens. Together they designed a platform aiming to ease the access to public services, with all actors receiving reiterative feedbacks. Retrieved February 6, 2020 from https://io.italia.it
Thus, design agency generates pressure in and out everyday life, impacting unavoidably the way politics is thought and practiced. Fuad-Luke’s (2015) concept of design activists crucial positioning as “non-aligned social brokers” along with the social designers “working from within” suggests a well outlined space for contradictions, stemming from the very nature of design problems and, therefore, of design as a whole. According to Cross (1982), design problems are always ill-defined due to time and/or resource constraints. The wicked feature results in the impossibility of an exhaustive analysis supporting the correctness of the preferred solution, but the designer is still asked to produce a precise solution within a given schedule. Designers, then, cope with complexity by imposing themselves limits to contain the problem and manage it better. Such a process calls for high responsibility, which designers know to hold as practitioners of a poietic activity that always works with internal and external instability: as Julier (2013) notes, designed outputs are unfinished, multifaceted - as they exist either as sketches, prototypes, updates - subject to reiterating reshaping and repositioning. Furthermore, since designers work in complex networks of actors that constantly influence themselves mutually, designed outputs are subject to external constant transformations too, occurring at all levels from meaning to value.

This is why designers are used to thinking critically about the problem at hand, mainly questioning which designing process to adopt from the very first step (Hegeman, 2018). The lack of generally viable models and methods is the key to the designedly ways of design. Every problem encountered and the way it is positioned from time to time within a specific contingency results in the design of the designing process itself: in these terms design culture seems ready to offer a meaningful contribution to the plungingly ways of politics. Coping with contradiction helps assuming uncertainty as a foundational feature of reality, something to embrace as it appears in its chaotic beauty, where collective thinking and actions offer a fertile ground for new lifestyles and worldviews. Such shift is taking place as some institutions are recently showing a growing interest in design approaches too, even with weak signals - whether they be the adoption of designing tools to better inform decision-making processes or the diffusion of experimentation through civic participatory workshops -, in order to speed up their regulating actions: guided by design’s proactive attitude, they are questioning their own schemes to keep up with contemporary global issues in an anticipatory approach, which should be far from a linear and coherent projection of the present into the future.

If politics calls for coordination, cooperation, control, and management skills within this framework, then facing the high complexity of the coming future - in which time exerts increasing pressure – will mean activating a more elastic transdisciplinary dialogue, made up of as many voices as communities hold. Complexity shows to be the main driver of unfinished products, as long as solutions are actually prototypes meeting the contingent need of a delivery in an everchanging reality. Therefore, politics would develop a deeper sensibility about uncertainty and, most of all, the unfinished feature of societal artifacts, whose experimentation would leave marks and traces to build up f(r)ictions (Mallol, 2011; Fuad-Luke, 2016) as vital sparks of collective life.

Such a combined approach outlines the field of research of “politics by design”, which
proposes to investigate the *designedly ways of making political plans*, which embrace parallel and contradictory answers to socio-political issues as a result of a contingent attitude to manage complexity. Design culture is therefore believed to be capable of disclosing experimental areas in which political, digital, and social life can interact and reiterate themselves at deeper levels, where challenges could be faced by many to many. New spaces for free, public and creative expressions would rise, where design as a “vector of the present” would encourage a growing awareness in shorter and longer-term horizons, exerting multiple divergent forces while speaking the language of change in both incremental and disruptive declinations.

**5. Conclusions**

Correlations examined so far show the need for a more extensive dialogue, whose gravitational point is crossing the plain transposition of instruments and models from one knowledge domain to another, from theory to practice. As discussed before, the hyper-complexity of current systems is not problematic in itself, although it needs a new perspective to be tackled properly. According to the old approach, machine-to-machine interactions would be outlined through a technocratic view. Even so, interactions are inherently human-related: hence a human perspective is needed to unravel the knots, because meaningful interactions take place every time objects and human beings connect. Aristotle wrote that social life is realized thanks to the innate sociality of man, in which he exercises the *logos* as a means of confrontation. It is in language that *interesse* unfolds, the in-between space where interests clash for their acknowledgement first, rather than unfolding in group conflicts about opposite positions. As long as words and actions infuse each other, they produce Mallol’s (2011) “commonplace”, the ubiquitous social material assemblies which everyday life is made of. These artifacts work together in the definition of - many - possible and divergent worlds, where disagreement stands for a stance, an approach of inquiry and practice: setting the stage for dissensus means reframing the configuration of problems both from a theoretical and operational perspective from time to time, while heterogeneous contributions amplify unpredictability. Thus, the capability of voice empowered by design enhances the interplay between revolution - the disruption of habitus - and reformation - the slow yet more feasible advancement. Such tensions dialogue in an agonistic way, never excluding each other, so that choices and decisions for further regulations will entail an ever-growing responsibility, which needs to be reframed too - along with other political conceptions - since the technologic actor is rapidly gaining less marginal roles within new governance assets. Design seems to be in an ideal position to make a significant contribution, by developing counter-narratives which reframe everyday problems as possibilities that address contingent realities. The specific way in which designers can develop their own thinking and practice gives them the ability to intervene on the sensible layer of reality, where ethics and aesthetics intertwine in such a phygital world, leading to new worldviews and *modus*
Politics by design. Here, as Redström (2017) notes, design practices explore and influence some future directions, discarding the others despite their viability. Therefore, the act of choosing which alternative would be the preferable one is full of social, economic, political responsibility. Design is a defining practice and, as such, a philosophical operation, but also and above all, a political one. The responsibility of designers as makers of worlds is significant, urging a reflection about their own ontological potential and how it is perceived from other disciplines, in order to develop a deeper awareness of their moves and their roles in the society of the future.

References


Politics by design


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Abstract | Historic preservation and climate change act upon our built environment from opposing directions. Preservation sustains a past state of being in the future while climate change renders a past state of being unsustainable in the future. As one attempts to delay change the other causes potentially irreversible change. In a future of rising seas, they will converge in a clash of values. This paper examines the collision of the preservation of coastal heritage and sea level rise through academic investigations of reuse for coastal heritage. Focusing on the question of how heritage coastal communities can be readied for needed but drastic measures, visualization is explored as a means of preparing these communities for inevitable future change.

KEYWORDS | BUILT HERITAGE, SEA LEVEL RISE, CLIMATE CHANGE ACTION, VISUALIZATION, ADAPTATION, COMMUNITY ENGAGEMENT
1. Introduction

The preservation and conservation of buildings and the science of climate change are both modern. The roots of preservation are found in Europe; the Society of Antiquaries of London (SAL) was established in 1751, the Commission des Monuments Historiques in 1831, and the Society for the Protection of Ancient Buildings in 1877. In the United States of America, historic preservation was only formalized with the National Historic Preservation Act of 1966. The roots of climate change science are found in the early 19th century with the defining of “ice age” and the 1896 observations and calculations of carbon emissions by Swedish scientist, Svante Arrhenius. Through the late 20th c., historic preservation focused on “maintaining the artifact in the same physical condition as when it was received by the curatorial agency” (Fitch, 1990). This premise would be challenged in the millennium by climate change and its impact. Preservation aims to sustain a past state of being in the future while climate change renders a past state of being unsustainable in the future. As one attempts to delay change and the other causes potentially irreversible change, these modern phenomena will converge, resulting in a clash of values. Its resolution will require a revolution as long standing beliefs are challenged by an unknown future. Academic investigations are notable for their freedom from pragmatic constraints and, as such, they are often the harbingers of revolutionary ideas. This paper categorizes and analyzes current options for the preservation of structures from the impact of climate change and offers future possibilities through a project explored within the educational environment.

2. Of Climate Change and Heritage

Climate change is the defining issue of our time. Extreme weather, changes in precipitation, heat waves, sea level rise, all pose a threat to our built heritage. Of these different climate threats, sea level rise is significant for built heritage due to the founding of many cities near the coasts. Estimated at 6.8 billion in 2010, the global population is predicted to increase to 10 billion by 2030 and 44% of this population live within 200 km of the coastline (Human Settlements on the Coast, 2019). From Shanghai to Tokyo, Rotterdam to New York, it is estimated that 570 cities will be affected (Muggah, 2019). The built heritage of such cities with long and rich histories will be threatened by flooding and rising waters. Venice, with its innumerable historic treasures, is an example of a city that has long battled rising waters. According to researchers from the University of Padua, “[b]y 2200, the IPCC [Intergovernmental Panel on Climate Change] projections indicate that global sea levels could be between around 2 and 5 meters [6.5 and 16.4 feet] higher, which would leave the city permanently submerged if no action is taken to protect it....” (Aristos, 2019).

Coastal cities are now considering various options for protecting against sea level rise. These range from aggressive infrastructural and engineering projects for building sea walls, dams,
and surge barriers to land mitigation strategies and resilience building. These strategies require adaptation and, therefore, change.

2.1 Built Heritage and the Regulatory Process

Built heritage such as Venice is protected by regulations - international, national, regional - that ‘manage change.’ The protection of such architectural heritage was primarily a national endeavor until the First World War when the resultant devastation crossed international borders. The Athens Charter of 1931 was the first step within an international arena toward the protection of heritage. The two World Wars resulted in the creation of the United Nations and subsequently the establishment of UNESCO. The ground breaking 1964 Second Congress of Architects and Specialists of Historic Buildings in Venice resulted in the establishment of the Venice Charter and the establishment of the International Council on Monuments and Sites (ICOMOS). UNESCO and ICOMOS are global non-governmental organizations that promote the conservation and protection of monuments. Through these organizations, varying charters for the management of heritage are proposed and adopted in an international forum. They span subjects from intangible heritage to ethical treatments.

The development of regulations for combatting the effects of climate change and, in particular, sea level rise, on world heritage is in a nascent stage. UNESCO’s World Heritage Committee on climate action and heritage issued recommendations and policies for assessments and managing short term actions. For cultural heritage sites, this equates to mitigation, monitoring, defining responses, research and communication (Climate Change and World Heritage, 2007). In 2019, ICOMOS released its comprehensive vision for mobilizing the cultural heritage community around climate change. In ‘Heritage and Climate Change Outline Report,’ climate change action is summarized as including data gathering/heritage monitoring, mitigating greenhouse gases, strengthening resilience and adaptive capacity to climate-induced impacts as well as preparing for losses and damage (ICOMOS Climate Change and Cultural Heritage Working Group, 2019). In addressing the management of heritage from climate change, the report cites ‘loss’ and its implications as critical components for combatting sea level rise. These include the consideration of strategies for memorializing, the expanded use of removal and relocation, the recording of sites prior to loss (ICOMOS Climate Change and Cultural Heritage Working Group, 2019). These recommendations exemplify the goal to “maintain” the artifact in the same physical condition as when it was received and, if not possible, to accept its loss. Is ‘loss’ inevitable due to an adherence to a definition of preservation formulated in an era with different priorities? Does the speed of the pending devastation wreaked by climate change require a reconsideration of that definition? Is there an alternative to loss? What of the possibilities of combatting rising seas using principles of adaptive reuse, principles premised on change? A future of living with and in water will require a reuse of structures beyond our established modes of thinking. The acceptance of such alternatives to losing built heritage will test the
premise of preservation. A comparison of two coastal communities facing the dire threats of sea level rise offers us the range of possibilities for such action.

3. Of Sea Level Rise and Heritage

3.1 A Tale of Two Venices

The city of Venice, Italy, and its lagoon are listed on UNESCO’s World Heritage Site. The protection of Venice is governed by many different regulations: The Code of the Cultural and Landscape Heritage, the 1973 Special Law for Venice, public authorities such as Magistrato alle Acque (the Venice Water Authority), a Management Plan with input of both regional and municipal bodies. These regulations share the objective to protect and maintain Venice as an artistic achievement, as an influence on the development of art and architecture, as an archaeological site, as an outstanding example of a semi-lacustral habitat (*Venice and its Lagoon*, 2019). The many governing bodies collaborate to manage change so as to maintain Venice, as much as possible, the historic city founded in the 5th century and first inscribed on the UNESCO World Heritage List in 1987. While Venice has always been under threat from *acqua alta* and flooding, it was hit in November 2019 “by the highest tide in more than 50 years” (*UNESCO closely follows tides and flooding in Venice World Heritage site*, 2019). The UNESCO World Heritage Centre, together with pertinent advisory boards, has agreed with Italian authorities to conduct an advisory investigation of these issues in 2020. In the meantime, citizens of Venice traverse their city on elevated catwalks hovering over the 4 feet 3 inches (1.30m) of flood water that has invaded the ground levels and foundations of Venice’s built heritage.

![Figure 1. Venice, Italy, at its highest tide of 6 ft (1.96m) in 1966 (left) and at 4’-3” (1.3m) in November 2019.](image.png)
Figure 2. Venice, Louisiana, USA, rebuilt with houses raised on stilts (left) and on buoyant foundations in the water (right).

Venice, Louisiana, USA, is a community of 200+ persons sited on the banks of the Mississippi River. Its industry includes commercial and sport fishing. Located some seventy miles south of New Orleans, Louisiana, USA, it was devastated by Hurricane Katrina in 2005. Since then, the small fishing community has rebuilt for a resilient future through employing unconventional and even extreme strategies. To withstand rising waters, houses, apartment blocks and small businesses have been raised on piers up to 15 feet (4.6m) above ground. Alternatively, single family homes are built directly in the water, supported by buoyant foundations. This rebuilt community is drastically different than its pre-Katrina existence. Visually, more than half of the town hovers on wood structures or piers high above the beach while streets have been replaced with boardwalks and jetties. Not of historic or cultural significance and unfettered by preservation standards, Venice, Louisiana is a demonstration of the strategies that may be necessary for coastal communities to thrive in future rising seas.

The two Venices provide a striking contrast of climate change action in coastal communities. Representing the opposing ends of sea level rise interventions, they reflect the range of possibilities between retreat, defense and adaptation. The comparison prompts an examination of the relationship between heritage protection and climate change action. In the face of rapidly rising seas and the urgent need to act, how does one negotiate the complexities of heritage protection and its particular conflict with change? What might coastal built heritage such as Venice, Italy, look like utilizing the extreme measures taken to allow Venice, USA, a future with water?

3.2 Sea level rise adaptation

Strategies for combatting sea level rise on heritage property can be categorized as either defensive or adaptive. Defensive strategies include large scale infrastructural interventions
such as Venice, Italy’s, implementation of mobile barriers (Modulo Sperimentale Elettromeccanico, Experimental Electromechanical Module) to defend the city from the acqua alta, begun in 2003 and pending completion in 2022. It also includes systemic interventions such as those for diverting stormwater or the creation of blue streets that control the influx of water. These are remote interventions that do not touch the built heritage itself but, rather, protect it from afar. Adaptive strategies include the small interventions to the property itself. These include protective retrofit actions – storm and water proofing, flood vents, sump pumps, etc. - that divert water from or incorporate water into the buildings. Both types of interventions “maintain the artifact” in the same relative physical condition thus fulfilling the premise of preservation/conservation.

These interventions suffice for the current state of water levels but with alarming predictions for the near future, additional measures are required now. The case of Venice, Louisiana, demonstrates what these measures might look like. But such additional measures will test the premise of preservation and its very definition. The elevation of structures, high above the water line, is one such example. This type of intervention is derived from flood insurance policies requiring that a structure, rebuilt post-flood, be built at a base elevation above the flood line. While this appears reasonable, it is for the most part unregulated. Those with means can exceed the base elevation to satisfy their comfort level. On the outskirts of New Orleans where Hurricane Katrina devastated many homes, some houses are rebuilt and elevated more than 14 feet (4.3m) above ground – coining the term “lollypopping,” where structures are raised on stilt-like supports of varying heights. Local governmental agencies are in process of developing flood guidelines for such interventions. Currently, however, the landscape of the outskirts of New Orleans has changed dramatically with homes that are both elevated and not. This type of intervention, permissible for Venice, Louisiana, would not be permissible for heritage such as Venice, Italy, or any other protected landmark abiding by the current definition of preservation. To prevent the loss of built heritage in a future of rising seas, a different and less restrictive definition will be required. If so, what is necessary to establish a new one? How does one propose and pass regulations for the extreme and drastic measures that are required to make impactful change in the face of urgent circumstances?

Figure 3. A house on the outskirts of New Orleans, LA.
4. Case Study: *Projecting Change*

4.1 Newport, RI, USA

These were the questions facing the city of Newport, RI, one of America’s oldest historic cities. Founded on the edge of the Narragansett Bay, the city is a treasure trove of built heritage, all protected by historic preservation guidelines. Newport, RI, USA, a city that holds some of America’s greatest historic treasures from 18th century homes of the American Revolution to 19th century mansions of America’s Gilded Age, is exemplary of other historic American cities on the Atlantic coast. The destination of the 17th century settlers who left England in search of religious freedom, the Atlantic Coast is dotted from north to south with waterfront cities - Plymouth, MA, to Newport, RI, Annapolis, MD, Charleston, SC, and St. Augustine, FL - that represent the earliest endeavors of the citizens of the newfound nation. These cities are preserved through strict standards and regulations aimed at maintaining them as cultural evidence of that period in history.

986 of Newport’s historic structures and 53% of the acreage of Newport’s homes are located in the flood plain (Union Studio & Conservation Associates, 2016). The project site, Easton’s Point (or the Point Neighborhood), is one of the oldest neighborhoods of Newport. Founded in the 17th century, it is part of the Newport Historic District Zoning, created in 1964 and designated a National Historic Landmark District in 1968. The neighborhood is characterized by 18th century houses, many of which are built directly on grade. These historic homes experience flooding from precipitation, storm surge, and extreme high tides. High-model projections of the National Oceanic and Atmospheric Administration (NOAA) predict 1 foot (30 cm) of sea level rise by 2035, and 3 feet (91 cm) by 2065 and almost 7 feet (213 cm) by 2100. The built heritage of the historic Point Neighborhood, which already floods with each severe storm, will be under water without a careful plan for its future.

In 2017, the City of Newport provided for the protection of these and other assets through a recently approved Hazard Mitigation Plan. The Hazard Mitigation Committee’s recommendations for flooding included: retrofitting flood risk structures, evaluating zoning to allow for flood retrofitting, constructing a sea wall. It also addressed floodplain management through inclusion in a recognized Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP). As part of the program, new home owners requiring federally insured mortgages, as well as current owners submitting flood claims, must comply with the FEMA requirement of elevating one’s house above FEMA’s design flood elevation.
All houses in the Point Neighborhood are sited below FEMA’s design flood elevation of 13 feet above NAVD88 (Union Studio & Conservation Associates, 2016). Compliance with the FEMA requirement in the Point would destroy the historic fabric of this community of two-story homes on grade. Yet, without specific preservation flood guidelines in place, this was already taking place as new owners and current owners of flood related retrofits complied. In addition, some concerned owners with means have also selected to elevate their homes. Together, these houses are raised some distance from 3 to 7 feet (91 – 213 cm) above the FEMA flood elevation. This “lollypopping” of various heights is visible now on many of the Point Neighborhood’s streets where the characteristic on-grade structures are slowly disappearing. These interventions are not in keeping with the principles of a National Historic Landmark District. But to keep the built heritage of the Point above water would require more than the raising of structures a few feet. Herein lies the clash of preservation’s aim and that of responding to the effects of climate change.

Figure 4. The changing face of Bridge Street in the Point Neighborhood with the phenomenon known as ‘lollypopping.’

4.2 Projecting Change

This was the context when, in 2017, graduate students in the Rhode Island School of Design’s 1-yr post-professional Master of Art program in Adaptive Reuse undertook an investigation of the impact of sea level rise on the coastal heritage Point Neighborhood of Newport, RI. Sponsored by the van Beuren Charitable Foundation (vBCF) and the Newport
Restoration Foundation (NRF), the aim of the semester-long project, *Projecting Change*, was to engage the 1000+ members of this historic coastal community threatened by sea level rise in discussions of their future. The objectives of the design studio were two-fold: first, to use design to redefine preservation in the face of significant future sea level rise and, second, to convey these implications to a community that had yet to discuss their future.

### 4.2a Projecting Change: Design

In meeting the first objective, 16 students worked in small teams to produce designs addressing the future of the Point Neighborhood, assuming NOAA projections for 2100. These designs ranged in approach as strategies for combatting sea level rise. Four projects were developed, representing the approaches of *retreat, defend or adapt*: *Memory Trace*, *Grey Green Blue*, *Living with Water* and *UpStruct*. The project *Memory Trace* accepts that the Point Neighborhood could not be maintained in its present location in rising seas. It chose to retreat as a strategy. Assuming future inundation, the project relocates the houses of the neighborhood to higher ground but leaves a memorial in situ consisting of the cast facades of the houses themselves. This proposal of reuse through translocation maintains James Marston Fitch’s definition for preserving the physical buildings albeit through relocation to higher ground.

*Figure 5. Casts of the houses are left as a memorial park in the project Memory Trace.*
In contrast, *Grey Green Blue* employs an expansive strategy of both defense and adaptation in order to maintain the Point neighborhood in its historic moment and in situ. A proposed breakwater on the nearby shoreline defends the community while a system of blue streets and retention ponds are integrated into the neighborhood for accommodating water over time. In this project, the built heritage is envisioned as part of a blue system in which the individual houses will serve not only as domicile but as part of a vast adaptive intervention.

![Figure 6. Water is brought into the neighborhood over time in the project Grey Green Blue.](image)

*Living with Water* employs more experimental means to maintain the neighborhood exactly as it was. Assuming the NOAA projections for future sea levels, the project proposes to replace all existing building and infrastructural foundations with buoyant ones. Tethered together, the houses would rise and fall with the water as it rises over time. While the built heritage would be reused as adapted water vessels, they will remain in place together as originally built in the 17th century.

![Figure 7. All the houses are placed on buoyant foundations in Living with Water. As the seas rise, the houses rise together with it.](image)

*Upstruct* instead proposes to update the definition of preservation in the face of sea level rise. It posits that if the historic community as we know it today is premised on the relationship of the buildings to each other in a horizontal ground plane, why not redefine
this relationship through a configuration defined by water? It offers a new vertical grid that maintains the relationships of the historic houses to each other but in a different axis, the $z$. In a vertical future, houses would have redefined but similar relationships to one another through streets that rise up into the air, with neighbors above or below rather than to the side and back. *Upstruct* proposes the reuse of a heritage neighborhood as a skyscraper in the sea. While fanciful for the present, it offers a glimpse of future possibilities.

![Figure 8. Historic communities are reinterpreted as vertical historic neighborhoods in the project Upstruct.](image)

4.2b Projecting Change: Community Engagement

The demographics of the neighborhood were critical to achieving the second grant objective of engaging the community in a discussion on sea level rise. A neighborhood of approximately 550 households, the Point is sited on a long narrow strip of coast. Three primary streets parallel the waterfront and are intersected by 11 short streets. The heart of the neighborhood is situated on the southern side, bounded by Bridge and Elm Streets. This area is populated with households of various ages, the most prevalent being those in their 20s, 50s and 70s. ([Statistical Atlas](https://statisticalatlas.com/neighborhood/Rhode-Island/Newport/The-Point/Overview))

At the start of the project, the students interviewed members of the households in the 5 most populated blocks. The neighbors’ understanding of and reaction to the threat presented by sea level rise corroborated the 2018 Pew Research Center survey which found that only 59% of Americans view climate change as a major threat ([Fagan & Huang, 2019](https://www.pewresearch.org/fact-tank/2019/01/31/climate-change-where-america-stands/)). Even those who were in this slim majority believed that sea level rise would not happen in their life time and would not affect them personally. Most of all, they did not believe their own actions would make a difference.
To engage this somewhat disenchanted group, the students explored the potential of visualization to help spark the discussion. Their objective was to enable the neighbors to experience impactful interventions for coexisting with high water levels. Utilizing both virtual and augmented reality, the four projects were presented in a one-day neighborhood event called *Projecting Change*. Three activities were offered at 64 Bridge Street, the property of co-sponsor Newport Restoration Foundation. The first comprised a series of exterior augmented markers, located in the backyard of the house and along the adjacent side streets. Google cardboard lens were distributed together with a download of the software Entiti. This enabled users to point their phones at any of the markers and, depending on which, they were able to see one of the four design schemes in ‘sensurround.’ Simultaneously, two virtual reality stations with Occulus headsets were available inside the house. Those selecting this option were also able to access one of the four designs and, in addition, place themselves in various locations within the schemes. The participants of both activities experienced the streets of their historic neighborhoods turning blue, retention ponds spreading into their gardens, and their houses flying into an *Upstruct* high-rise configuration.

The third activity was in the form of an I-pad game, with the neighborhood as its gameboard. With the assumption that a storm and related flooding were imminent, players had 10 minutes to make decisions regarding their house and neighborhood. Selecting to save one’s own home would advance one to the next level. However, in subsequent levels, the player realized that collaboration with one’s neighbors was necessary for ultimate survival.

*Figure 9.* Using augmented and virtual reality, the members of the community experienced sea level rise interventions on their phones.
Figure 10. A section cut through Upstruct’s vertical neighborhood.
Visualization allowed the members of the community - from middle schoolers to octogenarians - to finally experience what sea level rise might look like in their immediate surroundings. They were also able to understand what ‘retreat, defend and adapt’ might resemble as future scenarios. With this understanding, conversations about the future took place between neighbors as never before. Through visualization, *Projecting Change* connected the members of the community and introduced an unprecedented definition of preservation for a future yet to arrive.

![Figure 11. On May 26, 2017, the Point Neighborhood community of all ages looked into their future using the visualization techniques of augmented and virtual reality.](image)

5. Conclusion

Academic explorations in tandem with visualization were critical to the acceptance of sea level rise and the action required to preserve the Point’s coastal heritage. Often constrained by the empirical, the common person may find it near impossible to embrace new ideas that threaten to upend the certainty of their known environment. The leeway granted to students at the Rhode Island School of Design, known for thinking ‘out of the box,’ resulted in new vistas unfettered by real world constraints. Similarly, visualization offered the ability to place one in unknown situations, otherwise untried. *Projecting Change*’s unique combination of academia and visualization provided a bridge for discourse that would not have taken place. Presented through visualization, the projects served as a catalyst for dialogue amongst the members of the Point Neighborhood that spawned an interest in the opposing demands of historic preservation and climate change action, both locally and
globally. Community members requested that the visualization materials be displayed as a permanent exhibition of the local church, with the hope that ideas on climate change would become part of daily life, post-event. Newport law makers were interested in the use of the game for community discussions on sea level rise. Outside of Newport, the project was accepted and presented at 8 conferences in the US and Europe from 2017 -2019. This interest culminated in a 2019 New York Times article, ‘We Cannot Save Everything’: A Historic Neighborhood Confronts Rising Seas (Dean, 2019). In 2020, this project was published in Chinese as part of an Adaptive Reuse issue of the Chinese journal, The Architect. This interest became impactful when, two and a half years after Projecting Change, “The City of Newport became one of the first communities in the country to adopt standards designed to help protect some of its most historic neighborhoods from the threat posed by rising sea levels” (Daily News Staff, 2020). Newport’s historic preservation planner announced a new set of guidelines for elevating properties that considers contextual, architectural and material considerations – a direct response to the issue of “lollypopping.” Furthermore, a permitting process will be implemented to allow for discussions that consider both historic preservation and climate change issues, in hopes that ultimate decisions will protect the historic neighborhood from vulnerability on both fronts. More importantly, the introduction of these guidelines acknowledged the urgent need for change in the preservation of Newport’s coastal heritage. Within the current methodical but slow moving discussion on heritage and sea level rise, this local development of town governance was ground breaking.

The adaptive reuse of the built heritage of the Point Neighborhood – as memorial, as systemic intervention, as water vessel and as skyscraper in the sea – demonstrates the need to embrace change in the face of drastic conditions. In her 15th annual New Year’s speech, German Chancellor Angela Merkel said of climate change action, “We need, now more than ever, the courage to think in new ways, the strength to leave well-trodden paths, the readiness to venture into new territory and the resolve to act more quickly...” (Schuetze, 2019). The willingness to consider new ways and the mustering of the strength to leave well-trodden paths are challenging, especially when these new ways and paths are entirely foreign to what we know and understand. This is all the more pertinent when considering change for scenarios in the future, a future we can understand but not see. Humans require proof to consider revolutionary change in thought and action. Today we have incremental proof of climate change but the ability to extrapolate to what it portends for our future demands a certain faith. Thinking in completely different and revolutionary ways about the management and reuse of our built heritage will be a test of our understanding. Visualization, however, can help one to ‘see’ beyond what one can understand. On a January morning in 2007, daffodils bloomed in Washington D.C., USA, months earlier than they should have. The physical presence in the depths of winter of these golden harbingers of spring was a physical proof of the effects of climate change that caused New York Times writer, Thomas Friedman, to pen his now famous editorial on climate change, “A Warning from the Garden.” As we look to gather consensus on climate change and to plan for its impact on our historic built environment, visualization will be necessary to allow everyone to see into their future so as to take action now.
Figure 12. Projecting Change is a RISD graduate studio co-taught by Markus Berger, Michael Grugl and Liliane Wong. The students: Neethi Abraham, Angelica Carvajales, Udeeta Jain, Mengran Jiang, Vinoti Kabara, Krishna Lingutla, Sneha Mathreja, Hana Mehta, Gloria Ramirez, Eshank Rishi, Eder Romero, Yinhua Tan, Rohit Vantaram Rao, Ananya Vij, Plub Warnitchai, Mengyue Zhou

References


Image Rights

Figure 1. “Alluvione di Venezia del 1966,” https://commons.wikimedia.org/wiki/File:Alluvione_di_Venezia_del_1966.jpg#filelinks

Figure 2. “venice_3459940,” Pixabay free use

Figure 3. Courtesy of Liliane Wong
The management of change is an idea that is prevalent in discussions and writings on historic preservation. Graham Fairclough in his essay, “Cultural Landscape, Sustainability, and Living with Change?” in Managing Change: Sustainable Approaches to the Conservation of the Built Environment, The Getty Conservation Institute, Los Angeles, 2001, summarizes these ideas in this quote: “The cultural landscape is central to the debate about managing change. It is entirely the product of change and of the changing interplay of human and natural processes; …… Change, both past and ongoing, is one of its principal attributes, fundamental to its present character. There is no question of arresting change. Change needs to be managed, however.”

Projecting Change is a RISD graduate studio co-taught by Markus Berger, Michael Grugl and Liliane Wong. The students: Neethi Abraham, Angelica Carvajales, Udeeta Jain, Mengran Jiang, Vinoti Kabara, Krishna Lingutla, Sneha Mathreja, Hana Mehta, Gloria Ramirez, Eshank Rishi, Eder Romero, Yinhua Tan, Rohit Vantaram Rao, Ananya Vij, Plub Warnitchai, Mengyue Zhou

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Realising Discourse: A Strategic Design Solution to the Problem of Addiction.

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Abstract | This paper reflects upon new possibilities for strategy design. Information architecture (IA) is reconsidered as a tool for meaning-making with relevant links to discursive design methods. Together, these design forms provide an extension of synthetic reach into complexity and synthetic integrity to addressing deep socio-cultural change. A review of a design project conducted to address the challenges of addiction forms the basis of the discussion. Ontological complexity is revealed to be a defining feature of the problem of addiction and is considered in reference to the recent emphasis in design into considering human experiences. IA and discursive design are then discussed in reference to design artefacts created in ideating a strategy design solution. The paper concludes by offering an outline of a method and model for consideration as a pre-pattern derived from said project. Whether towards transformation or the sustainability of social ontologies, the solutions presented stand to assist design in theoretical, educational and practical terms.

KEYWORDS | STRATEGY DESIGN, DISCURSIVE DESIGN, INFORMATION ARCHITECTURE, ONTOLOGY, ADDICTION
1. Introduction

Designing solutions to wicked problems is no simple matter. This paper adds to the already complexity fraught domain, the manner in which socio-cultural ontological constructs can be central to their wickedness.

This discussion reflects on the socio-cultural aspects of synthetically determining a strategy design solution for U-ACT, an addiction treatment facility and provider of addiction recovery services in Johannesburg, South Africa by the author. The design project was undertaken employing a research through design (RTD) methodology for an MA dissertation in Design (Hobbs, 2021) from the University of Johannesburg.

In the Thesis, a new form of information architecture (IA), Conceptual IA (CIA), is posited and explored for the design of a strategy enacted through the Design Thinking (DT) process-method. The use of both strategy design and CIA take their cue from DTs theoretical response and relevance to the complexity associated with wicked problems in design (Buchanan, 1992).

IA is usually associated with activities supporting end-user sense-making in digital design. The thesis argues on constructivist grounds that sense-making and meaning-making are mutually inclusive concepts which tacitly constitute an internal meaning of design objects so intended for the world. In the conception of a CIA, which is enacted in a problem-led, non-assumptive manner following the DT process-method, all designed objects are argued to contain within them such semantic structures which constitute ‘contrived ontology’ (Hobbs & Fenn, 2019):

“In essence, sensemaking and meaning-making in IA are the processes of decoding and encoding in DT where, from a humanities and cultural studies perspective, contrived ontology is understood as a subjective, constructed reality embedded in designed artefacts and systems.” (Hobbs & Fenn, 2019, p. 764)

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1 Three entities exist to provide these services, referred to collectively as U-ACT herein: The Foundation Clinic (the treatment centre), The Recovery Wellness Programme (an outpatient and public-facing, peer-to-peer recovery programme) and the Ubuntu Addiction Community Trust offering accredited, experiential recovery coach training and certification.

2 Specifically, Zimmerman, et. al.’s methodology (2007) designated as ‘Research Through Design’ by the authors, however not in reference to Christopher Frayling’s (1993/4) conceptual category by the same name.

3 To be referred to herein as ‘the Thesis’ (Hobbs, Applying Information Architecture In Design Thinking: Ideating Solutions To The Wicked-Problem Of Addiction, 2021).

4 In digital design, IA (Rosenfeld, Morville, & Arango, 2015) is best described as a derivative application of, and from, Library and Information Science (Resmini & Rosati, 2012) frequently enacted within User Experience Design. Pervasive IA (Resmini & Rosati, 2011) positions IA for cross-channel, systemic design at similar levels of abstraction to Service Design.
The first section in this paper brings together related theory and perspectives from across the spaces of DT, strategy and service design and addictionology. The second section reports on the design project conducted, highlighting those aspects of the design relevant to this conversation. Lastly, drawing on insights which emerged from a reflection upon the extensibility of the design process and its artefacts (Zimmerman, Forlizzi, & Evenson, 2007), an outline of a method and model for use in and of strategy design will be presented.

As such, this particular method and model stands as a potential pre-pattern for consideration, rather than knowledge per se in any scientific sense. Hopefully its contribution will be found to be of sufficient value to warrant further study and validation, use, and experimentation with, in practice and ultimately inclusion in design education curricula.

2. The Problem of Ontology

Indeterminacy in Design, introduced by wicked problems as conceived by Richard Buchanan (1992), challenges traditional product-led approaches to problem solving in design. Since any particular artefactual outcome should not be assumed under these circumstances, a shift occurs in the object of design: from concrete product-making to abstract solution-creating (Buchanan, 1992) commonly understood in DT as Ideation or design-led innovation.

Service design, closely related to strategy design and human-centred design (HCD), resolves the ‘design object-level’ or product-level void by ‘rising up a level’ and orchestrating systems-level interactions in such a way as to manifest new experiences at the product-level ‘below’ (Polaine, Lovlie, & Reason, 2013). In a Service Dominant Logic framing (Lusch & Vargo, 2006), the ambition lies in co-creating value in-use with users for the purposes of the improvement of a systems wellbeing. Consequentially, the wellbeing of the system’s system takes centre stage due to the constructive, networked nature of value co-creation (Vargo, Maglio, & Akaka, 2008). In many cases, the strategic act of problem-solving manifests as the use of design tools, often enacted with stakeholders in the immediate problem system, which facilitate and stimulate design’s thinking at the system level (Stickdorn & Schneider, 2010). For example, the use of customer journey maps (Curedale, 2018).

Systems-level framings and their related design research methods, models, techniques and information are argued in the Thesis to be supported by CIA in accessing a further level of abstraction, a conceptual-level, ‘above’ the systems-level. In this wholly abstracted and conceptual domain, the dominant socio-cultural, political and economic logics of a subject-matter may be deconstructed in context. Based on theories of social practice and construction, such as Bourdieu’s Habitus (1977), this meta-discursive space (Tharp & Tharp, 2019) in design may be described as a critical, conceptual immersion into the problem-ecology (Hobbs & Fenn, 2015) of the problem at hand. For example, if a bank asks for design assistance in improving their home loan / mortgage product, the brief may be taken at face value (product-/object-level). Alternatively, the designer may question home loans and
property ownership as the only, or best, potential solutions available for living (systems-level). And the designer may question further still, what the bank’s place is, or could be, in the relationship between a home, shelter, society and available resources (conceptual-level).

It was at the conceptual-level of the abstraction of problems, that the strategic effort in resolving the wickedness of addiction, emerged. The reasons for this are best explained through the ontological nature of addiction as a problem in the world.

2.1 Approaching Addiction

One explanation for the wickedness of addiction can be extrapolated from the work of Guy Du Plessis who, writing from the perspectives of Integral Theory and clinical psychology, roots the challenge of addiction in its ontological complexity (Du Plessis, 2014). In short, his argument and approach (Du Plessis, 2017) lies in an analysis of addiction summarised as follows:

“...the phenomenon of addiction is a third-order ontology, which can only be coenacted (brought-forth-in-the-world) when juxtaposed with associated methodological variety and epistemological depth (Esbjörn-Hargens, 2010). The notion of epistemological distance highlights that some facts of addiction speak louder than others and some elements of addiction are only enacted within certain worldviews. Methodological variety refers to the fact that:

“The more epistemological distance and ontological complexity increase, the more methodological variety will increase. Thus, the more multiple an object becomes (the What), the more methods and disciplines you will need to study and make sense of it (the How), and the more perspectives there will be on what is or is not the nature of that object (the Who). (Esbjörn-Hargens, 2010, p. 162)” (Du Plessis, 2017, p. 60)

A parallel may be drawn here to how the multiple perspectives of varying stakeholders are understood in DT (Kolko, 2012). If fact, he is only actually describing one aspect of the domain, being the positivist-oriented spaces of addiction’s multiple object, such as the varying perspectives across and within areas like neuroscience, psychology and social science. His description does not include other related systems and their actors in the broader ecosystem such as healthcare systems, family and community systems, education systems, workplace, supply systems, a criminal justice system and the police officer knocking on your car window.

Post researching the domain (Hobbs, 2021) it is clear that no universally accepted etiology of addiction yet exists. Research has emerged over the last decade or so providing neurobiological accounts of how one comes to be dependent on psychoactive substances due to changes which take place in the brain’s functioning (U.S. Department of Health and Human Services, 2016) but this research is unable to definitively explain why people become dependent in the first place. Furthermore, neither of the two prior points provide sufficient knowledge to determine what should be done to recover from substance dependence, other
than the rather uncreative yet largely ubiquitous suggestion of abstaining from such substances.

Du Plessis’ likening of the ontological problem of addiction-in-the-world, as a wicked problem, to the ontological problem for an addict being-in-the-world, stem from his view that the problem, for both, is being-in-the-world. In other words, the condition is a fact of life in being a part of the human condition. His view is not dissimilar from how one might interpret Buchanan (1992) or Normal (2010) regarding wicked problems and complexity (though not in existential terms): that wickedness and complexity are natural states of (social) reality, beyond direct epistemological reach, which we frame in an attempt to understand and design within. Cross’s (2006) conception of design’s intellectual culture as being distinct from that of the sciences and humanities relates to this point.

In Heidegger’s existential phenomenology, Dasein⁵ refers to the experience of being human, or the experience of experiencing your being. As such, experiencing your existence gives rise to a self-awareness of your human condition. However, ‘to be’ through this act of experiencing, is not a (static) state of merely being alive but is rather a process of continually ‘becoming’ in relation to one’s dynamic, embodied experience: the human ‘being’ alive in the world. In contemporary design discussions within HCD, interaction design and experience design (Hassenzahl, 2010) (Rogers, Sharp, & Preece, 2012) (Wilson, 2010) (McCarthy & Wright, 2004) – even in IA (Hinton, 2014) - we see a popular interest in phenomenology and the theories from fields such as embodied cognition and environmental psychology, amongst others.

In addiction terms, Du Plessis takes our existential human condition as his starting point for addressing recovery in addiction. As he wryly observes:

“To talk at a molecular [neurobiological] level about addiction is like saying that an amoeba, which only primarily exists in a primitive level of ontological complexity, has abandonment issues originating from poor object relations” (Du Plessis, 2017, p. 97).

Du Plessis’ view also draws on Max-Neef’s theory of Human Scale Development (1989), where any fundamental human need, “... not adequately satisfied generates a pathology” (Du Plessis, 2017, p. 109). Du Plessis continues to explain that unmet fundamental needs manifest the experience of psychic or psychological pain, for which psychoactive substances are well suited in terms of pain relief (ibid). When coupled and left unaddressed, the use of psychoactive substances becomes a second, or third, problem to emerge as dependence develops as a neurobiological disorder (U.S. Department of Health and Human Services, 2016). As such, he describes addiction as “a misguided attempt at self-repair” (2017, p. 109).

⁵ This interpretation of Heidegger’s use of the term is not specific. These are common and largely accepted interpretations, outside of philosophical circles. Thomas Wendt’s (2015) “Design for Dasein” is recommended as an entry point for considering Heidegger’s concepts in Design.
3. A Design Response to Addiction

Strategy design is interpreted literally herein, meaning ideating a strategy through the DT process-method where the output, a strategy, acts as the object of design, the ‘what’, which will inform further making, such as in prototyping. In the Thesis, the design of the strategy lies in the synthetic resolution (Dorst & Cross, 2001) of the problem using CIA in a manner which followed Rumelt’s (2012) ‘kernel’ of any good strategy. The kernel comprises a diagnosis of the problem, a guiding policy for the solution and coherent actions for the execution of the guiding policy (Rumelt, 2012, pp. 77-94).

Together, these various approaches merged to form a working theoretical model (Fig. 1) within which a strategy (design) was synthetically determined in complexity.

![Diagram of the conceptual framework and working theoretical model](image)

*Figure 1. Illustration of the conceptual framework and working theoretical model employed in the Thesis* (Hobbs, 2021).

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6 A simplified categorization of the DT process-method is presented here. In the project execution nuances to be found across various descriptions of the process (Harris & Ambrose, 2009) (Stanford D.School, 2018) (Hasso Plattner Institute, n.d.) were applied.
Figure 2 presents activities performed across the DT process-method enactment (Hobbs, 2021). The model depicted builds upon IDEO’s description of the HCD process (2009)\(^7\) amended to represent the increased breadth and depth of engaging with the wicked problem. The three rows in the figure represent the levels of abstraction previously discussed: the product-, systems-, and conceptual-levels. Activities relating to the CIA and strategy design are depicted at the conceptual-level of abstraction during Ideation (within the pink rectangle).

![Diagram](image)

Figure 2. Design activities mapped to a conceptual model of the DT process-method enacted in the Thesis (Hobbs, 2021).

Lastly, figure 3 presents a detailed view of the various aspects of the strategy design as enacted in reference to Rumelt’s (2012) kernel. (a) represents the reframing (i.) of the problem, being the diagnosis; (b) represents the strategic solution (ii.) at top and the CIA concept (iii.) below being informed by the reframe and constituting the guiding policy; and (c) identifies a journey map (iv.) created in response to the strategic solution and CIA

\(^7\) The original version - to be found in the ‘Intro PDF’ (IDEO, 2009, p. 11) - consists of two rows. The lower row contains activities oriented within a ‘concrete’ modality and the row above includes activities oriented towards an ‘abstract’ modality. The movement is from the concrete (researching), into the abstract (Ideating) and back down into the concrete (prototyping).
concept, which contained the coherent actions within. These three aspects are discussed respectively in the sections to follow.

![Figure 3. The strategy design and Conceptual IA illustrated through their creation in Ideation in the Thesis (Hobbs, 2021).](image)

3.1 Shifting the conversation

In the design project conducted the problem of addiction was reframed from one centred on addiction and substances, to one centred on a consideration and prioritisation of the human condition across the lifecycle of addiction. By far, the near pervasive belief persists that the solution to addiction lies in abstinence from psychoactive substances either as a preventative or rehabilitative course of action (Hobbs, 2021). In the abstinence model, recovery from addiction is understood as a binary state of either being ‘clean and sober’ or ‘using’ (Solheim, 2015). Figure 4, presents a distillation of the author’s interpretation of information gathered for the purposes of summarising a model\(^8\) (Solheim, 2015) (Solberg, 1983) (U.S. Department of Health and Human Services, 2016) (White, 1996) (Collins, 2018) (DiClemente, 1998) (West, 2005).

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\(^8\) To the author’s knowledge no such graphical or so modelled interpretation of the abstinence approach exists.
Figure 4. Use and abstinence in addiction conceived as a lifecycle model (Hobbs, 2021).

The reframe and descriptions which follow represent a subjective interpretation of the problem space premised upon research conducted and validated by U-ACT.

It needs to be noted that many South Africans, despite its constitution being one of the most progressively liberal in the world, remain in many ways and across many domains, a conservative⁹ people living in the aftermath of a colonial, Calvinist Apartheid era (Collins, 2018) and indeed prior to Afrikaner rule.

In South Africa, the dominant negative socio-cultural logics with regards to psychoactive active substances (beyond alcohol, cigarettes and perhaps marijuana) imagine addiction to be a result of defects of character (lack of self-control, willpower or taking responsibility) or immorality (Collins, 2018). The moral recrimination applies largely due to most of these substances being illicit, and by implication the user too is ‘bad’ or ‘wrong’ or ‘deserving of what they get’. This is in no small part a global inheritance of the USA’s ‘War on Drugs’ (The Global Commission on Drug Policy, 2017).

⁹ Today, SA has some of the longest jail sentences in the world for crimes relating to illicit drug-related crime.
A further dominant logic lies in the classification of addiction as a mental health disorder (Solheim, 2015). The issue thus moves into (mental) health or public health spaces (U.S. Department of Health and Human Services, 2016). Sadly, even here, the view emerges of the addict as a social abnormality and another to be pitied and / or treated differently. An example would be the non-disclosure of a substance disorder in general social terms or when applying for a job.

However, a ‘resource model’ of addiction\textsuperscript{10}, a term being coined herein, would suggest that addiction is better understood as the problem of problems, where a lack of internal and / or external resources available to an individual suffering from psychological pain - as a pre-existing condition - provides an arguably rational and reasonable inclination towards the (mis) use of psychoactive substances to ease the pain (Collins, 2018). This follows the views presented earlier by Du Plessis\textsuperscript{11}. Left unaddressed, a dependency on psychoactive substances can result, leaving the individual with two problems rather than just the original, one.

In this reframing the addict possesses innate and intact dignity, where the implicit moral intent in the reframe, positions addiction alongside other critical theory discourses with their concerns for justice, equality and fairness. This view is most loudly advocated in the Recovery Movement and its practice known as Recovery Management. Solheim observes:

“... The goal of recovery [has become] repositioned as “improvement in key areas of life that were impaired by chronic SUD [substance use dependence], emphasizing the need for coordinated and comprehensive services” ... The literature has moved far beyond the ideas of cessation of substance use: we have entered the developmental realm of recovery management, embracing recovery as a process, not a state, a process that is experienced as a better quality of life.” (Solheim, 2015, p. 13)

Du Plessis further notes that “QOL [quality of life] is applied as a fundamental concept across health care research... especially in mental health care and disability studies... QOL is increasingly recognized as a valuable indicator of the impact of treatment, need for health

\textsuperscript{10} In the Recovery Management domain, the concept of recovery capital centres on a recovering addict being assisted in building up the resources required for long term, sustained recovery (Solheim, 2015).

\textsuperscript{11} In citing Max-Neef, Du Plessis very cleverly contextualises addiction by connecting the individual to the larger socio-political system within which the addict suffers: “Each economic, social and political system adopts different methods for the satisfaction of the same fundamental human needs. In every system, they are satisfied (or not satisfied) through the generation (or non-generation) of different types of satisfiers...We may go as far as to say that one of the aspects that define a culture is its choice of satisfiers. Whether a person belongs to a consumerist or to an ascetic society, his/her fundamental human needs are the same. What changes is his/her choice of the quantity and quality of satisfiers.” Max-Neef (in Du Plessis, 2017, pp.107-108).

It is in the context of these enormous shifts in thinking about addiction that the well-being of an addict (in recovery or not) needs to lie at the heart of any design intervention.

3.2 Message-Content and Message-Form

In a most unexpected turn, it would appear that an overlap exists between IA and Discursive Design which could have far reaching, and positive, implications both for Design and IA.

In Tharp & Tharp’s (2019) “Discursive Design: Critical, Speculative, and Alternative Things” they describe message-content which refers to the content of the subject matter under discussion within a discourse, and message-form as the mode of discourse or form for sharing the content. It is in their considered and combined form that an additional level of meaning is conveyed which allows for complex handlings of content, form and context (Tharp & Tharp, 2019).

In its simplest form, IA is typically used to create the content structures of websites. This involves the identification and grouping of information into categories, all of which are labeled, and then modelled in an iterative top-down and bottom-up process to develop a structure, an IA, which people navigate through using a (graphical user) interface. This act has recently been reframed (Hobbs & Fenn, 2019) as the creating of a structural logic which through taking a form, referred to as a semantic formation, (trans)forms when realised (made and used) within design objects.

Although discursive design (DD) and IA have very different purposes and contexts of use, they use almost exactly the same constructs: message-content being structural logic; and message-form being semantic formation. For now, these constructs will only be highlighted for their likeness in relevance to the strategy design conducted. Later, the conversation will resurface again for other reasons.

The strategy design solution consisted of defining an aim for the design, a concept for the design and the approach to be taken to its execution. Sadly, there is only space within this paper to discuss the design concept and even then, at-a-glance.

The CIA concept, which emerged from the reframe, while also functioning in relation to the aim and approach, consisted of two parts: a set of ‘experience drivers’ (Fig. 5) determined through synthesis of the research; and a novel lifecycle or ‘relationship model’ (Fenn & Hobbs, 2017)(Fig 6) for a wellbeing centred recovery. The former operates as message-content / structural logic and the latter, as message-form / semantic formation.
Figure 5. The experience drivers model as the message-content / structural logic (Hobbs, 2021).

Figure 6. A wellness centred relationship model as the message-form / semantic formation (Hobbs, 2021).

Together, these two artifacts provide the structural semantic architecture as, and for, a new ‘contrived ontology’ for the solution intended for the world.
3.3 The Contrived Ontology

The experience drivers and relationship models provide something like a *kernel* for the IA of the entire solution to be built upon, thus providing a contrived ontology. The CIA concept’s first instantiation took the form of a more familiar design artifact, a Recovery Wellness Journey (Fig 7). This journey is in essence a pervasive, cross-channel information architecture (Resmini & Rosati, 2011) functioning at a systems-level. In turn, and sustaining the thread from CIA concept, specific services and products (Fig 8) were able to be ideated and prototyped at an object-/product-level for stakeholders engaged across the ecosystem.

In figures 7 and 8, the relationship model is rendered in a linear form as the top line of five, black journey stages, reading from left: Immersion, Define & design, Wellness and re-engaging. The content depicted below, organised per stage, is colour coded in reference to the experience drivers model. In this way the coming together of the structural logic and semantic formation to form a *whole* is made visible.

*Figure 7. The version 1, lo-fidelity prototype of the Recovery Wellness Journey (Hobbs, 2021).*
Figure 8. Mapping of cross-channel ideas generated into journey stages (top) and colour coded by experience driver (below) (Hobbs, 2021).

Figure 9 presents an example of one of the in-channel (website) user journeys created for the Immersion stage, transitioning towards the Define & Design phase in the same channel.
Visible across figures 5 to 9 should be the move from upper abstract levels of description downwards towards increasingly granular and concrete descriptions of the concept in design. Visible too should be the manner in which each successive level of ideation and description takes its logic, and meaning, from the prior level. Thus, the form of the CIA concept is both preserved and discovered through the DT process-method to ultimately manifest a contrived ontology as a meaning tacit within the user’s experience of the solution.12

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12 A distinction is made in the Thesis between a minimal conception of contrived ontology, being a meaning intended for the world, and a maximal conception, where the meaning transcends contrived intent to become an authentic ontology co-produced with users. The extent to which the maximal contrived ontology coheres with the minimal may be taken to be a measure of the quality of a design.
4. System Wide Synthetic Integrity

Synthetic integrity is a praxeological concept also referred to by its authors as a ‘golden thread’ (Fenn & Hobbs, 2017). Their original conception was of a horizontal, linear thread which, through the use of design journeys, made shifts in the meaning of information visible and traceable through design processes (Hobbs & Fenn, 2013). This is important in DT where, due to reframing, information used throughout the design process, such as research data or, even decision making, transforms in meaning due to deconstruction and decoding in Enquiry, recoding in Ideation and encoding and reconstruction in prototyping (Hobbs, 2021).

The Thesis expands upon the original notion where a second thread was observed operating ‘vertically’ forming, by way of analogy, an X- and a Y-axis. The X-axis represents the aforementioned golden thread. The Y-axis manifested through the CIA concept being employment across the three levels of abstraction from Ideation through to the end of Prototyping. Together the axes provide a scaffolding which pervades the design process.

It is in this way that the complexity of the wicked problem is harnessed through the use of IA and CIA in two ways: first, affording a realising of meaning, through sense-making in Enquiry at the point of reframing, through deconstruction and decoding; and second, realising the CIA concept as meaning-making in Prototyping through encoding and reconstruction.

It is worth restating that IA comes be discursive, though not necessarily critically so, when it shifts from applied science to Design (Hobbs, 2021). In this shift, how one considers and treats information derived from research and employed throughout the design process needs to be understood in the terms of Design’s mediation of social reality (Hobbs & Fenn, 2019). Without this, it becomes extremely difficult for Design to take responsibility and be accountable not just for what it makes but also how it makes what it makes (Hobbs & Fenn, 2019).

The strategy design, sitting at the pinnacle of the process thus becomes a hinge for managing not only project, programme and even cultural design-related affairs, it provides for the management of the meaning in the system created and the networked meaning of this system in relation to others in its ecosystem. In this context, meaning could possibly be understood as value in the language of SDL (Vargo, Maglio, & Akaka, 2008) however, more consideration of these implications is required in general.

4.1 A Pre-Pattern?

The basis of a method and a model for praxis, a pre-pattern in RTD (Zimmerman, Forlizzi, & Evenson, 2007), has been developed in the Thesis which builds upon Buchanan’s (1992) concept of placements. In this method we may observe an ontological reframing of what addiction could come to mean in the world. This shift in meaning is captured in the CIA concept, the Recovery Wellness Concept, which acts as a ‘pivot’ for exploring solutions. The mechanic for exploring and defining combinations of placements across space and time, in
the Thesis, was a journey map, which in turn inherited its structural logic and semantic formation from the CIA.

As the dual enactment of IA, and CIA, occurs across both X- and Y-axes a scaffolding, or semantic structure, comes to pervade the DT process-method providing system-wide synthetic integrity (Fig 10).

What synthetic integrity then brought forth was a concept for a generalised architectonic for systems of meaning and meaningful systems as two parts of a gestalt whole (Hobbs, 2021). The system of meaning took the form of a system of wellbeing - from the relationship model as the semantic formation; and the meaningful system took the form of a system to be well in – from the experience drivers as the structural logic (Fig 11).
In concluding this exposition of the project, a last observation is to be made. In terms of a coherent and consistent framework of meaning, the integral, structural nature of the system to emerge from the strategy design is one in which all instances of the system appear in the system itself, but in turn, the entire system can be observed in any particular instance. This last point provides the technical explanation of how the system’s tectonics some to support the meaning for its architectonic.

Conclusion

This paper has provided an account of strategy design created through the DT process for the purposes of solutioning for the highly complex topic of addiction. Strategy design in this case, is demonstrated as a meaning-making process capable of emerging through synthetic resolution in Ideation. Through the use of conceptual information architecture (CIA) such meanings are capable of manifesting in the world as contrived ontologies within robust, transformative systems. In the identification of the shared semantic mechanics of discursive design (DD) and information architecture (IA) important and exciting opportunities become available to design, and the world.

Both DD and IA make meaning by being in social reality, however DD would emphasise a transformative social agenda and IA would likely default to a sustainability agenda (which should not necessarily be interpreted as a conservative socio-political stance). Where contemporary IA practice perhaps differs from DD is in its principal application in the design of increasingly pervasive digital spaces (Resmini & Rosati, 2011) which have shifted from our being related to, to our becoming dependent upon (Floridi, 2016).
These digital spaces are interactive and functional and thus, what were discursive ‘readers’ become discursive ‘users’ of semantic systems. In a sense, the nature of digital environments renders the message-form, in the first instance, as something to be in rather than to observe at a distance. The pre-pattern presented within allows discourse to become realisable as the environments within which we will soon be living.

References


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Reframing development: A proposal on the role of design research in Latin America based on situated views of the world

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Abstract | Design has gone, through the past decades, from looking for solutions to everyday problems to the production of actions on a systemic level. That path has led design into getting involved with the process of policymaking. But as many researchers have reported, a constant failure in the implementation of policies for innovation and development on so-called ‘third-world’ countries, might imply a necessity to investigate its possible reasons and implications. Design practices related to policy making have proposed possible frameworks to evaluate those failures and seek for solutions, however, these procedures might be based on the wrong assumption, that these failures are barriers to overcome, rather than embedded values to be encouraged in the design process of possible new systems and ideas of the preferred future. This paper considers some critical notions of embedded values on Latin-America communities and the implications for a growing role of design in devising actions that can lead us to a preferred future state of the system.

KEYWORDS | POLICY DESIGN, SYSTEMIC DESIGN, EMBEDDED VALUES, LATIN-AMERICAN DEVELOPMENT
1. Introduction

In the past 60 years, design theory has developed significant arguments about the nature and role of design as a discipline as a way of thinking (Polanyi, 1964; Alexander, 1967; Simon, 1969; Bucahanan, 1992; Banathy, 1996; Cross, Christiaans & Dorst, 1996; Sevaldson, 2017). Some of these arguments have been widely accepted and some are still discussed among academic communities, but from them we could establish certain principles and trends that can show us current exploratory practices and their possible impact in the future role of designers in the world. One of the most significant ones and the one on which this article is supported the idea of design thinking and design process as possible tools for the design of economic and political policies (Ingram, & Schneider, 1993; Soss, 1999; Skelcher, Mathur, & Smith, 2005, Hendriks, 2009, Kimbell, 2015).

This practice is located inside the conjunction between the capacity of design to look and research into possible preferred future states of the system (Simon, 1969; Banathy, 1996) with the purpose of producing tangible artefacts as catalyst for the required transformation, and the notion that design is by nature systemic (Sevaldson, 2017), and it is constantly looking for connections outside the initial scope and for solutions to larger or wicked problems (Rittel & Webber, 1973).

But most of the approaches presented in the research literature about the process of design for policymaking, assume the existence of a system in place, and focus on the systemic search for failures with the intention of producing formal solutions that fit into the system and improve its functioning, either by overcoming barriers (Woolthuis, Lankhuizen, & Gilsing, 2005) or by a participatory model that informs the process (Barbero & Bicocca, 2017). This methodology present significant problems when the view of the system moves from theoretical and structural to a real, complex and dynamic view, and factors like the culture and values are recognized, not as barriers to the adoption of a policy, but as leading principles of the real system. Leading to the question of how to make sense of those systemic failures as index of underlying principles of the community not capture by the design process.

This paper seeks to interrogate the idea of design for policy making, with the specific case of Latin-American models of development (Escobar, 1991), when concepts like situated knowledge (Haraway, 1988) and systemic values (Friedman et.al., 2013) are incorporated inside the design process; and what are the possible implications for the area of study.

2. Theoretical context

2.1 Designing for policy making

Design devises tangible means of transformation of the world (Simon, 1969) on a systemic level (Sevaldson, 2017), therefore its recent role on acknowledging different stakeholders
and the use participatory approaches to recognize possible spaces of transformation on governmental policies and produce viable possible alternatives to address those issues. Initially based on the application of ‘design thinking’ techniques (Buchanan, 1992) to include the targeted communities on the discussion and to search for creative solutions to complex issues on the governmental level, design for policy making has quickly turned to a systemic approach. This idea of a systemic and yet actionable approach that design brings, has created new opportunities for designers to get involved on the process of policymaking on a higher level (Bason, 2014).

But those design actions focused on the improvement of society have shown over the years to present significant problems on the search for the development of the so called ‘third-world’ (Escobar, 2012). Projects of social innovation and social awareness, have fell into oblivion when communities are unable to support or maintain those design solutions built for the covers of magazines. And large scale policies for development slowly bleed out their resources on the intent for acceptance and implementation. One possible reason is that there are several intrinsic factors in the systemic level of policy making, like the situated knowledge of the community, their cultural values and their views of the world, that are usually not incorporated by policy makers under the assumption that their role is to make their policies viable.

This notion of viability is a very dangerous statement, since it assumes the existence of one view of the world and one image of the future, and policies as the correct mechanisms to lead us there. In this model, the failure of policies is conceived as the result of a series of systemic barriers that must be identified and resolved to make the policy implementation possible (Woolthuis, Lankhuizen, & Gilsing, 2005). We could argue that a significant problem of many design processes is that they focus their attention on the production of artifacts (either images, objects, plans, service blueprints, etc.), but that the real objective of this artifacts, that is the actual transformation of the future system, is sometimes overlooked. Ideas like predictability or anticipation, that are coming from economical sciences and engineering, support this idea of the production of objects that intent to fill a predicted gap of the future and that their success is measured based on acceptance rather than on the unintentional consequences that they produce or the values that they support. This view eliminates one the most important principles of design: that it is about the actionable transformation of reality.

However, the application in the process of design of socio-political and cultural theories as systemic factors, might present a more critical way to devise policies that agree with the reality of the system and the stakeholders involved, or at least to a more critical understanding of the system and the real reasons for failure.

2.2 The importance of situated knowledge

One of the different struggles for policymakers to introduce new policies that support a specific model or view of the world, is the one that is presented when communities are
forced to accept policies that go against their current practices. This conflict between the traditional practices and the requirement to accept new ways of doing, is usually seen by policymakers as a deficit or inability of individuals to adapt or develop (Smith, 2000), even though those disregarded traditional practices, might sometimes have a better understanding of the ecosystem. This type of knowledge that is produced by cumulative experience of a tangible relationship with the world, or situated knowledge (Haraway, 1988), is not just built on a more systemic process, but is also intrinsically connected with cultures, traditions and ways of being in the world.

Besides the fact that communities who are subject to models foreign to their reality must deal with the erosion of their traditions, they also should tolerate the disdain of the situated knowledge that they have built through generations by the institutionalized structures of knowledge, and accept new methods that rely on notions sometimes built on a lab separated from reality, or based on theoretical ideas that have not been fully developed.

Escobar (2007) points out this phenomenon on his critique to the ideas of development,

“...the forms of exclusion that went along with the development project, particularly the exclusion of the knowledges, voices and concerns of those whom, paradoxically, development was supposed to serve: the poor of Asia, Africa and Latin America” (p. 20).

This disregard of their traditions, this silencing of their voices, is not just a barrier to overcome or a matter of inclusion, it is a sign of a larger problem on a systemic level, and it raises the question of whether the role of design is to find a way to ease the transition, or to reframe policies and the notion of development in a systemic level.

This issue is not just a matter of cultural acknowledgement, it is important to recognize, that even though situated knowledge does not follow the paradigm of scientific knowledge, it is constantly producing hypothesis that are tested for even longer periods than the ones used on science process, and they are deployed under real conditions. It is also important to add, that a possible advantage of situated knowledge for problem solving, is that it seeks for actions on real instances, it does not rely in the ability to validate or explain, but on the pragmatic search for a solution. Finally, situated knowledge does not simplify or discretize reality like the scientific process, it works in a systemic way, connected to all possible variables and consequences (Haraway, 1988). Therefore, in the case of design practices, integrating this kind of knowledge to the construction of ideas for the future of these communities is not just adequate but necessary.

We can see several examples of this denial of situated knowledge by the political systems of hegemonic knowledge, and they extend far beyond ‘underdeveloped’ countries. Praxon (2012) argues that there is a political decision behind the imposition of these models and that their effect might put in danger a specific knowledge that has not been collected or recognized by other means; Marcellino et.al. (2001) also explains how the introduction of
modern technologies on the production of cheese has been eradicating ancient techniques and knowledge,

“As traditional cheese making techniques are threatened or have been abandoned, the collection, characterization, and preservation of native strains of cheese-ripening microorganisms are critical…” (p. 4758).

This idea of a standardized knowledge eradicates the possibilities for conversation, and assumes a given truth about the world, ignoring that many of the problems that we face today were already resolved hundreds of years ago by the communities that inhabit those spaces.

That is the case of the flooding areas of the Zenú river in Colombia, where the larger hydraulic system of ponds, canals and floodgates of the Americas was set on place even before the arrival of the Spaniard Conquistadors, managing the caudal of the river to provide irrigation and organic material to the soils, bringing sustainable wellness to the local communities. This model that guaranteed prosperity for the whole community was based on the principle of governance as a service and management instead of ownership in terms of the use of lands.

However, the introduction of political decisions intended to provide benefit to individuals, and policies that disregarded that situated knowledge, transformed the overflown of the river into a constant focal point of humanitarian crisis, where, on yearly bases, families lose their crops and assets. As lands are no longer communal, communities are forced to deal with their own problems as individuals, and large scale actions are only reserved to a governmental level.

But cases like these are even more complex when indigenous communities that are still actively using that knowledge, and we can count that on hundreds of communities in Latin-America, are forced to face science, medicine or modernity. We see their lack of acceptance of these ideals as lack of development or understanding, ignoring that their knowledge of reality might be better connected to the natural system.

These statements are supported by different authors, some of them, like Escobar (1992), criticizes the notion of ‘development’ as a constructed ideal for the future that has been imposed by the mechanisms of power that are in place, to maintain control over the ‘less-developed’, ignoring their voices and their ability to produce their own idea of future. We live in a society that has taken for granted a single idea of what the future is, and the role of technology, science and politics in the construction of that future, ignoring that there are other communities sharing the space and dealing with the consequences of our ideas; communities with other views of the preferred future, that are based on cultural values different than those of the modern western world that have determined the path we have followed.
2.3 Embedded cultural values and their systemic repercussions

The discussion about embedded values in design have been getting more attention and discussion on research literature (Pereira, Buchdid, & Baranauskas, 2012; Friedman, et.al. 2006) and other design related disciplines on the fields of architecture and engineering have included the use of values on the definition of current projects, from infrastructure to big data and AI, human values have gained attention as significant variables on the construction of large scale system or environments. Values are strong forces pulling into specific directions, especially those with cultural origins, since they represent a shared view of our roles inside society; these intrinsically bounded cultural values of local communities, define a big part of their traditions and actions, since those have been historically oriented to the fulfillment of symbolic needs.

However, as stated by Escobar (2007), there is no way to assume that policies intent to fulfill the real needs and requirements of societies, especially since most of these (needs) are produced by a dialectical relationship with the ideals of the ideology on place. It is necessary to recognize that the role of design on communities where foreign values have been already introduced might go farther than applying participatory processes to recognize their needs, since those might be skewed from reality. As for those communities that have not been obligated to adopt external models or ideologies, these values could be leading into a different direction.

It is then important to understand that for many traditional Latin-American communities, the wellbeing of a community is more valued than individual interests, and the ecosystem is valued beyond the discrete idea of ‘resources’. Those communities historically have looked for balance and flourishing rather than growth or development as a definition of future, for them notions like individual growth or private property are not only foreign but dangerous. In that sense, Riley (2000), points out about how non-Western indigenous communities still carry a deeply embedded notion of property as a value intended for the wellbeing of the community that clashes with the ideal of individual property of western copyright laws; adding to that, Redford & Stearman (1993) also argue on the dangers of imposing western notions like ‘property’ on the issues of land on indigenous communities, since the sustainability of many of the tropical forest areas of the Amazonia have been supported by a complex system of collaborative and communal management of those lands, and oriented to guarantee its persistence for present and future generations.

Isemberg (1992), also discusses how the delicate ecosystem of North-American communities was disrupted by the imposition of European policies, and how the practices of sustainability of Native American communities change from a system of multisource communal support to a nomadic economy of hunters, forcing them to abandon their traditional lands. He also points out the devastating consequences of the introduction of the notion of capital as a desirable value and a constant goal that is opposed to the wellbeing of communities. These factors present a significant learning for design in general and design for policymaking in particular, since it reveals the constant existence of embedded values on everything created.
by humans, from everyday objects to large-scale policies, and the significance and implications of those values on human behavior and on the balance and survival of the system.

3. World-views and images of the future

Both the values and the situated knowledge represent the past and present of communities, the trends, patterns and lenses used to produce an image of both the present and the future system. They have been a significant part of what have produced specific ‘world-views’ or ‘Cosmo-visions’ on local communities. Therefore, any image of the future used on a design process (Banathy, 1996) that fails to incorporate those views will produce a natural resistance on the implementation process.

These views of the world might be significantly different to ours; particularly in Pre-Hispanic America, these visions were based on a sustainable and systemic view of the world, where nature was not defined as a set of human resources, but as a living organism, and the role of humans to maintain its balance. Escobar (2007) comments

“...alternative political ecology, based on notions of sustainability, autonomy, diversity and alternative economies that do not conform to the mainstream discourse of development” (p. 21)

referring to the vision proposed by local black communities in Colombia on their process of trying to define their idea of future, and proving a systemic dislocation between large scale politics and the real intention of communities.

And yet, many policymakers still try to implement policies that are foreign to the reality of these communities, disregarding the lessons of the past. The implantation of policies based on unaligned world-views may produce unintended (or not) negative effects; as Isenberg (1992) points out, the imposition of modern 19th Century worldview of the evolutionary struggle of the species facing the cruelty of nature and the need for individual survival as the ‘fittest’ might have come with devastating consequences, like the nearly eradication of both American buffaloes and Native-American communities.

All these principles are embedded in communities and born through their relationship with the real world, but in the process of policy making are not commonly acknowledge as possible factors to seek the transformation of the current policies or even the reframing of notions like development or the underlying economic and political models that supports them. Woolthuis, Lankhuizen, & Gilsing (2005) explain this dislocation between policies, situated values and knowledge as a “Soft Institutional Failure” and argue that policy designers must overcome those to be able to implement the desired policy, disregarding the possible importance of these principles in the constructions of policies. Others, like Skelcher, Mathur & Smith (2005) argue for a participatory process for policy design, that allow communities to part on the definition of their future, but even in the participatory approach
the role of communities is reduced to the production of ideas for policy making, leaving outside the discussion if there is a real common view of the future, and if those policies are just patches sawed on a defective system.

If design is indeed a holistic process of understanding and transformation of reality based on a specific view of the world, and that both the understanding and the possible implications of design actions are supposed to be happening on a systemic level (Sevaldson, 2017), we should not be looking only into the production of artifacts to support the implementation of one single view of the future, or to ease transitions into what some stakeholders assume as the right direction. We should be able to reframe those notions of the future, to include the reality of the communities that we are working for, considering possible game-changing actions intended as catalyzers to the large-scale transformation of the current system, and if Escobar’s (2012) argument of “Design has doubtlessly been a central political technology of modernity” (p. 5), we should also have a significant role to lead us pass that notion of modernity into a more inclusive view of the world.

We can see emerging cases of participatory future building in Latin America, like the one presented by de la Rosa, et.al. (2021) about the creation of the CIIC (Communitarian Center for Research and Innovation), where communities lead grass-root processes that seek to produce images of their future that can help them modify the policies that affect them. These actions do not seek to map problems or needs, but rather recognize their values, and their ideas of what a better future looks like for the community, and then plan for strategic actions that can lead into them.

On these practices design becomes an enabler of their process, it does not ask for problems or presents solutions, but recognizes the design process as its main contribution, and the constant reminder that the goal of the process is the future of the community, and the participation of every voice. In this process design is not the savior or the initiator, it does not take the credit or publish creative innovations on the cover of a magazine. It rather maintains a silent role of support and focus.

On the mentioned case of the CIIC, the design team organized a series of community-based workshops that used methods like value-mapping, cultural probes, self-ethnography, prototyping and collaborative analysis to create images of a future where community values where acknowledged and incorporated for the wellbeing of the community.

Although these processes emerge on very specific circumstances of socially concerned community values and a history of participation. The role of designers seems ideal for policy-making, facilitating discussions about the future on a systemic way, interconnecting intentions and agencies to produced strategic plans to incorporate voices and actions into the construction of that future.
4. Discussion

The problem for neglected communities could go as deep as the primordial principles of the capitalistic system and may explain the permanent seek of Latin-American communities of alternative systems, and their foreplay with communist ideals, that at the end become also imported views of the world. Escobar (2007) point out that

“with their focus on discourse, the post-development proponents overlooked poverty and capitalism, which are the real problems of development” (p. 21).

This might determine the need to go even farther in the definition of future, and the idea of development, to seek from the perspective of policy design an approach that recognizes the real nature of communities as a foundation to produce new models, and as Escobar points out, enter the era of post-development, when communities become more involved in their construction of their future.

From the perspective of design, as a process that constantly seeks for the transformation of reality to achieve a preferred state, the question is, how do we define the notion of ‘preferred’? Is it based on the view of the systems of power in place or is it really considering the preferred views of the members of the communities that those policies serve? And how deep into the system should design process look? Should it be just a tool to serve to patch the gaps of a failed system or a catalyzer of transformation of current models and institutions?

Design have historically play the role of facilitator, greasing the wheels of the power system, either as the building arm of the economic powers or the path maker that with the ideal of social innovation helps to maintain the inequity of the system. Giridharadas (2018) on this issue, quotes the 1891 essay by Oscar Wilde, referring to the actions of design thinking as a tool to alleviate poverty, rather than a radical force of change, as the good slaver who by actions of kindness covers the horror of slavery. Isn’t it time then that Design assumes the role of truly aiming for a preferred future that we can all share, and not one that has been systemically designed to maintain poverty an inequity as a mechanism of control.

If Escobar (2012) is right is, the constant failure of the systems is related to the implementation of extraneous politics and models that are unaligned with the values of the communities they seek to represent, and do not recognize the nature of these communities. With the assumption that the role of design as a discipline is investigating the future to produce new artifacts, and that those artifacts are determined based on the structure of the system, working with a failed system as an initial parameter, will mostly produce inaccurate results. Therefore, every intention to produce innovation and development in Latin-America might be by nature flawed and might require for design researchers as their priority to investigate the notions of development and future to produce new models that include the reality of the socio-cultural ecosystem of Latin-American communities.
This paper calls for design research communities in Latin-America to prioritize the design for policy making as their main initial preoccupation and to seek for ways to reframe the idea of development towards an inclusive, sustainable and responsible model of the future world from a systemic perspective.

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Speculative Design for the Public Sector. Design Fiction as a Tool for Better Understanding Public Services.

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Abstract | This paper investigates how speculative design and particularly design fiction can be an effective educational approach to public sector design. The innovation and digitization of public services has been an important driver for the introduction of design thinking and service design methodologies in the public administration in recent years. Design for the public sector on the other hand affects the way the citizen-institution relationship is conducted and therefore requires an ethical and possibly critical approach. Likewise, the global challenges that await public policy choices are increasingly confronted with analyses and foresights of the future. Design fiction is a way through which, starting from the designer’s educational path, design, politics, foresight and civic participation can be combined within a conscious and ethical narrative framework.

KEYWORDS | DESIGN FICTION, SPECULATIVE DESIGN, SERVICE DESIGN, DESIGN FOR SOCIAL INNOVATION, DESIGN FOR PUBLIC
Without a utopian element, another world is not possible and would remain the expression of a pious ethereal wish without concrete consequences.

*Gui Bonsiepe* (2010, p. 41)

The purpose of this paper is to investigate how speculative design can represent a useful didactic methodology for providing designers with the skills necessary to take on the challenges of digital public service design. In recent years, innovation and digitalization in public administration have been an important stimulus for introducing the methodologies of design - and service design in particular - into the field, especially in cases where design’s capacity to promote inclusion and civic participation proves to be a useful resource. The result of this process is an increasingly intense and inevitable synergy between designers and the public sector.

1. Design for the public sector

This is reflected in the fact that international experiences concerning the design of digital public services have recently been on the increase. The effectiveness of digital public services, in fact, represents one of the policies monitored by the European Commission through the Digital Economy and Society Index (European Commission, 2019). One of the most significant ongoing experiences, in terms of originality and scope, is certainly the seminal work conducted by the British government through the activity of the Government Design Service (GDS), which began in 2011. Having employed to date over nine hundred designers (Downe, 2019b), the GDS is the proof in the field of how the sector of design for public administration represents a promising field of development for the near future. Jason Shupbach, Design Director at the National Endowment for the Arts during the Obama administration, left no room for doubt when he stated that “to me, that’s where the real energy is on good governmental graphic design” (cit. in Budds, 2017). Professional opportunities, of course, are not the only question of interest here. Indeed far more significant are the civic and democratic ramifications that designing the relationship between citizen and institutions implies, and which makes public sector design so crucial. It is certainly not difficult at the present time to recognize that “democracy is a design problem” (Chisnell, 2016), particularly given the challenges implicit in the widespread and generalized distrust of politics. Training designers who are skilled in crafting services in the public interest thus constitutes a precious necessity which university-level education must ensure.

It is important, nevertheless, to dispel a series of quite common misunderstandings that view the design of public services as limited to the simple graphic rendering of an interface,
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or as a problem of an exclusively technological nature. Public service design represents a classic example of one of those wicked problems that Richard Buchanan, using Horst Rittel’s definition, so usefully described, identifying the design thinking approach as the only one capable of handling these specific sets of problems (Buchanan, 1992/2019). They present unique challenges to traditional solutions because they are symptomatic of numerous conflicts; they are problems that risk being aggravated rather than resolved by solutions that are isolated from the broader context. Naturally, public organizations are not enthusiastic when faced with these questions: “After all, wicked problems are (social) issues that no one entirely understands and that cannot be effectively addressed by any one person” (Schaminée, 2019, p. 31). Only through a holistic approach to design can we hope to structure effective paths for public service design that attribute the necessary importance to the “human factor.” Participatory approaches and co-design, the involvement of the various stakeholders, and the creation of multidisciplinary coalitions are the necessary conditions for an effective approach to digital public service design, as the experience accumulated in recent years demonstrates.

But which characteristics should a service have in order to be considered effective? The answer provided by Lou Downe, ex-Design Director at the GDS, in his recent book Good Services. How to design services that work goes straight to the point: a well-designed service must be a good service for the user, a good service for the organization that provides it, and a good service for society in general (Downe, 2019a, p. 36).

Preparing to design a new generation of citizen-centered digital public services, therefore, means first creating the necessary skills in the designers of the year to come. Skills which cannot be limited to mere aesthetic and technological solutions, but must include the ability to guide and direct those processes that underlie the management of the services themselves. Without innovation in administrative processes, any action risks leading to the development of disappointing and ineffective services (Downe, 2016), yet public organizations are not always structured to grapple with the techniques and methods of design thinking. Where possible, it is necessary to build the necessary bridges between designers and public sector innovators to develop a shared method and language for the achievement of their common goals.

But dealing with the frequently contorted and bureaucratic reality and procedures of public administration can often prove frustrating, nullifying the enthusiasm of even the best intentions. Limited aptitude for technological innovation, antiquated procedures, overlapping competencies between various offices, and disagreements over how to manage change constitute some of the main hurdles in the interaction between designers and the public sector. At times, such obstacles can even provoke cases of “friendly fire,” with the consequent slowing down - if not out-and-out stalling - of the innovation process (Schaminée, 2019, pp. 40-62; Tassi, 2019, p. 83). All of this clearly represents a significant impediment for designers’ work in this particular field. As Mike Monteiro summed up, “for the most part, no one wants to be doing these things. They’re not exciting. They’re tolls for
existence” (Downe, 2019a, p. 8). Managing to understand this reality, establishing constructive dialogue, and getting the most out of the excellent resources that are present in the public sector constitute a necessary step in public service design. Thus emerges a responsibility on the part of the educational system, along with public institutions, to identify less common and potentially more intriguing ways of interesting students in the design of public services, fully conscious of the fact that only an active presence of designers can guarantee the development of good services. Ben Terrett, another former GDS Design Director, doesn’t mince words when he argues that

“every designer should work in the public sector. Being a civil servant and using your talents to help the people in your country is an honour. In an industry so often obsessed with novelty and persuasion, government is a chance to do real design work. If the government started a fast stream programme for design grads it would start to change the industry and make services better at the same time” (cit. in Pasqual, 2017, p. 199).

And it is here that higher education must intervene: in the creation of a shared workspace for design and the public sector. As Kees Dorst put it, “there’s a lack of instruments and tools where organizations and design intersect. Moreover, there’s not even a profession for that area” (cit. in Schaminée, 2019, p. 14).
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Figure 1. The final exhibition at the 2016 IUAV Design Workshop (University IUAV Venezia) on the design of future public services.

Developing specific courses on government service design means preparing tools to make this field more attractive and stimulating, going down less traditional paths. This phase appears increasingly urgent because public service design provides a renewed opportunity with which, as Victor Papanek phrased it (1973, p. 19), “design can and must become a way in which young people can participate in changing society.”

2. Design fiction and public sector

One of the most promising approaches in this perspective is represented by speculative design, and particularly by “design fiction,” a method still little used in public sector design with the controversial exception of defence departments and the armed forces (Otero Verzier, 2018). Design fiction brings together the creation of objects not yet existing in reality with the construction of a fictional narrative context whose purpose is to stimulate “debate” and reflection on the part of the general public (Tharp & Tharp, 2019).

A story’s ability to mold the public perception of government policies has been investigated on many occasions. We know, for example, how the mainstream media, particularly film and literature, have had a direct influence in orienting U.S. government policies regarding the reorganization of psychiatric institutions after the publication of Ken Kesey’s novel One Flew Over the Cuckoo’s Nest (1962), or in supporting the huge federal investments in space exploration through Hollywood’s massive production of science fiction films (McCurdy, 1995). Cinema also has a long history of representing the machine of government, the bureaucracy and its functionaries, highlighting its merits or, more often, its downsides (Holley & Lutte, 2017). Similarly, the science fiction genre has repeatedly transposed onto the silver screen visions of public administration of the future – from the obsessive, obtuse bureaucratic system of Orwell 1984 (1984) and Brazil (1985) to the lobby-like pressure groups in the Galactic Senate in Star Wars: Episode I - The Phantom Menace (1999), from the alien census in District 9 (2009) to the ludicrous public health system of Altered Carbon (2018), in an alternation between utopian and dystopian visions (Lee, 2017; Sauvé, 1998). Speculative design brings a narrative, critical dimension – sometimes provocative and politically antagonistic – into the work of the designer.

The term “design fiction” indicates the method of creating alternative future scenarios through the design of particular objects or, to use the famous words of writer Bruce Sterling, “Design Fiction is the deliberate use of diegetic prototypes to suspend disbelief about
change (Sterling, 2013). In this approach the centre of interest is no longer design in itself, but rather the user and those changes, opportunities, and critical conditions that design can contribute to create. As highlighted by Dunne and Raby (2013), two of the most representative explorers of this approach, when it comes to speculative design,

“rather than thinking about architecture, products and the environment, we start with laws, ethics, political systems, social beliefs, values, fears, and hopes, and how these can be translated into material expressions” (p. 70).

It is difficult not to see in this orientation the essence of that “design hope” discussed by Tomas Maldonado (1970, p. 60): “Politically speaking, the revolutionary sense of dissent is really only attainable through design. Dissent that rejects design hope is nothing but a subtle form of consent.”

Design fiction has not often been used for the public sector precisely because it is so strongly connoted by this provocative vein, sometimes subordinated to the narrative, other times explicitly evoked to exploit its potential tension within participatory processes (Boer & Donovan, 2012). Of course this tension also constitutes a risk, and may sometimes even be the cause of rejection in those public milieus less inclined to innovation, or strongly opposed to changing their consolidated processes. The fact that speculative design is characterized, as we mentioned, by an explicit political outcome is certainly useful in stimulating discussion, but can become problematic when the bodies that use it have to present themselves as impartial, as is the case in the public sector.

Yet anticipating and imagining the future represents a meaningful way of evaluating the implications of the choices made in our present. With the global challenges humanity faces today – the climate crisis, social inequalities, migratory phenomena – we can ill afford to disregard a perspective so suitable for probing long-term consequences. Design, too, must therefore ensure that it does not lose sight of the consequences of its work for the next “seven generations,” as the Great Law of Peace of the Iroquois required. And this is even more applicable when that work pertains to the public policy sector.

3. Policies and future

A growing number of organizations and international research centres have identified speculative design as a useful procedure in defining governance policies. In 2012 UNESCO

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1 “‘Deliberate use’ means that design fiction is something that people do with a purpose. ‘Diegetic’ is from film and theatre studies. A movie has a story, but it also has all the commentary, scene-setting, props, sets and gizmos to support that story. Design fiction doesn’t tell stories -- instead, it designs prototypes that imply a changed world. ‘Suspending disbelief’ means that design fiction has an ethics” (Sterling, 2013).
began constituting a Global Futures Literacy Network,\footnote{2 https://en.unesco.org/themes/futures-literacy} with 11 countries currently involved, that aims to develop operational tools for applying speculative design to government, business and community initiatives (Miller, 2018). The Organization for Economic Co-operation and Development (OECD) has utilized anticipatory scenarios to identify risks and critical issues for possible innovative paths in Brazilian public administration (OECD, 2019, pp. 105-118). The EU Policy Lab recently initiated “The Future of Government 2030+,” a project whose approach to defining political responses combines forecasting, design and citizen involvement; the purpose is to answer the question of how citizens will model governments, policies and democracy from 2030 on (Vesnic-Alujevic et al. 2019). Forecast scenarios are the basis of the Danish Design Center’s Future Welfare platform, whose purpose is to imagine that country’s future healthcare system (Bason & Striegler, 2019), while Lancaster University’s “Imagination” lab has conducted a series of design fiction-based workshops with senior citizens from various assisted living facilities to investigate how politics might innovatively confront the general aging of the population (Darby et al., 2015). Also in the United Kingdom, the Policy Lab, the Cabinet Office’s consultative body for the introduction of new political tools and techniques, has frequently underlined the creative power of speculative design (Drew, 2015), while Nesta, an innovation foundation, underlines how important it is for governments to consider the future implications of their political choices with a forward projection of at least 15 years (Kolehmainen, 2016).

In all these cases, the “shock therapy” of provocation, at times implicit in the design fiction approach, becomes a stimulus for the institutions themselves, while the narrative aspect turns out to be particularly interesting in the context of a co-design of services, paying particular attention to citizens’ hopes and fears regarding their own future and that of society. After all, citizen involvement is an essential step if we want to locate speculative design for the public sector within an ethical and, necessarily, empathic framework. Ethics and empathy are two important characteristics of speculative design that allow for the development a critical discourse, rather than limiting ourselves to a mere exercise in science-fiction narrative or techno-enthusiastic marketing (Jensen & Vistisen, 2017).
4. Tools

Within the practice of design fiction – from the anticipation of scenarios to the creation of diegetic prototypes – it is necessary, from an educational standpoint, to develop tools that are applicable to public design and give the necessary emphasis to the ethical dimension. A first important goal, therefore, is to try to infuse design students with an awareness of the implications that each project brings with it and the complexity of the ecosystem involved.

In this direction we can identify several examples of tools applicable to speculative design projects for the public sector, tested in workshops and university classes [Fig. 1], that are characterized by a collective brainstorming process. One place to start is by assessing participants' expectations about the future through a version of the Polak Game where everyone is asked to indicate their own position with respect to the semiotic square of the experience of change (things are getting better/worse) and influence on change (I can do...)

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The experiences reported here were developed in the Hybrid media design Labs at the master degree course in Design at the University of the Republic of San Marino in the years 2017-2019; in the 2016 Iuav Design Workshop and in the Communication Design Lab at the Iuav University of Venice in the year 2020.
little/can do a lot) [Fig. 2] (Hayward & Candy, 2020).

Figure 3. A “What if” brainstorming workshop at the international symposium “Updating Values”, University of the Republic of San Marino, January 2020.

With the “What if” question, starting from a specific argument – the narrative premise introduced by the phrase – a discussion group can construct a matrix of the scenario’s implications such as the Futures Wheel: a visual representation in which participants hypothesize the future repercussions in various fields – social, economic, philosophical, religious, healthcare, juridical, ethical, environmental, and so forth (Glenn, 2009). For example, if the initial topic of the discussion is “What would happen if all cars became driverless?” we could mention as one of the social consequences the “drastic reduction of fatal accidents,” while from the healthcare perspective we would note a “drastic fall in the availability of organs for transplants.”

An even deeper immersion into the complexity of future projections is represented by the transformation of the above “What if ...” narrative premise into an “If ... Then ... Else” conditional instruction, in which the many possible implications are developed on the basis of the first statement, before serving themselves as a point of departure for subsequent branches, a representation of the classic “butterfly effect.” Applied to a chronological grid based on the “Futures Cone”4 of Joseph Voros (2001) [Fig. 3], this representation of the
alternatives will outline the map of scenarios and turning points for possible futures, beginning from the choices of today: “IF all of our sensitive privacy data were grouped into a single database, THEN this would have to be managed by the government, ELSE it would be possible to request a public service of virtual reconstruction of our identity after death”.

Also worthy of mention as an introductory tool for public sector design fiction, lastly, is the immersive approach to storytelling and brainstorming represented by games of “reverse archaeology,” as in the case of the renowned “The Thing from Future.” Created by Stuart Candy at the Situation Lab, the game requires participants to create a story starting from a series of premises defined by playing cards – chronological placement, trend, context of reference, type of object, mood – with nearly endless possible combinations, culminating in the creation of an object-find from the future, the factual evidence of the story (Candy, 2015).

5. Conclusions

The general governmental trend toward offering digital public services makes the contribution of design thinking and service design increasingly crucial to designers’ approach to a given project. It also underlines the need to train an adequate number of designers capable of grappling with the peculiarities of working for the public sector. The creation of efficient services, of good services, has a significant impact on citizens’ civic participation, how they exercise their rights and are reminded of their duties, and thus plays a major role in delineating the perception and the boundaries of the relationship between citizens and institution. The crisis that has affected this particular relationship in recent decades and the emergence of new, increasingly complex and global challenge underline the need for innovative approaches in the definition of new public policies. For this reason the most sensitive international institutions have introduced specific research labs for the study of the future implications of today’s policies. Speculative design, and design fiction in particular, provides a stimulating method which, from a designer’s formative years, is capable of combining design, public policy, projections and civic participation within a conscious, ethical narrative framework.

4 In Voros’s formula the future 4 P’s are represented as a cone of light projected forward in time, in which we can identify, starting in the centre, the probable future, the plausible future and the possible future, among which we try to orient ourselves toward a preferable future (Voros, 2001).
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**Filmography**


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Speculative Design in Education: Mapping the Landscape.

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Abstract | This paper presents findings from a recent European-wide study on the use of Speculative Design approaches within education. The study included a survey of design educators and interviews with Speculative Design practitioners. This data has contributed to a mapping of the current educational landscape in Europe and will inform the development of an open set of resources for educators interested in Speculative Design and related approaches. Themes that emerged from the study are discussed in detail in the paper including; views on defining a curriculum along with metrics for assessment, the development of open guidelines and frameworks, attitudes towards generating change and implementing action, and understanding the distinguishing characteristics of Speculative Design within an educational context.

KEYWORDS | SPECULATIVE DESIGN, CRITICAL DESIGN, EDUCATION, INTERDISCIPLINARITY
1. Introduction: the survey and interviews

1.1 Speculative and related design approaches

Speculative, Critical and Fictional Design methods question the conventional practices of design, including interrogations around who has the rights and privileges to carry out the activity of designing. This alternative way of working foregrounds the freedom to use creativity to extrapolate from signals observed here and now, in order to ask questions about how the future - or indeed the present - could be, rather than merely how it should be (see e.g. Auger, 2013; Dunne & Raby, 2013; Sterling, 2009). This family of design methods, based around the blending of aesthetics and critique, has attracted much attention in recent years from both enthusiasts and sceptics, and many words have been written about the nuances of different styles and approaches (e.g. Bardzell & Bardzell, 2013; Malpass, 2017; Tharp & Tharp, 2019; Tonkinwise, 2015; Blythe & Encinas, 2018). In this paper we use the term Speculative Design in an inclusive manner, acknowledging that there is a broad range of related approaches, each with their own emphasis, and that these continue to evolve.

This paper, however, focuses specifically on how Speculative Design - and related disciplines - is currently used as an educational approach, both within direct design-related disciplines as well as in other educational domains at undergraduate, postgraduate and professional levels. While conventional design practice often focuses on making technology easy to use, functional and desirable, in Speculative Design, an educational curriculum can propose a practice that engages further with social context. It uses design as a means of examining both the potential positive and negative implications of introducing something into everyday life; imagining possible, as well as preferable situations.

The inherently discursive and reflective nature of the Speculative Design approach makes it particularly useful for teaching both practice and theory. If applied effectively within an educational setting, the processes of creating speculative objects and narratives can encourage interrogation of prevailing assumptions and invite exploration of other, alternative states of being and doing. These activities can lead to a deeper understanding of, for example, the contextual, political and cultural factors that influence the activity of design, and in turn, consideration of the potential implications and effects caused by bringing new products and services into the world (Dourish & Bell, 2014).

Educational contexts are varied, with different motivations and expectations and therefore they require different pedagogical approaches. Speculative Design has tended to sit within art and design school curricula, especially within western European universities and within the art school tradition, but this is changing. As an approach, it has become relevant where there is a focus on imagining products and services that incorporate technology, and it is now increasingly finding a place within subjects such as computer science, engineering, and social sciences. It is currently being reinvigorated and reinvented in other geographical areas, such as south-eastern Europe, and in varied types of independent research and educational institutions.
1.2 The SpeculativeEdu Project

The SpeculativeEdu project began in 2018, at a point where Speculative and Critical Design practices were maturing and becoming widely discussed. The project offered a timely opportunity to take stock of how the domain had developed so far and to consider where it is heading as an educational approach into the future. The SpeculativeEdu project is situated within a European context, with partners across five European countries, but as authors and project partners, we are mindful of the expanding reach of Speculative and Critical Design. The project’s stated aims are to “strengthen Speculative Design education by collecting and exchanging existing knowledge and experience whilst developing new methods. Its scope is to collect, exchange, reflect upon, develop, and advance educational practice in the area of Speculative Design and its self-critical approach” (SpeculativeEdu, 2018). At a time when many designers are becoming interested in alternative design approaches, disillusioned with the conventional, dominant narratives of innovation (Morozov 2013), problem-solving (Encinas et al. 2018) and technological growth, speculative, reflective and expressive approaches are offering fresh possibilities to practitioners and educators.

It is against this backdrop that the Speculative Design interviews and education survey were conceived; in order to examine and share knowledge and practices, and to collectively work towards developing educational techniques, especially those focused on the critical relations between technology and human society.

1.3 The Interviews

A primary activity during the SpeculativeEdu project has been the interviewing of key figures from across the Speculative Design landscape. These figures were chosen to provide a broad range of perspectives – established practitioners in the field, recent graduates from Speculative Design programs and critics/curators who have provided valuable interrogations of the approach. For consistency, similar questions were used across the interviews, although in many cases the questions were customized for the interviewee – based on specific projects, articles or personal experiences.

1.4 The Survey

The Speculative Design in European university education programs survey was available online and open for responses from early 2019 until early 2020, available to anyone who wished to contribute. It was disseminated through the project’s networks and social media and was aimed at educators involved in the development or delivery of a program that included an element of Speculative Design or a related topic. The survey gathered examples of current teaching practices and methods from a range of design-related disciplines, as well as asking for viewpoints about the direction that the field should take in the future. The survey in particular aimed to understand the breadth and variety of current speculative educational practice across different disciplines, including modes of delivery, examples of
teaching resources and assessment strategies. The survey also asked questions about the motivations and rationales informing the development of courses, and about plans and ambitions for the future.

2. Analysis: Interviews

2.1 Interview Questions

Speculative Design is a relatively new approach and as such its borders are quite blurred, its purpose can seem vague and its systems of evaluation immature. The interviews provided an opportunity to focus on these key issues:

1. **Purpose:** This can be relatively straightforward when considering the role of mainstream design (e.g. variants of form, function, desirability, market appeal). However, Speculative Design promises a diverse range of possibility; design for debate (Dunne, 2008), to improve government processes and policymaking (Kolehmainen, 2016), to critique current design practice (Auger, 2013) and re-think the technological future (Mitrović, 2015). Such claims have, on occasion, left the approach open to critique, for example, “Where is the debate?” “Who is it between?” “What is the impact?” One of the key questions asked of the interviewees was “what is the strength of Speculative Design?” The aim being to present a more coherent definition within the lifetime of the project.

2. **Metrics:** The design community is very fluent in evaluating the various qualities of traditional designed artefacts. Countless books have been written on this subject and relate to the straightforward notions of purpose listed above, and well-known lists guide students and practitioners towards (so-called) good design (Rams, 1976). Speculative Design suffers from the fact that its purpose is still unclear – without purpose, evaluation is impossible. After examining the question of purpose, we then asked interviewees to suggest an exemplary Speculative Design project and to describe why it stands out.

3. **Value:** The first two questions potentially paint a bleak picture for Speculative Design, so what is its true potential? We asked, how could Speculative Design become more politically active or more purposeful in its aim to challenge mainstream design?

3.2 Interview Themes

In comparing the interviews, we have identified a number of themes that encompass the responses from the interview participants:
• **The state of design**: a discussion of ideas on what Speculative Design has accomplished by placing it in relation to a particular understanding of the status of design as an established practice within the wider contexts of business, culture and politics. This might be due to the influence of Dunne and Raby’s (2013) well known “A/B List” a manifesto that positioned critical design against normative or non-critical design.

• **Existential angst**: a recurrent topic of discussion within the interviews was related to the agency and responsibilities of practicing Speculative Design. Who gets to future? What kind of privileges do speculative and critical designers enjoy? Or what does it mean to design a future for a context in which the designer does not participate?

• **Divergent references**: the materials that interviewees suggested varied greatly in terms of disciplinary background. There were references to texts belonging to politics, economics, history, literature, design and many others. The answer to the question; “what kind of knowledge should the education of a speculative designer include?” resists reduction in terms of defining a canon of suggested literature.

• **The “speculative” in Speculative Design and the “critical” in Critical Design**: most interviews involved a stage of setting the common ground between interviewer and interviewee through finding a consensus for the meaning of speculative and critical. Defining what speculative and critical mean seemed to be a necessary step in establishing the ground for further discussion on particular examples of Speculative and Critical Design.

• **The future as context**: while not specifically implied in many of the questions asked during the interviews, many participants chose to locate their arguments in a more or less distant future. This seems to be a characteristic of Speculative Design but not a necessary one because alternative presents or counterfactual stories abound in the history of Speculative Design. This is interesting because many of our respondents expressed the intentions of their designs in terms of having an impact in the here and now.

### 3. Education Survey Analysis

#### 3.1 Survey Questions

The survey was constructed in separate parts and this paper describes two of these parts; the first asked for descriptive information about educational programs, and the second asked for further information about approaches and opinions. Each part was analyzed separately in order to keep the answer data anonymous. Throughout the survey, questions
included a mixture of multiple choice and open-ended questions where respondents could write as much or as little as they wished. The open questions were analyzed using a simplified thematic analysis approach. To do this, the authors each read the anonymized responses individually and then shared their own interpretations of the important emergent themes. These interpretations were then compared in order to arrive at the list of overarching themes.

3.1 Respondents
The Speculative Design survey was aimed primarily at European university education programs but participation was open to everyone, including educators working outside of universities, for example delivering short courses or workshops. By early 2020, the survey had collected 36 usable responses, of these there were a mix of courses described at undergraduate and postgraduate levels, with rather more at undergraduate and some at both levels. All the courses mentioned were based in Europe, spanning 12 countries. Over half of the courses mentioned were first presented from 2018 onwards, demonstrating rapid growth in recent years. The majority of the respondents reported that their courses were situated in design disciplines, mainly in Interaction Design, Product Design and Graphic Design, including Communication Design and Information Design, along with several situated in Art disciplines. Other design fields mentioned included Interior Design and Fashion Design. Of the remaining disciplines mentioned, a few were situated in Computer Science related disciplines, and some were situated in humanities, management and interdisciplinary disciplines, such as Futures Studies.

3.2 Current Approaches and Future Directions
The following sections describe some of the main findings from the online survey relating to current educational approaches, opinions and future directions. One of the first questions asked about the names used to describe the approach. Of the three options provided; Speculative Design, Design Fiction and Critical Design, there was an almost even distribution across the choices. Other terms were offered, most of which included the word “design”, and “future” also appeared frequently. Other words included “research” and “debate”, and some of the descriptions included words that could be described as provocative, such as “adversarial” and “inconvenient”.

3.3 Rationale and Motivation
When asked about the motivations for developing the course and why Speculative Design was used, two main themes emerged, firstly the importance of multidisciplinary and interdisciplinarity in preparing students for the future, and secondly the development of a mix of both practical and critical skills. This emphasis on interdisciplinarity was seen as important in order to equip students to work and contribute to society in an as yet unknown
future. The ability to work within various industries and with a range of stakeholders was often mentioned as a priority, as these respondents put it:

“... as the world changes increasingly rapidly, we are educating future designers and other creative practitioners for jobs and contexts that don’t yet exist. They instead need to be equipped to identify and exploit new opportunities by working across disciplines and considering multiple intervention points - from hard systems transitions, such as mobility or energy, to soft systems transitions, such as culture, identity or narratives.”

“The production of near future scenarios allows to uncover new opportunities and to produce professional profiles who are able to help organizations and institutions to deal with the transformation of society, of the environment, of cities and people’s daily lives.”

In terms of skills development, these can be grouped into two categories - practical and critical - which were both discussed by respondents and were seen as working in tandem in many cases. The development of practical skills included many of the pragmatic aspects that are familiar within design teaching, such as project-based skills and competencies, communication through design, the development of usable designs, research skills, lateral thinking skills, and the creative presentation of research insights. Speculative Design was also seen as a promising approach for developing criticality and systemic thinking, in particular for building the competencies and knowledge needed to address the world as it could be in the future, rather than the current status quo. Strategic, long-term thinking was seen as necessary for dealing with complexity, controversy, uncertainty, and societal, technological and cultural change. The ability to interrogate and debate, to understand relevant theoretical framings, and to reflect critically on the application of design methodologies were discussed. This comment illustrates these points:

“...the ... course proposes to read the challenges of a changing society through the controversies that animate it. The course trains students to decipher the latter via three complementary disciplines (theory of imaginaries, digital mapping of controversies and design fiction). They offer an original and unprecedented toolbox, whose instruments make it possible to locate the controversy in a field, to unfold its facets in the present while considering future blind spots and layers of representations inherited from the past, sedimented in the actors' discourses.”

Approaches to support this type of critical skill development included challenging current approaches by promoting values. Students are often encouraged to question ideas such as; design as need-seeking and problem-solving, and design for comfort and convenience, as expressed by this respondent:

“The course ... investigates the potential of "Inconvenient Design" as an interrogative design approach, as well as critical design tactic and practice. It addresses the trend in the design discipline to design products, interactions and services (and thus, futures) with one aim: convenience. ... Using tactics and mechanisms of Design
Fiction and Speculative Design, we explore the design of discursive objects to express criticism and initiate discussion.”

A theme of values was frequently evident in the survey responses, with a strong emphasis on social and environmental justice, and participatory citizenship. Across the survey there was evidence of a desire to go beyond the more accepted, rather passive Speculative Design aims such as; questioning stereotypical views of the future, critically reflecting on the roles of technology in society, and considering implications and consequences, and instead to take a more proactive role in shaping the future through activism. For example:

"design futures could be framed as ways to develop and deploy prompts, artefacts and narratives to critically interrogate tomorrow’s societal debates today; as such, it is intentional from the outset in its questioning of the dominant paradigm in the pursuit of preferable futures and therefore social and environmental justice."

“This is a powerful opportunity for communities as well as for organizations and institutions, who can benefit from speculative designers in creating new strategies and to get communities engaged and involved in participatory, collaborative transformations.”

3.4 Teaching and Assessment

Addressing the delivery of teaching and assessment approaches, a mix of theoretical and practical elements were evident. In the multiple-choice section of the survey, the most frequently used approaches mentioned were; practical creative work, group projects, and workshops, demonstrating the emphasis on collaboration and pragmatic skills development. Theoretical essays were used to some extent, while written examinations were rarely used. Other approaches mentioned that were not directly asked about in the survey included several types of research such as social, artistic and observational research, and cultural probes. Debates were also mentioned, especially involving external actors and stakeholders.

In answer to the question on the main teaching resources used, a very wide range of materials was mentioned, echoing the findings of the interview analysis discussed in Section 2. In addition to art and design texts, and writings on Speculative Design, Critical Design and Design Fiction, there was mention of texts and examples from such diverse subjects as storytelling, comics, science-fiction, film and television, architecture, urban design, foresight and futures, social science, and many others.

There was an open section in the survey for suggesting appropriate assessment metrics for evaluating student work within a Speculative Design approach. A total of over 40 individual metrics were proposed, some of which included more than one metric bound up within them. Here these are summarized into two categories, Process and Practice:

Process Assessment Metrics:

- Depth of research
• Criticality in research documentation and analysis
• Criticality of future trajectories
• Creative engagement with alternatives
• Experimentation and risk taking
• Communication to, and engagement with, intended audience and publics
• Self-reflection and self-assessment; critical discourse around the project
• Creating potential for stakeholders to adapt in changing situations
• Enabling and stimulating debate and critical reflection
• Team working, participation
• Understanding of context

Practice Assessment Metrics:
• Response to the brief, and ability to serve the needs of stakeholders
• Novelty, originality, innovativeness, imagination and challenging paradigms
• Plausibility and internal consistency; social, political, technological, environmental, etc.
• Action generation, potential to stimulate impacts and consequences
• Analysis of possible impact and consequences of the designed output
• Breadth and depth of worldbuilding and storytelling
• Quality and comprehensiveness of the proposal, presentation, exhibition or demonstration
• Evidence of rationale for design or technology artefacts, prototypes or representations
• Collection of, and engagement with, feedback from audiences

3.5 Defining a curriculum

The survey asked a question about how important it is, within the context of a design curriculum, for Speculative Design to be either fully defined; or whether there should be an open approach relating to sets of methods, tools and techniques. The majority of respondents favored an open or mostly open approach, but there was a substantial number of respondents who were unsure or favoring a defined approach. In the open comments, both sides were represented, citing, for example, the utility of explanations of specific
methods, but also the benefit in the diversity of approaches due to the “bottom up” and relative youth of the field. In fact, not all of the respondents answered this question which suggests that there is no consistently strong feeling over this issue, or perhaps that this is as yet an unresolved question for some educators. One respondent did indeed make the comment that they need to reflect further on this topic.

Some respondents mentioned working towards creating open source collections of their own design materials and resources. For future development, guidelines, frameworks and quality criteria addressing teaching approaches would be welcomed by some respondents, but openness and breadth of types of teaching materials were also mentioned. Briefly, some of the types of learning sources mentioned as potentially useful included; seminal films and videos, expressions of past future visions, theatre and improvisation, data tools and information visualizations.

3.6 Future Directions: Towards Action

Within the responses there was generally an optimistic view expressed of the development of the field as playing a transformative role in wider society, or at least training the practitioners of the future to use skills of transformation, underpinned by a methodological approach. However, there were reflections on some critical aspects of speculative practice such as lack of action, lack of political commitment, a need for decolonization and emancipation from the current economic and socio-political system. This theme of moving towards implementing active change, for example in policy making and citizenship, in addition to the development of design skills, emerged strongly in the survey. The desire to transition toward top-level influence was clear in some of the responses, for example in urban planning and government organizations, with a stronger influence on the “real world” and impact on more mainstream practice and educational approaches. There was an awareness expressed around the limitations of showing work only in “white cube” gallery spaces, and a desire to create broader impact in society and in professions. Comments often mentioned a need to include Speculative Design methods in more curriculum subject areas such as policy making, psychology, social and anthropological studies, economics, business and management.

Finally, here is a comment from one respondent who mentioned working with younger students, demonstrating the wide potential for the approach:

“I really hope it will continue as a vibrant, diverse, pluralistic community of practice and that it won't become too much of a recipe. I'd love to see these approaches more embedded outside design education as from our experience in working with over 200 STEM oriented teenagers we’ve seen how hugely transformative they can be in providing them with handrails upon which to imagine, explore and question how the world should and could work.”
4. Conclusion

As we, the authors, look over the results of the interviews and survey, representing a substantial collection of voices in the field, it is clear to us that Speculative Design and its related approaches remain an important and evolving domain, exhibiting a desire to reflect upon its own future. This is a domain that is no longer in its infancy or led by one or two institutions; as our study demonstrates, it is a broad and diverse field and as it enters its mature phase, educators and practitioners need to come together to create a shared vocabulary, collection of best practices, methods of evaluation, and more. At the same time, as the world has changed dramatically in the past two decades, so has the role of design – as the interviews and survey demonstrate, Speculative Design today has moved beyond its early function of provoking internal debates, to a more outward looking role of facilitating urgent discussions about the central role design plays in shaping our collective futures and society as a whole. One of the most striking themes that emerged from both the interviews and surveys was the clearly articulated desire to implement transformation and to create impact on the world through action. This desire was supported by discussion around the importance of defining underpinning values, including such ideas as responsibility and justice.

References


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Targeting Design Intervention across Levels of Complexity

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Abstract | As service design continues to expand its reach and blur the lines between disciplines to address value co-creation and deeper contextual based challenges, it becomes increasingly crucial to work within an ecosystemic perspective. For the sake of simplicity, designers build frames of reference and construct metaphors to better understand and target possible intervention and the roles, activities and consequences of that intervention. In reality, when addressing increasingly complex issues, design action may cross the boundaries constructed by these models making it more difficult to understand. Using a more fluid metaphorical model to target design intervention across levels of complexity enables designers to consider the ecosystemic nature of an intervention, the level of control they have over the end outcome and the potential consequences it may bring.

KEYWORDS | ECOSYSTEM, LEVELS, VALUE, CO-CREATION, CONTROL
1. Introduction

As a heterogeneous and emergent discipline, Service design has over the last two decades evolved to blur the lines between disciplines. By borrowing and adapting concepts from management, participatory design, marketing and anything else that works to face the current challenges in design practice, it has expanded its reach and objective. (Kimbell & Blomberg, 2017) This expansion has followed a logical shift from a goods-oriented perspective towards a service-dominant one, (Vargo & Lusch, 2004; 2008) and consequently, toward new conceptualizations of design objectives. (Kimbell & Blomberg, 2011; 2017; Meroni & Sangiorgi, 2011; Wetter-Edman et al., 2014) These new conceptualizations form the basis for arguing the relevancy of service design as a means of designing not only meaningful service encounters but also value co-creating systems and socio-material configurations (Kimbell & Blomberg, 2011; 2017).

With the shift toward designing for services - instead of the design of services - designers are increasingly introduced to the complexities of services on both the ‘front’ and ‘back-stage’ of service delivery. These complexities reach past the interaction between product and user and into value networks and service systems where value is co-created for both users and service providers, within the context of a complex constellation of actors, institutions, stakeholders and technologies. (Normann & Ramirez, 1993) As the recognition of contextual effect on services grows, so also does the need for new ways of thinking and adapted tools to design for service ecosystems that additionally consider and even emphasize value created in-context (Nelson & Stolterman, 2012; Vargo & Lusch 2004).

1.2 From Linear to Ecosystemic

While some value propositions are conveniently constrained to linear service encounters and walled off from other channels of delivery, others “straddle digital and physical spaces; instantiated by individual actors moving freely and at will between locations, devices and contexts.” (Lindenfalk and Resmini, 2016). Lindenfalk and Resmini (2016) go as far as to claim it is a “myth that the service designer can design a perfectly bounded artefact and simply drop it in place within a dynamic environment.” Although they admit there are benefits to focusing on the experience of a single touchpoint, if complexity is unnaturally constrained to a linear path it can result in jarring over simplification.

To address this complexity designers can shift their perspective from linear to ecosystemic to focus on more than one perspective within the context of an ecosystem. Where a linear perspective considers the entire end-to-end experience, an ‘ecosystemic’ perspective also considers the many vantage points that make that experience work. To implement this shift, designers have to start considering both the different possible perspectives of actors and the possible value not just created in-use but created in-context, at each level of the ecosystem (Vink et al., 2017; Lindenfalk and Resmini, 2016). This infers the designer may also have to give up some control over each interaction in favor of the value that can be created in the
context of the greater ecosystem. This perspective refocuses the goal from a complete instance of value creation designed and controlled exclusively by the designer, to potentially creating the favorable conditions for interactions and relationships to co-create value - Kimbel (2011) describes such a shift from service design to design for services.

To guide further discussion on designing for ecosystemic value creation we will use the analogy and framework of an organism, which under different magnification can be viewed at an atomic, molecular and organism level with varying degrees of relational complexity. In its most complex and complete form, this analogy refers to an ecosystemic organism with emergent and adaptive qualities. As each level is no more important to the survival of the organism than the other, it produces value within its own sphere and as a part of a whole.

After outlining each level we will then discuss how being able to target a design intervention across these levels can help designers consider and target areas of intervention within complexity using a more fluid organizational model and visualization. This model outlines each level’s characteristics, but only loosely constrains them to allow interventions to be framed and considered across multiple levels. The intention is not to propose new methodology or tools for working with ecosystems but possible ways of seeing and thinking about the objectives and goals of service design. Such a discussion can help form a clearer conceptualization of a context informed design process, and offers insights into the different roles and opportunities for designers within that process. This model also potentially frames the design intervention not just as design action but also as design consequence which can help designers better consider potential impact and the consequences of their participation in the intervention.

2. Atomic Level

2.1 The Encounter

According to Kimbell and Blomberg (2017), interactions at this level are conceptualized as ‘The service encounter’ which they propose is one object of service design and focuses, “on the experiences people have as they engage in interactions with touchpoints provided by others.” This objective implies that the goal at the atomic level is that of new service development (NSD) and is outcome focused (Homlid et al., 2017).

Considered within the perspective of designing for service ecosystems, however, the goal expands to designing interactions as a means of reconfiguring the relationship between humans and the service to evaluate and create strong value propositions that clearly fulfil what Christensen et al. (2016) call the ‘jobs to be done.’ Although micro in comparison to the organism, interactions at the atomic level are crucial to the survival of the system as they form the basic arguments for desirability— the reasons why customers hire products and services to achieve their desired outcome (Christensen et al., 2005).
Focusing on relationships, channels and value propositions as part of the experience at this level connects it to the greater ecosystem and emphasizes the need for more co-design based practices to consider multiple perspectives when designing the digital and material artifacts that guide the service encounter (Vink et al., 2017). These value propositions also form the basic assumptions of interaction at the molecular level to consider even more complex relationships and value co-creation strategies.

2.2 Atomic Consequence

Uber, the American born ride-sharing service claims that, “In the United States alone, more than 45 rides on Uber happen every second” (West, 2019). From the Atomic level perspective Uber is a digital application that allows anyone to easily find and pay for a ride. As a relatively simple service, at least in concept, most experiences include one mobile interface and two dominant touchpoints, the application and the vehicle. As a relieving service the Uber app has many features designers have consciously included that allow riders to fulfil the Job-to-be-done and more are added each year to further personalize the experience. Many of these design choices are benign and solely focused on creating a good experience. Others are not so innocent and even an omission or lack of consideration can have serious ecosystemic implications.

In December 2019, Uber released its first Safety Report that reported “3,045 sexual assaults during its rides in the United States in 2018, with nine people murdered and 58 killed in crashes” (Conger, 2019; West, 2019). To combat these safety issues, starting in 2018 Uber has released many safety features including, pin identification, audio recording and even emergency response integration (Marshall, 2019; Dicky, 2018; Singh, 2020). Whether the possible consequences of a service like this were considered before seven years after its launch may be a mystery but we can clearly see how design decisions at this level, to include safety features or not, can not only influence the success of the experience but have very serious consequences for participants, the company and society as a whole.

3. Molecular Level

3.1 Value Co-creating System

At the molecular level of the organism the focus turns from the service encounter to the value co-creating system. Here, the materials and objectives fundamentally change from the orchestration of touchpoints to form positive service journeys (Blomkvist et al., 2018), to dynamic reorganization of resources to form arrangements between actors to achieve mutually beneficial outcomes and value creating relationships. (Kimbell and Blomberg, 2017; Vargo and Lusch, 2004) Typical tools used at this level include service ecosystem maps and value constellations to focus on the negotiations between actors, their desired outcomes and how they account for those outcomes (Kimbell and Blomberg, 2017; Patricio et al., 2011;
Normann and Ramirez, 1993). Although this level can involve professional designers working with methods and tools, a service eco-systemic perspective recognizes that design activities are not single actions in the process and that value co-creation is ongoing and collective in nature; each actor participating in the relationships they have entered into to realize preferred change (Vink et al., 2017; Manzini, 2016).

3.2 Beyond the Experience

To create value in context it is not enough to design a good experience. Designers must, as Normann and Ramírez (1993) put it, “redefine the roles, relationships and organizational practices,” of the business itself. Almost two decades later Normann and Ramirez’s example (1993) of IKEA in the furniture industry, still stands as a successful implementation of just such a redefinition of in-context value co-creation. In this example, IKEA ultimately shifted the responsibility of the assembly of their product from the business to the shopper. To do this they not only designed the assembly experience but the entire ecosystem around it. Judging by IKEA’s current success as #39 on Forbes top valued brands for 2019 valued at $15.8 Billion with revenues of $45.8 Billion (Forbes, 2019), IKEA continues to re-evaluate their value co-creating systems to keep them at the top of the industry.

3.3 Business modeling

While ecosystem maps and value constellations emphasize a focus on reconfiguring actor relationships and resource exchange, developing and investigating business models is another way of understanding and experimenting with creating value in-context (Osterwalder and Pigneur, 2010). This includes both the context of the business itself and as an entity within a market environment. Mapping the market forces, macro-economic forces, industry forces and key trends surrounding a business model and its parts can offer an environmental and eco-systemic view of issues and opportunities crucial to reconfiguring or maintaining the right value proposition, relationships and competitive edge. (Osterwalder and Pigneur, 2010, 2014; Porter, 1979)

This indicates that the value proposition, albeit crucial, is not the only element of a business model that describes how an organization creates and exchanges value (Osterwalder and Pigneur, 2010) and various forms of business modeling techniques and experience building tools can be used to organize these elements to create new services. New service development (NSD), however, is not the only purpose of service design at the molecular level. Holmlid, Wetter-Edman and Edvardsson (2017) argue that only viewing service design within an NSD process limits its scope and potential by treating services like goods — to be developed through the same type of process. In an ecosystemic perspective, however, the scope of service design expands to potentially include active participation in the development and reconfiguration of actors and resources, and implies a change in practice to arrange for implementation (Holmlid et al., 2017). This could be considered what Martin
calls ‘the design of business’ (Martin, 2009) and of which more traditionally falls in the camp of strategy, management and operations.

4. Organism Level

4.1 Emergent Value

While reconfiguring service encounters and value co-creating systems at the atomic and molecular levels takes into consideration the ecosystem, the value created at the level of an organism can be very different due to its emergent and adaptive qualities. The object of service design at this level also expands further to focus on the socio-material configurations that impact assemblages of people, entities and institutions; both formal and informal. (Kimbell and Blomberg, 2017; Vink et al., 2017). It is worth noticing that while such configurations are not exclusive of this level, unlike other levels, the focus here is on the broader ecosystem.

According to Nelson and Stolterman (2012), within an ecosystem, elements are interdependent and value is created both between relationships and as an aggregation of value co-creating systems. This value emergence co-occurs with the intentional actions and behaviors of actors as they pursue their desired futures and cannot be completely controlled through the design process (Vink et al., 2017; Jones, 2014; Manzini, 2016). This implies that the goal at the organism level is similar to what happens at the molecular level and is not to create a final product but to create the favorable conditions for the right relationships to happen (Kimbell, 2011; Vink et al., 2017). The main difference between these two levels, however, lies in how much control is relinquished to focus on allowing for value to emerge out of the context of the ecosystem and the potential for self-maintenance and reproduction of the ecosystem (Sangiorgi et al., 2017).

4.2 Blurring Boundaries

In the example of IKEA, Norman and Ramírez (1993) describe how the company redefines relationships internally and with its suppliers to form an efficient and successful machine. Although IKEA goes about doing this with consideration for the ecosystem, redefining relationships in this way relies on an amount of control as each entity in the system carefully negotiates desired outcomes. This control indicates that value created here, although created both in-use and in-context, does not directly facilitate uncontrolled emergence like an organism, and could be viewed as molecular in nature. On the other hand one example of emergent value does illustrate how these levels may not have as clear cut boundaries as often modelled.

IKEAHackers.net has since 2006 gathered IKEA furniture customizations into a blog to be viewed free by anyone. In 2014, however, IKEA threatened to take legal action claiming
IKEAHackers.net was infringing on intellectual property. After a vast public outcry, IKEA back-pedaled and apologized about the situation claiming that they are actually excited about how this site and customization movement fuels desire for their products (Hanesgarde, 2014; Winston, 2014). In this case, value emerged from the arrangements of both formal and informal actors outside of the original design and context. Reportedly, some IKEA staff have even used IKEAHackers.net for inspiration in the design of new products (Winston, 201), and IKEA has since then continued to open their doors to new ideas of customization (Chaudhuri, 2017). While the initial move to threaten legal action may have been short-sighted, the continued decisions to embrace and use this movement exemplifies an understanding of ecosystemic thinking and emergent value co-creation within a market.

4.3 Designing ‘Space’

At both the atomic and molecular levels, interactions in value co-creating relationships are typically dyadic. Even if one entity has relationships with many others each relationship is negotiated separately as one to one agreements with different aggregations of resources and value exchanged. At the organism level, however, these relationships can become entangled forming ‘many to many’ interactions, relationships and networks. With so many variables and negotiations happening between multiple entangled actors it becomes difficult to control a final outcome. In some cases the complexities become so dense that no single entity can understand the system. As such, the goal and object of service design can shift from designing the experience or relationships in the system to designing the service providers role in the service ecosystem and the ‘space’ or institutional arrangements needed to facilitate the emergence of relationships and co-created value (Sangiorgi et al., 2017; Jones, 2014).

The creation of ‘space’ to facilitate the emergence of value can refer to the design of platforms (both digital and social) that provide the necessary tools and conditions for “communities of contributors [to] build on...to create new services that expand the ecosystem.” (Sangiorgi et al., 2017). Although platforms can be broadly defined they all are characterized as ‘pull based’ and “[allow] each of us to find and access people and resources when we need them, while attracting to us the people and resources that are relevant and valuable, even if we were not even aware before that they existed.” (Hagel, 2016, Hagel et al., 2010). The opposite being ‘push based’ which is characterized by product ‘pushed’ out into the market and requires anticipating customer demand to align the right amount of resources or inventory to meet that predicted demand (Hagel et al., 2010).

Platforms are also defined by Hagel (2010) as,

“a governance structure, including a set of protocols that determines who can participate, what roles they might play, how they might interact, and how disputes get resolved.”
Based on recent tech trends, it is easy to think of platforms as only digital. Although trends in technology have allowed digital platforms to become the almost default option for bringing parties together, platforms can also be created in physical and social space, and may be more or less defined by set protocols (Björgvinsson et al., 2010). Examples of such a ‘space’ include maker’s spaces or communal gardens that provide a physical platform for value creation, and tools and elements to engage people in an interaction without prescribing the details of the interaction or the possible outcome. These spaces must also constrain the interaction with set protocols or rules to keep participants safe and to protect against liability.

4.4 Institutional Creation and Disruption

In some cases the object of service design at the organism level focuses less on roles and ‘spaces’ and more “as a means of reshaping the institutions that guide value co-creation in service ecosystems.” (Vink et al., 2017). In this consideration, the word ‘institution’ relates to the ‘rules, roles, norms and values,’ that support an entity as they pursue a desired future (Vink et al. 2017). Institutions can be built, maintained or disrupted to facilitate preferred futures (Björgvinsson et al., 2010). Similar to how things present opportunities to realize new behavior, prototyping preferred futures and alternative institutional arrangements with participating actors can expose them to new ways of working and allow them to “iteratively develop and establish new [institutions] to support their preferred future” (Vink et al., 2017). In inconceivably complex ecosystems like healthcare, transportation or climate change, where the end outcome is difficult to control, reshaping or disrupting institutions to guide actors to pursue one desired future over another, can have a powerful effect on the emergence of patterns, properties and value, albeit with ethical concerns and considerations of unforeseen consequences and representation (Sangiorgi et al., 2017; Jones, 2014; Irwin, 2015). Partly due to its complexity, this level is still being understood and defined.

5. Targeting the Intervention

5.1 A More Fluid Model

So how does an understanding of these levels help designers target a design intervention and for what purpose? As we consider all of the levels as part of an ecosystem and present at varying degrees within a design intervention, the boundaries between each level start to dissolve (See Figure 1). To visualise this we propose using a gradient model. Rather than placing over simplistic and limiting boundaries between each of the levels, a gradient facilitates a fluid way of thinking across each level. (See Figure 1.) For example, Atomic level action within an intervention may grow in scope to start looking more like Molecular action as it navigates partnerships and value potential, or as discussed in the beginning of this paper, have far reaching effects at the Organism level.
Targeting Design Intervention across Levels of Complexity

It does not matter, necessarily, if a design action is strictly targeted to one level as long it is considered along the gradient. Although heuristics may be derived at each level, this more fluid way of seeing complexity better facilitates discussions of scope and designer roles as well as the consideration of actions and effects—rather than constraining them to limiting silos where exceptions abound and disagreements of nomenclature grow. Even while writing this paper some examples seemed to be able to be seen from more than one level. Business modelling, for instance can be used in a molecular setting to understand and coordinate the elements within a company, but it can also be used to manipulate or provoke changes within a market context. Both may lead to creating value for the business but with different levels of controlled and uncontrolled emergence.

*Figure 1. With no strict boundaries, a gradient show how each level flows into the other.*

This model also provides a way for designers to start seeing ‘control’ as a key element of their participation in a design intervention, their role and the ultimate effect. Within an intervention the control a designer has over the end outcome shifts to inversely correspond to its complexity. (See Figure 2) This shift plotted along a curve illustrates that at the Atomic level a designer will have more control over the end outcome as they have more power to constrain the agency of the end user. At the Organism level, a designer will have less control over the end outcome and a user or participating actor will have less constraints placed on their agency. Used as a scoping tool designers can target how much control they actually have over the outcome of the intervention and plan the corresponding action. When used to define and align roles, designers can see where their specific skills fit into the intervention while still considering the ecosystemic effects of their decisions. From the previously discussed example of Uber (West, 2019), we can see that an absence of this consideration
can be far reaching and more dangerous than might be expected when only considered at one level alone.

![Control](image)

*Figure 2. Control: The amount of control a designer has over the end outcome inversely corresponds to the level of complexity.*

### 6. Conclusion

This perspective and model, although functional, can have an even deeper purpose of guiding designers to critically consider their decisions and actions as constraining, directing or enabling individual choice with corresponding levels of consequence. While some choices may be individual, facilitating the conditions to enable many individual choices can create a more ecosystemic consequence and ultimately an uncontrolled emergence of value.

As service design continues to expand its reach to address increasingly complex and contextual based challenges, it becomes crucial to consider the potential for this emergent value, whether positive or negative. Understanding opportunities, roles and effects at each level and within an ecosystem offers insights into the expanding roles designers play in the development of services within ecosystems and how to adapt processes and methods to fit the contextual inquiry (Author 2, 2016; Vink et al., 2017). As this expands the potential for strategic impact on business and society, does it also expand the responsibility to explore and consider the designer’s place as they contribute to that impact?
References


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The Agency of Discursive Design Exists in the Industrial

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Abstract | Can there be a closer collaboration between academic design and the industrial world? This paper outlines common territory between Discursive Design and industrial market forces and proposes a partnership for a more sustainable future. In contrast to the commercial product, I advocate for the Twenty-First Century Activist Discursive Object. This object acts as a catalyst for change, rejecting the antiquated model of the designer aspiring to create a perfect aesthetic in favor of a collaborative, team-based multidisciplinary practice where comprehensive solutions are offered to the global commons. This paper envisions a future where intellectual criticality is capable of positively influencing practices that exacerbate societal and environmental ills, thus proposing a more sustainable future. As ideas generated in Discursive Design grow and become integrated into commercial culture, their positive effects will become palpable, and the status quo will transition into a friendlier, more sustainable reality.

KEYWORDS | DISCURSIVE DESIGN, DESIGN ACTIVISM, RESPONSIBLE DESIGN, INDUSTRIAL DESIGN, ETHICAL DESIGN.
1. Introduction

In a world where consumerism, environmental degradation, and inequity are ubiquitous, this article analyses the role of design in creating positive change within society. Specifically, I address the difficulty of introducing effective systemic change within the existing consumer-driven culture using design. I also showcase how Discursive Design can serve as a tool to normalize the integration of ethical principles into commercial practices.

I begin by presenting the need for industry to embrace a new mind set and highlight how Discursive Design can play a potent role in influencing the methodologies of the business world. Then, I define Discursive Design and its activist dimension within communities and illustrate its close link to a sustainable capitalism that has been proposed by ever increasing segments of industry in recent years. Following the study of these seemingly dissimilar fields, I argue that the most effective kind of agency for Discursive Design exists when conceptual designers are able to work in close partnership with industry and the public. Finally, I study the positive contributions of an industrial discursive product and illustrate the importance of further fruitful collaborations to demonstrate my argument.

This collaboration between the discursive and business fields is central to the establishment of more sustainable economies and the idea of global citizenship. The ultimate goal of the paper is to demonstrate that Discursive Design is able to go well beyond the parameters of theory and infiltrate industrial production and consumer culture. Helped by industry, Discursive Design has the power to remodel long-established realities and to reinforce values of social fairness and sustainability. And while a successful discursive object is one that engages with the user, thus bringing about its activist dimension and transformative power, I am proposing that discursive objects that are imbedded in the digital culture of the twenty-first century have greater power to achieve this end. These are what I call Twenty-First Century Activist Discursive Objects.

2. The Collaboration of the Business and Discursive Design Worlds as a Solution to Unsustainability

2.1 Failure to Address Issues of Sustainability

Throughout the twentieth century, product designers served industry by creating an endless stream of appealing objects. The job of product designers was to create beautiful objects and to increase a consumer’s desire to buy (Andrews, 2009). The capitalist industry became associated with self-serving actions and pursuit of profit. As a result, ecological and social systems that we depend on throughout the world have been negatively affected and find themselves in decline. Our supply of materials and energy is suffering, and the disparity in wealth is increasing as are a multitude of educational and health problems (Thorpe, 2003).
Since the publication of the *Brundtland Report, For Our Common Future* by the World Commission on Environment and Development in 1987, a multitude of theories have been posited to explain the “principles of sustainable development.” Summing up the underpinnings of these theories are three core principles: environmental stewardship, social equity and justice, and economic stability (Walker, 2006, p. 36). Designers have discussed the benefits of potentially integrating these values into production, but have failed to open up new spaces for practice beyond the conventional market model where design is seen as an engine to create goods for the market (Margolin, 2003).

2.2 The Need to Introduce a Change in Mentality

Given the urgency to address structural unsustainable practices and the process of what Tony Fry has called “defuturing” (2011), it is important for designers to create strong collaborations that result in more favourable conditions for the planet (Fry, 2011). Ethics within design practice need to be reformulated, and producers need to be held accountable for their impact on communities and the environment.

Today, designers and industrial producers will need to bear responsibility for the impact of their practices and collaborate to create a more meaningful material culture (McCoy, 1995). Designing for sustainability and working to increase a global sense of citizenship are matters that touch on both design and industry. To address contemporary issues, such as the globalization of industrial capitalism, environmental degradation, and social disparity, both designers and producers need to question the structure of the current material culture. New design solutions will need to be critical of a consumer culture that focuses on results that are fashionable at the expense of more ethical considerations (Walker, 2006). The challenge for a sustainable economy hinges on finding new ways to capture values of sustainability and citizenship within a commercial system that can nevertheless remain profitable (Thorpe, 2007).

Behaving ethically and showing a strong sense of global citizenship in the field of product design is a mentality that the designer, industry, and the consumer need to adopt. To succeed in this endeavour, all stakeholders must be accountable for the consequences of the resulting industrial production. The transition from the current practice model, which relies on mass production of consumer goods, toward a more meaningful material culture, requires new kinds of design solutions that address both environmental and social conditions (Hart, 2010). This transition to a new reality requires both grass-roots behavioural changes and a strong sharing of ideas among players (Manzini & Jegou, 2003).

A tight collaboration between the community of discursive designers and industry is in fact mutually beneficial. The market is not inherently bad and is able to offer many benefits to the discursive world, especially as it relates to commercialization and reaching a wider audience (Tharp & Tharp, 2018). Discursive Design is a tool that can be used by corporations to create innovative approaches and bring about societal good in ways that would be financially beneficial in the long term.
2.3 The Potency of Discursive Design

Discursive Design is a branch of design that focuses on research and the formulation of positive change. In opposition to commercial design, its priority is to criticize non-sustainable behaviours and propose design in the context of possible futures that lead to better social conditions. It enriches societies with new knowledge and aims to introduce some level of sociocultural change (Tharp & Tharp, 2018, p. 7). Discursive Design is often dismissed because of its highly poetic or unrealistic qualities. Still, given its high concern with issues of sustainability, matters of citizenship, as well as its courageous stand against destructive behaviours, it has a mentality that can positively influence industrial approaches.

Collaboration between Discursive Design and industry is therefore possible. The Discursive Design world, though young as a field, has matured into a domain with well-defined parameters and approaches (Tharp & Tharp, 2018). At the same time, the industrial world is ready to embrace innovative ideas, and commercial players are eager to embody technological advancement, introduce disruptive ways of working, and change industry’s dynamics (Lefkofsky, 2007; Harmut, 2009).

3. Discursive Design

3.1 The Function of Discursive Design

This paper considers Discursive Design, a design approach focused on articulating criticism of the status quo, to be an essential pillar of our quest for a better future (Dunne & Raby, 2013). The function of Discursive Design is in the debate, and this function is what is critical. In their book, Discursive Design: Critical, Speculative, and Alternative Things, Bruce and Stephanie Tharp (2018) define Discursive Design as

“...the creation of utilitarian artifacts whose primary purpose is communicative.... They encourage reflection and also often aim to subsequent debate and response” (p. 51).

Discursive Design acts in the tradition of many art and design movements, which are rooted in activist principles. Design has a long history of demanding change (Tharpe, 2014). The activist nature of discursive objects is clear: they freely challenge the conventional and call for change in adopted behaviours and accepted realities. Their interventions purposefully disrupt the routine by revealing and speaking out against societal ills.

Because Discursive Design challenges convention, it gains the quality of an activist tool. Design activism is displayed when buildings, objects, and systems act similarly to social movements by identifying an ethical concern and creating designs that call for social change and seek to influence public opinion. Anne Thorpe (2010) defines activist design as any intervention that “addresses largely progressive social and environmental issues, over and
above profit-driven or aesthetic agendas that are most common in design” (p. 276). Because of its focus on criticizing existing circumstances and proposing different ones, Discursive Design could be described as essentially activist.

The activist role of discursive design takes on the task of promoting a future that is safe for all. The strategy of getting to that future is to conduct research that leads to creating functional or pseudo-functional products that can be used within our current daily lives. Discursive design creates products that are either dystopian, when they represent the result of our destructive behaviour, or utopian, when they represent the possibilities of science. I propose three examples that illustrate this point.

The Huggable Atomic Mushroom, designed by Anthony Dunne and Fiona Raby (2004), was created for people afraid of nuclear destruction. The object challenges people to face their fears of nuclear devastation and provides a reminder of the negative impact of a nuclear explosion, both on people and on the environment. By addressing a genuine concern, this discursive object goes beyond the functional and opens important ethical, social, and political discussions with the goal of creating better future conditions.

![The Huggable Mushroom](source: http://dunneandraby.co.uk/content/projects)

*Figure 1. The Huggable Mushroom by Dunne & Raby, 2004. (source: [http://dunneandraby.co.uk/content/projects](http://dunneandraby.co.uk/content/projects))*

*Between Reality and the Impossible* is another example of a project by Dunne and Raby that criticizes overconsumption and addresses the notion of a future parallel but possible world. Foragers 1, 2, & 3, shown in Figure 2, are products that visualize technologically advanced devices that city-dwellers might need in the future as humans run out of food and must develop objects that assist them in filling the gap between the food they have and that which they need to survive (Dunne & Raby, 2010).
In his book *Design Activism: Beautiful Strangeness for a Sustainable World* (2009), Alastair Fuad-Luke elaborates on Dunne & Raby’s work and emphasizes its activist dimension. Fuad-Luke defines Design Activism as an agent for change that influences behaviours and facilitates a transition toward more sustainable ways of living. He considers *The Placebo Project*, designed by Dunne and Raby, to be an example of successful activist design.

*The Placebo Project* created a series of functional objects that encourage awareness of electromagnetic fields inside the average home by building pieces of furniture that react when a device that emits an electromagnetic field is placed on or close to them. As opposed to Dunne and Raby’s *The Huggable Mushroom* and *Between Reality and the Impossible*, this project does not just speculate about the future, but makes tangible an invisible effect of the industrial world, and thereby calls our attention to its possible negative effect on humans. The project analyzes people’s relationship with electronic objects and warns against the adverse effects of electromagnetic waves generated by everyday products like GPS systems, mobile phones, and computers.

Fuad-Luke (2009) explains that these objects

“stimulate the imagination of the users while simultaneously raising their awareness as to the invisible landscape and territories of electromagnetic radiation, a topic rarely touched upon in social discourse” (p. 121).
Fuad-Luke considers this experimental project to be effective both in delivering a message and in transitioning toward the commercialization of safer electronic products. In this manner, he views discursive products as activist entities that not only raise pressing concerns, but also put forward a new aesthetic and significance to electronic products. These objects redefine our interaction with consumer electronics and reformulate our relationship with the digital, amounting to a visualization of a new kind of technological industrial product.

3.2 The Failings of Discursive Design

The subjects addressed by the Discursive Design world are timely and relevant. Yet, this design approach still has many limitations, most notably limited reach, oversimplified semiotics, and resultant semi-utilitarian designs. The audience of this design approach tends to be restricted to conceptual designers, theoretical thinkers, and highly informed segments of the public.

To make Discursive Design more relevant, its products need to become more usable by the average consumer. The criticism expressed by discursive products needs to be a starting point for design processes, as opposed to the end result of the product itself. A stronger collaboration with the industrial world might partially compensate for the failings of Discursive Design. In this case, industry’s expertise could introduce products that address more utilitarian functions, open up new markets, and launch production in large quantities with advanced technologies, all while effecting the social, political, and ethical goals of the discursive designer.

4. The New Paradigm of the Competitive Business World

Long gone are the times when corporations are seen as the avaricious “enemy” to be controlled with penalties and fines (Hart, 2010). The world no longer considers ethical implications as an absolute impediment; sustainability and ethicality are the new values at the forefront of the corporate agenda in order to remain profitable in the long term.

This new kind of global sustainable capitalism, which takes into account natural and social capital, is the new paradigm that helps the industrial world make decisions about the design, fabrication, and distribution of products. Conducting a sustainable business is the new managerial methodology of competitive capitalist economies. To succeed within the new global economic order, businesses are thinking in terms of the “triple bottom line”: economic prosperity, environmental quality, and social justice (Elkington, 2002). As a result of this mentality, new partnerships between entities that might have previously been opponents are embracing technological advancement and collaborating to reach these triple bottom line goals.
Corporations are proposing alternative design solutions to benefit communities. This practice is changing the current model of industrial production. Markets open to competition are producing de-materialized, highly technological products that intervene in the political, the economic, and the social (Elkington, 1999). Profitable companies are able to improve their business performance by taking into consideration the environmental and social impacts of their production, resulting in a merging of corporate and societal needs. As a result, creative approaches are allowing for new kinds of collaboration and for social innovation that benefits communities (Hart, 2010).

It thus becomes increasingly clear that industry’s new agenda is similar to the values of Discursive Design. Both fields are proposing new and unexpected interruptions to the conventional by taking into consideration the wellbeing of communities and humans’ impact on nature.

5. The Agency of Discursive Design Exists in the Industrial

5.1 The Discursive Industrial Product

Discursive objects may be impractical and difficult to grasp, but their real value exists in their intellectual content, researched content, and disobedience. They criticize questionable practices and visualize new findings without any reservations. In order to extend the discursive object’s agency beyond the intellectual realm of the elite, product designers and producers need to deepen their understanding of Discursive Design’s approach and help it step out of the gallery.

In his book, Design for Life: Creating Meaning in a New Distracted World, Stuart Walker (2017) envisions a new kind of design defiant of the existing profit-driven model. Walker’s proposal for a different path relies on ethical thinking and creative criticality. He encourages the incorporation of the “pragmatic and the philosophical” with

“learning to find a more equitable balance between, on the one hand, rationalism, intellectual pursuits and ‘progress’, and on the other, intuition, experience and expertise” (pp. 184-185).

Anthony Dunne (2008) refers to Jack Kevorkian’s Suicide Machine as an example of an industrial design that enters the realm of Discursive Design. Dunne describes this invention as “a powerful ‘unofficial’ design that materializes complex issues of law, ethics, and self-determination,” and “shows how an industrial invention can be a form of criticism” (p. 43). He also proposes a

“role for design objects as discourse where functionality can be used to criticize the limits that products impose on our actions” (p. 43).
Through his analysis of this industrial invention, Dunne recognizes the power that industry has in creating functional Discursive Design that can criticize existing behaviours and propose new laws. The suicide machine showcases how industry can generate controversial discussion as it defies existing laws by addressing human fears and unusual needs. The more industrial entities succeed in manufacturing discursive products, the more likely it is that alternative models will be able to replace, or at the very least complement, existing industrial systems and reshape the conditions of material culture.


5.2 The Immaterial Dimension of the New Discursive Industrial Product

The new discursive industrial product focuses on social issues, introduces new mentalities and behaviours, and will see its impact increase considerably as it becomes designed within social and digital platforms. Discursive Design can become a particularly potent influencer as it embraces technological advancements and allies itself with other complementary design disciplines that are well-established within industrial circles, by developing digital connectivity—namely Service Design, Interaction Design or Transformation Design. Transformation Design introduces innovations to encourage more sustainable behaviours within society (Wolfgang, 2016). It encourages the creation of new markets to modify existing ones (Polanyi, 1944). This design approach focuses on an ethical agenda and introduces participatory techniques to tackle the complex challenges of our society and introduce long lasting change (Sangiorgi, 2010).
6. Case Study

6.1 Twenty-First Century Activist Discursive Object

A meaningful collaboration between the discursive and the industrial world would introduce an industrial technological product that rejects unsustainable practices and encourages enhanced participatory citizenship to build continuous change. In the context of this paper, I am referring to a product with the potential to change the status quo and introduce new behaviours relating to a heightened sense of citizenship as the Twenty-First Century Activist Discursive Object.

This object would manifest the critical input and activist intention of the research world and be produced and distributed efficiently by the industrial world. The object’s influence can increase if the design has a digital component that designers are able to capitalize on to expand its reach via already-existing digital platforms. This product would be able to shape new experiences and create new behaviours, unlike objects limited to a more static function.

A model example of an Activist Discursive Object that is relevant to the twenty-first century is the BuggyAir, designed by Superflux, a British design practice that defines itself with the words “Translating future uncertainty into present day choices” (BuggyAir, 2018). Superflux describes the BuggyAir as “an accurate mobile sensing kit that helps parents understand their children’s exposure to air pollution” (BuggyAir, 2018). It is designed to hang easily on strollers and measure ground-level air pollution. Superflux built ten sensor kits, each consisting of a research booklet and the product itself, and made them available to approximately fifty caregivers for two to three weeks. This product that spread knowledge about pollution was developed with the help of industry and saw its activist transformational power realized as users contributed to the design process.

![Figure 5. Images of the first BuggyAir prototype, 2014. (source: https://superflux.in/#)](image-url)
6.2 Discursive Dimension of the *BuggyAir*

By acknowledging the fear that parents can experience living in an urban polluted area, Superflux offered industry an opportunity to address genuine human needs not typically taken into consideration within consumer culture. Rather than clean the air, the design is meant to empower the urban dweller by opening a discussion about ignored situations that, in the eye of the user, need to be addressed.

*Figure 6. BuggyAir sensor kits (Source: https://superflux.in/#)*
6.3 Digital Activism

*BuggyAir* is an activist initiative targeted at generating public discourse with the aim of changing acquired behaviours and with the ultimate goal of seeing new laws against pollution implemented. To reach as many people as possible, the *BuggyAir* was introduced to the public as a technological product that exists within a well-designed digital ecosystem, similarly to how the iPod exists within the wider Apple framework. *BuggyAir* is directly connected to the *Internet of Things Academy*, described by Superflux as “a website with a core mission to show how people use their data as evidence for change” (*BuggyAir*, 2018). The intention is to collect data that measures pollution levels, which would later be put forth as evidence to reshape accepted behaviours, “influence regulation and policy, encourage a culture of civic innovation and change corporate practices” (*BuggyAir*, 2018).

![Figure 7. Images of the first BuggyAir prototype in use (the product) and logo of the Internet of Things Academy (the platform). (source: https://superflux.in/#)](image)

Users become active participants in the design process by walking, measuring, and logging the amount of pollutants *BuggyAir* detects. As users create the content in the research kit and digital interface, the activist and discursive aspects of the initiative merge. Users become a primary actor in designing the object as the co-creation process facilitates the development of a product that reaches a fuller discursive potential through involving the public. In this manner, we see how active citizen involvement and participatory thinking become essential components to creating a *Twenty-First Century Activist Discursive Object*.

![Figure 8. Images of the booklets distributed with the prototypes. (Source: https://superflux.in/#)](image)
6.4 Creating a Sense of Global Citizenship

As users become citizen-designers, who share information and inform other users about the least polluted routes, the product becomes an example of how discursive designers can help people connect with the realities around them and take control of their situations. In the case of BuggyAir, transformational change becomes evident as caregivers start adjusting their daily routine according to this newly acquired knowledge about pollution that exists in their former routes.

![Meeting with users.](https://superflux.in/#)

6.5 Connection to Industry

BuggyAir’s initial website came to be with the financial help of Nominet Trust, a company that supports “ventures using digital technology to create real social impact” (BuggyAir, 2018). To develop the product itself, Superflux worked with private-sector partners, ScienceScope and Virtual Technologies. By collaborating with the corporate world, Superflux received the technical help it needed to launch its product while showing producers new possibilities and consequently influencing the mentalities of those who determine commercial culture. It proposed a project to industry that explores and criticizes consumers’ impact, as opposed to the more common projects that are designed to ignore or deny their own carbon footprint.

6.6 Value Beyond the Function

BuggyAir is not an air filter; it does not give an immediate solution to the problem of polluted air. Yet, its activist dimension has value that is superior to that of a fully functional object. It refuses the status quo and pinpoints ecological and societal failings. It engages the public in solving one of the biggest issues of our time and draws its strength from direct engagement with communities. The product guides participants in designing their path toward a better future and uses the power of digitized ecosystems to create platforms that link designers, scientists, citizens, and industry.
Product designers face the challenge of breaking away from restrictions of form to explore alternative practice models with the goal of introducing transformative change that allows for a resilient existence. It is the responsibility of product designers and industry to face up to pressing problems, confront change, and explore the power of science to influence the adoption of behaviours that are more fitting with the planet’s conditions. Discursive Design has a role to play in this quest for new ways of producing, especially as the field begins to join forces with industry to create the Twenty-First Century Activist Discursive Object.

7. Conclusion

This paper proposes how discursive designers and industry can work together to push the boundaries beyond their current collaboration to support our common, ongoing quest to create better conditions for the future. To reach the potential of the progress they both seek, producers and designers need to commit to a wider awareness of each other’s fields and the unsustainable realities we are living. Such action will allow for an exchange of ideas that leads to transformational collaborations.

The challenge of establishing a meaningful material culture lies in the active participation of all stakeholders: designers, producers, and users. Discursive Design has an important role to play in this development; it defies the negative impacts of commercial dynamics as they exist and displays the possibilities of scientific progress for the benefit of society. Nevertheless, without close collaboration with industrial entities, the impact of this design approach will remain too limited. Industry has proven itself more equipped to promote and normalize ideologies and concerns born of discursive discourse than designers, governments, or other players. Industry, with input from discursive designers, holds the key to guide society toward an increasingly sustainable and equitable future.

References

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About the Author:

Karma Dabaghi earned her Master of Design in Designed Objects from the School of the Art Institute of Chicago after completing a B.S. and B.Arch. from McGill University in Montreal. Dabaghi is an architect and product designer, who taught at the School of the Art Institute of Chicago, where she ran a number of studio-based and lecture classes between 2009 and 2016. She also led multiple Design Thinking workshops and helped build the Executive Design Thinking Program for Professionals. Outside of academia, she worked with a start-up company, imagining design solutions for various projects. Her design work includes collaborations with international commercial design companies such as Bruce Mau Design, where she contributed to a research project on the future of Chicago’s Burnham Plan. Her collaborative work with DuPont and Danese Milano was featured in Intramuros and Core77, and exhibited at Neocon, Chicago and at FuoriSalone, Milan. She is presently working on establishing a conceptual studio practice that addresses academic design discourses and simultaneously aims at changing existing social conditions.
Abstract | This paper explores the emerging role of patients and caregivers as user innovators within design processes. The phenomenon of user-driven healthcare has been recently renamed ‘patient innovation’ (Olivera et al. 2015). The first part of the paper presents a literature review to explore the phenomenon of patient innovation, especially in Italy. The second part analyses a range of European research projects on patient innovation, carried out and participated by makerspaces and fab labs, according to several indicators, such as the role of patients, the role of healthcare stakeholders/providers, the design processes implied and the outputs of these design processes. The final part of the paper systematizes the results and use case analysis in order to qualify the nature of collaboration between different healthcare stakeholders as a key to design innovative roles, skills, spaces for patients, doctors and institutions.

KEYWORDS | PATIENT INNOVATION, USER-DRIVEN HEALTHCARE, MAKERSPACES, DISTRIBUTED DESIGN FOR ALL, DIGITAL HEALTHCARE
1. Introduction

Nowadays, we observe an increasing need and willingness for patients, patient associations and caregivers to be involved in cure and recovery processes for economic, time, social, and psychological reasons. However, a major role of patients should not correspond to the absence of the medical staff from the whole process. The involvement of patients in the cure and in processes to envision new solutions might be the right answer to avoid the so-called do-it-yourself care and medicine. Indeed, more than 47.4% of Italian citizens prefer self-diagnosis (Eurispes, 2017) and self-care.

Within the healthcare system, the personal relationship between patients and general practitioners has been reduced and replaced with specialist visits augmenting and disintermediating human relations. Patients and doctors nowadays seem to be more distant than in the past: 54.3% of citizens are not satisfied with our health system, only 57.8% are confident in the effectiveness of influenza vaccines (Eurispes, 2017).

Enabling innovation communities and spaces such as Makerspaces and Fab labs can favour technological and social innovation in healthcare. Design can act as a mediator between different stakeholders, and as a facilitator of innovative processes; makerspaces can act as platforms for co-creation. As the design process and its results are concerned, “Research has shown that many users ‘drop out’ of the innovation process before having realized a prototype and may be doing so too early for what is socially optimal, leaving potentially valuable ideas undeveloped.” (Svensson & Hartmann, 2018: 278). Makerspaces and Fab Labs can act as enablers of patient innovation processes avoiding cases of dropout. Italy can be considered an advanced country in this area, and Italian makerspaces collaborate and operate on these issues together with patient associations, policy-makers and RRI experts in several European projects.

2. Framing the Patient Innovation

Healthcare needs are changing according to society changes. One of the most relevant highlights stressed by OECD Health Statistics 2018 is the need for health systems to be more people-centred, in particular in facing life-threatening diseases and to be able to exploit the potential of new digital technologies to strengthen prevention and care.

The approach to health as a system, the focus on people (both as patients but also caregivers), the exploitation of digital technologies and robotics (Butter et al., 2008; Brose et al., 2010) can be identified as relevant elements that have to be taken into consideration when we talk about Patient Innovation.

In order to talk about Patient Innovation is necessary to frame this phenomenon within the wider concept of Grassroots Innovation, which is defined as “a network of activists and organizations generating novel bottom-up solutions for sustainable development and
sustainable consumption; solutions that respond to the local situation and the interests and values of the communities involved” (Seyfang & Smith, 2007: 585). For the discussion here presented we find in this definition two main relevant keywords: network and sustainability.

The need for communities and networks in order to be able to activate and implement an innovative solution is particularly relevant. Indeed, the capability to have a systemic view and rely on a critical mass of intentions and interests are fundamental elements for the success of an innovative idea. The very first limit to the development of an innovative solution is based on the fact that patients (in many cases) are not experts or entrepreneurs, and their objective is basically and clearly oriented to the improvement of their own critical condition without any regards to the market or other users. For this reason the concepts of “network” and “alliance” are very relevant; first of all this concept refers both to the geographical and value-oriented proximity of members of these networks (Boschma, 2005).

In addition to that, even if Grassroots Innovation is primarily generated by civil society (Tang et al., 2011; Hossain, 2016), it has to engage other relevant stakeholders, such as government and business, especially when innovation happens in the healthcare domain. Indeed, these networks include a “social dimension” composed by people who have different needs and goals; hard components, such as tools and devices; normative components like permissions, obligations and power (El-Hassan, Fiadeiro, and Heckel, 2008). This view is very close to what Harvey Molotch (2003) called “lash-up”, that is an integrated and networked system which is at the basis of the creation of a product or a design solution: “Tracing the connections in products can show how the social and the material combine to make, depending on circumstance, both change and stability happen in the world” (Molotch, 2003: 3). Every innovation to be effective, in this sense, enroll a socio-technical network, different stakeholders, tools and technologies. Harvey Molotch uses the “lash-up” concept also to address the issue of sustainability, which is very important also for our discourse.

The concept of sustainability is very relevant but complex, as well. Sustainability has multiple facets and does not refer only to the environmental sustainability but also to the economic and social ones. Also sustainability has to be approached with a multidimensional perspective (Davico, 2004). Therefore, when we take into consideration healthcare, it is very important to look at the ethical-social sustainability, which refers to issues of social equity between individuals, groups, between broader social aggregates, fair distribution and equal access to services in order to strengthen the population's capacities and opportunities (Davico 2004).

The Open approach is very much related both with the discussion on network and sustainability. Indeed, innovation owns the characteristic of openness when it is participated by subjects that usually do not enter in these processes (such as patients and caregivers), and when it is free to be used and shared (not for business purposes). As the NESTA report “Open Innovation in Health” (Gabriel, Stanley, and Saunders, 2017) states that innovation in order to be “open” has to involve a wider range of people that “can generate better ideas, at lower cost. They can also democratise innovation, giving a wider range of people a say in
setting priorities” (Gabriel, Stanley, and Saunders, 2017: 4). As the economic sustainability is concerned, the affordability of solutions implemented, according to the Frugal Innovation approach, is connected with low-cost and low-tech productions.

Previous research (Dreier et al., 2016) identified some common characteristics to define a “low level” of Patient Innovation:

1. independence: in most of the cases the idea was born from the personal condition and to face a personal issue;
2. repetition: in many cases the solution identified already existed but the patient did not know;
3. sharing: when a solution was found in general patients tend to share their positive experience with other people in their same condition lack of connection with doctors and professionals.

In this view, Design might act as an important mediator, connector of health services and institutions with patients and citizens, and as an activator, thanks both to tangible (availability of facilities and infrastructures) and intangible (knowledge and networks sharing) factors.

2.1 The “space” for Patient Innovation

Grassroots Innovation and co-creation processes can happen in those places where networking between different actors is facilitated and performed, where knowledge is shared, where experimentation is easily performed (in terms of availability of tools and competences). Focusing on design-driven innovation, Makerspaces and Fab Labs are places where it is possible to face the previously mentioned issues of independence, repetition and sharing which characterize Patient Innovation at a very first stage. Makerspaces and Fab Labs are facilities but also actors of a socio-technical system, where social and economic sustainability can be performed thanks to the adoption of processes of open and distributed production.

The first, open production, refers to an emerging production model, based on cooperation between different subjects. Often this production model is connected to open design approaches that lead to the development of projects (under free IPR Creative Commons license) based on the sharing of digital project files released freely to allow their replication or distributed production (Maffei, et al. 2017). The second, distributed production, is essentially a decentralized form of production developed by organizations or individuals who use a network of structures and production technologies geographically located through ICT technologies. This form of production is the basis of the Maker movement (Anderson, 2013; Dougherty, 2016) or the Do-It-Yourself culture and allows remote production of objects, at a microscale close to the end user. In technologically more advanced forms distributed production is present today in the concepts of Industry 4.0 (Europe) and Smart
Manufacturing (USA) with the introduction of cyber-physical systems or the development of autonomous systems managed by Artificial Intelligence (Maffei, et al. 2017).

From the socio-technical network point of view, we want to stress here the importance of Makerspaces and Fab Labs to be in connection with wider networks of stakeholders; in many cases, Universities, Research Centres, Hospitals, etc. take part in these networks. In addition to that, there are some examples of Makerspaces, Fab Labs, Innovation Centres which are not only located but even promoted and managed by Universities (e.g. POLIFACTORY at Politecnico di Milano, Lab4Living at Sheffield Hallam University, UCL Centre for Co-production in Health Research at University College London, Helix Centre located at the St Mary’s Hospital in London but managed by Imperial College London and The Royal College of Art); this means that theoretical and applied research can be performed in very close connection. In addition to that, the reputation of Universities as “reliable” institutions can favour the involvement of different stakeholders, since, according to Quadruple Helix approach (Carayannis & Campbell, 2009), innovation is favoured and better performed thanks to the connection and the collaboration among Academy, Government, Civil Society, and Enterprises. In the following section, we are going to focus on the Italian context, presenting a selection of case studies of Design-driven Patient Innovations (DPI).

3. Patient Innovation case studies

The following case studies were selected looking also at previous research, such as MakeToCare1 and MakeToCare2,(Maffei et al., 2017; Maffei et al., 2019), La cura che cambia (NESTA, 2018), Digital Social Innovation: DSI4EU platform1.

The 5 selected case studies are: NEXT STEPS, CAREABLES, BODYSOUND, Patient Innovation Platform, Hackability. We are going to present them according to three main sections:

1. DESCRIPTION: which will contain general information about the typology of project and funding, the partner we are going to take into consideration, area of interest of the project, actors involved.
2. PROCESS: will be dedicated to the research and design processes used in Patient Innovation journeys.
3. OUTPUTS: resulting from the process previously described; typologies of outputs and their distribution.

Finally, according to the identification of several variables, a model for the comparative analysis and synthesis will be proposed and used on the selected case studies.

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1 https://digitalsocial.eu/
3.1 NEXT STEPS (Distributed Design Market Platform)

**DESCRIPTION.** NEXT STEPS is an experimental initiative developed by Polifactory, the makerspace of the Politecnico di Milano, within the Horizon2020 project Distributed Design Market Platform (DDMP, Creative Europe Programme 2017-2022) that stimulates designers, makers and patients to co-design and prototype a collection of open source walking aids that can be distributed through digital platforms and materialized in Fab Labs, starting from the Design Distributed Market Platform perspective. The initiative developed in collaboration with AIG – Associazione Italiana Glicogenosi, a patient association that represents people affected by Glycogenosis.

**PROCESS.** The project was divided into several phases involving patients, caregivers and designers through participatory activities and workshops both in presence (at the Fab Lab) and remotely. The results collected by a survey were the starting point for the co-design workshop aimed at collecting project ideas for mobility aid solutions. During the following phase, called “Makers in Residence”, patients worked in close collaboration with designers and makers supporting them in the development and prototyping of open source walking aids. Technical and scientific support was provided by Polifactory researchers; medical and scientific support was provided by Sanofi Genzyme (a pharmaceutical company) with a specialty care unit focused on rare disease.

**OUTPUTS.** Five solutions have been developed:

- **Twistr:** a parametric stick generated through a scanning made by a Kinect Cam;
- **Taylor:** a generative stick based on three parameters: gender, height and weight;
- **Wander3d:** an hacking project to transform a traditional walker into a motorized and sensorized rollator. Users can decide to activate the motors according to their needs.
- **Clip Clap:** a family of 3D printable clips for personalizing crutches;
- **Crutches adds-on:** a system of accessories that integrate on crutches to facilitate users’ movements and activities (hooking systems, battery charging systems, lights, tips, holders, etc.).

All projects files and the INSTRUCTIONS FOR FABRICATION are distributed with a Creative Common License (CC BY-SA) on the distribuddesign.eu platform and Polifactory website.

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2 www.polifactory.polimi.it/en
3 distributeddesign.eu
4 https://www.aig-aig.it/
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Figure 1. Taylor one of the solutions developed within the NEXT STEPS project.

3.2 CAREABLES (made4you)

**DESCRIPTION.** Made4you it’s an Horizon 2020 project (2018-2020) that involves several Fab Labs around Europe, participated by the Italian Fab Lab OpenDot. The project was aimed at connecting local communities of citizens with disabilities, their families, and healthcare professionals with makers and designers. The collaboration between these separate communities was based on the development of open-source interventions and solutions, so called “Careables”.

**PROCESS.** In made4you project people became creators, not only users of innovation. Patients, their families, healthcare professionals and designers were involved in a co-design process as experts in their specific field, and were asked to collaborate with makers, who are -on the other hand- experts in the use of digital tools, such as 3D printers, laser cutters, etc. OpenDot chose a method already tested in other projects on the development of healthcare through co-design. This method is composed of 8 main steps, as shown in Fig. 2.
**OUTPUTS.** Made4You project had a series of different outputs both connected to co-design, prototyping and open distribution. Careables products are solutions for healthcare co-designed, replicable, accessible, adjustable, and shareable online, using digital technologies. These products are collected and distributed on the platform careable.org, where also a wider collection of open products is available to be downloaded. The platform collects about one hundred products and solutions, such as:

- **Davido:** a musical instrument that allows children with motor disabilities to maintain a rhythm, produce music and play alongside other people;
- **Hack a toy:** DIY low-cost mod to help turn toys into accessibility devices;
- **3D printed orthotic swimming fin** for the arm suitable for rehabilitation after a stroke.

### 3.3 BODYSOUND

**DESCRIPTION.** The Horizon2020 project SISCODE Co-design for Society in Innovation and Science (2018-2020) is aiming to understand the co-creation phenomenon that is flourishing in Europe and to analyse the context and conditions that support its effective introduction, scalability and replication. Within SISCODE, 10 pilot projects have been developed, involving different stakeholder in the co-creation of solutions addressing societal challenges. One of
these pilot projects, called BODYSOUND, is run by Polifactory, in collaboration with the Patient Association FightTheStroke; it investigates the physical-motor needs of children diagnosed with cerebral palsy.

**PROCESS.** BODYSOUND was developed starting from the process developed and proposed by the project leaders (Politecnico di Milano) in collaboration with other partners.

**AN ITERATIVE PROCESS IN 4 PHASES**

The SISCODE Toolbox proposes 4 phases with different goals and results, as described below:

1. **ANALYSE CONTEXT**
   
   To understand the context based on experience or by analysing the situation, or to re-interpret an existing (problem). To identify how differences in circumstances of the environment are related to the project/challenge.

2. **REFRAMEx PROBLEM**
   
   Create a structure, visualization or framework to organise your learnings about the context and stakeholders, but also drawing from personal experiences to gain multiple perspectives about the problem.

3. **ENVISION ALTERNATIVES**
   
   Elaboration of new ideas based on the previous reflection or conversations and insights into concepts. Clustering and synthesising concepts into coherent value proposition systems.

4. **PROTOTYPE AND EXPERIMENT**
   
   Apply the new visions ensuring that the solutions are purposely built around people’s experiences and can provide real value.

**Figure 3. Process within the SISCODE toolbox for co-creation and co-design.**

Different moments of co-creation have been conceived and planned, in order to involve different stakeholders:

- the patient association FightTheStroke, who took part in the whole process from the definition of the challenge;
- children and families who have been involved in co-design workshops, experimental laboratories, and tests;
- therapists, sports doctors and sports scientists who were involved to test the solution and during the service co-design workshop;
- policy makers who were also involved in different moments of the process, through interviews and during the service co-design workshop.
Figure 4. BODYSOUND pilot co-design process timeline

**OUTPUTS.** The output of BODYSOUND will be a product-service system intended for all children, with particular attention to the needs and requirements of children with cerebral palsy, aimed at motor reactivation through music that uses touchless technologies and will be able to collect data related to the movement. In particular, the product BODYSOUND will be a system based on coreutics and on the transformation of movement into sound. Within this system, children can perform a “choreography” and transform it into a “melody”.

### 3.4 PATIENT INNOVATION PLATFORM

**DESCRIPTION.** Patient Innovation platform was an output of the research "Visualizing user innovation in the healthcare" (2011), supported by Pieter Pribila Foundation, The Portuguese Science and Technology Foundation and Carnegie-Mellon Portugal Program, in collaboration with Universidade Católica Lisbon with Università di Roma Tor Vergata and the Universität Innsbruck. The project was aimed at studying user innovation developed by patients and non-professional caregivers. During the project, the need for these innovations to be shared with other patients, researchers and makers, became clear. For this reason, the Patient Innovation Platform was created in order to open distributing these solutions.

**PROCESS.** The process here presented it has not to do with the development of the platform in itself but with the process that the platform follows to collect (patients) innovations. Anyone interested in sharing an idea or solution can join an existing Patient Group or create a new group and can post information and multimedia content that can be implemented over time. Platform managers enable user-innovators interested in sharing their product-service solutions: solutions are analyzed by the Patient Innovation medical team, only those validated are published, thus ensuring a security check.
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**OUTPUTS.** An international, multilingual, non-profit platform, and social network that connects patients and caregivers, and enables the sharing of their solutions. Since the launch of the platform, over 650 care and disability product and service solutions from over 40 different countries have been presented by patients (non-professionals) or caregivers, validated and then shared online.

3.5 HACKABILITY

**DESCRIPTION.** Hackability is a Non-Profit Organization born in Italy (2013) that aims to identify, invite, inform, interest and involve makers, designers, technicians, Fab Labs and people with disabilities, in an on-line and off-line community, to realize products for everyday life using new (or improved) digital fabrication processes. The initiative was born in Torino, but today in Italy there are several Hackability communities. The initiative is based on a meeting formula inspired by hackathons aimed at developing solutions based on the needs of patients and caregivers.

**PROCESS.** The challenge of Hackability is to build strong relationships between the local communities of makers and people with disabilities. This is done by encouraging people of both communities to work together with the aim of developing an assistive device, which solved a specific need expressed by a person with physical impairments. The basic idea behind the process is that people with disabilities already are hackers and makers since they often modify or develop their own ATs solutions.

**OUTPUTS.** Hackability developed three kinds of outputs:

- **Event:** standardization of a format inspired by hackathons (popular events in the community of makers) to propose systematic occasions where people with disabilities and makers can meet and work together, creating workgroups that are led by patients (i.e., begin-user).

- **Products:** are solutions for healthcare co-designed inside Hackability events by patients and designer/makers, to solve a personal need. These solutions are documented and distributed with on hackability Platform, we mention here only few examples like *Tournée* (folding table for wheelchair completely made by 3D printing), *Hackability Geo* (interactive 3D map of Italy for blind children).

- **Platform:** collects the documentation related to projects developed with the Hackability co-design methodology. All material is released as Open Source, with a Creative Commons License (CC-BY-SA-NC).

3.6 Synthesis

Case studies previously presented are going now to be synthesized according to 5 main characteristics. The variables identified for each of them are limited to our case studies but -
for sure - they should have to be improved if other Patient Innovation case studies would be taken into consideration (see Tab.1).

**Table 1. Grid analysis with variables to be considered in designing for patient innovation**

<table>
<thead>
<tr>
<th>The leading subject</th>
<th>Research center</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Fab Lab</td>
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<tr>
<td></td>
<td>Association</td>
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<table>
<thead>
<tr>
<th>The involved stakeholders</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Caregiver</td>
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<tr>
<td></td>
<td>Patient associations</td>
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<tr>
<td></td>
<td>Healthcare professionals</td>
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<tr>
<td></td>
<td>Designer and makers</td>
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<tr>
<td></td>
<td>Researcher</td>
</tr>
<tr>
<td></td>
<td>Policy makers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The process</th>
<th>Co-design</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Co-production</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>The outputs</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Platform</td>
</tr>
<tr>
<td></td>
<td>Product-services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The characteristics of the outputs</th>
<th>Accessible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Customizable</td>
</tr>
<tr>
<td></td>
<td>Digitally fabricated</td>
</tr>
<tr>
<td></td>
<td>Open</td>
</tr>
<tr>
<td></td>
<td>Distributed</td>
</tr>
</tbody>
</table>
The Patient Revolution. New design perspectives in healthcare innovative processes.

As it is possible to see in the chart above, design-drive Patient Innovation pays great attention to different stakeholders in the healthcare field. Therefore, both patients and caregivers are involved and often, as we will see later, asked to work in close collaboration with designers and makers. However, innovation, in general, and Patient Innovation, in particular, need to communicate, engage and discuss in order to be efficient and effective both with researchers, healthcare professionals and policy makers.

These stakeholders are usually in co-creation processes. In the wide definition of co-creation, we could distinguish between:

- **Co-design processes**, which put in place specific actions of co-creation, where collective creativity is applied across the whole span of a design process (Sanders and Stappers, 2008; Sanders and Simons, 2009; Freire and Sangiorgi, 2010)
- **Co-production processes**, are temporally following actions to co-design and refer to the collective materialization or creation of knowledge.

Co-design and Co-creation processes, which we can collectively name, Co-creation are often *ad hoc* designed by researchers and designers and they can also be very different one from

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**Figure 5. Summary table of the case studies analysed**

As it is possible to see in the chart above, design-drive Patient Innovation pays great attention to different stakeholder in the healthcare field. Therefore, both patients and caregivers are involved and often, as we will see later, asked to work in close collaboration with designers and makers. However, innovation, in general, and Patient Innovation, in particular, need to communicate, engage and discuss in order to be efficient and effective both with researchers, healthcare professionals and policy makers.

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Co-design and Co-creation processes, which we can collectively name, Co-creation are often *ad hoc* designed by researchers and designers and they can also be very different one from
the others. Since we took into consideration especially Fab Labs (and in one case - BODYSOUND - a Fab Lab which is part of a Research center) outputs are mainly products; however due to the nature of these projects, in many cases platforms are other very important outputs since they represent the virtual spaces were to disseminate and distribute these projects. Looking at the outputs, we could define their main characteristics. The accessibility of these products is very relevant. Indeed, in many cases these solutions answer to needs connected to the economic accessibility of healthcare products.

Accessibility is also very much connected with the possibility to customize these products. The customizability of a solution has to be taken into consideration in the very first-stage of the design process; therefore products have to be thought in parametric perspective to ensure that even a non-expert can enter his/her preferrable measurements.

The digital fabrication consent to use the same “language” which can be easily distributed and shared (open). Finally, openness and distribution are characteristics at the basis of the maker philosophy, as we discussed before.

4. Conclusion

Design-driven Patient Innovation is based on the observation and the recognition of a fact: patients (especially chronic patients) are daily facing issues connected with their disease, of which they become experts. The expertise is very relevant in managing these problems and, especially in cases of physical impairments, they tend to adapt the (standardized) medical aids which they need to use. However, to be so, innovation has to be known and shared, and not all the patients have the knowledge and the power to go beyond a personal level of innovation. To this end, Makerspaces and Fab Labs can act, in connection with other relevant experts, to empower patients who own an innovative idea, providing them the “space for innovation”, composed by infrastructures, tools, methods, networks and money, thanks also to public or private fundings, which are more and more taking into consideration Patient Innovation as part of Responsible Research and Innovation domain. In addition to that, research and calls focusing on patients involvement, allow engaging in co-creation processes also those patients who aren’t already conscious and confident not only in their possibilities but also of their capabilities and opinions. In order to make innovation possible, design-driven Patient Innovation looks at the whole healthcare ecosystem and to the need of a product or service to be inserted in a socio-technical framework in order to stimulate the conversation between healthcare providers and patients, but also improve the healthcare professional acknowledgment on patients’ preferences and values. Finally, another important aspect is to propose more flexible medical aids and even cure processes, taking into consideration patients’ general wellbeing and quality of life.
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References


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The transformation will not be televised

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Abstract | The design field has been increasing its efforts to address societal issues with research and initiatives developed to provide adequate response. However, the gap between design’s best intentions and the still rather poor effects of ambitious designs for social innovation suggest these responses may not be enough. To overcome this gap the authors offer two design frameworks addressing the growing social and environmental pressures: DEFT and the CONCERN CANVAS. These frameworks were developed based on the authors’ research and work in the U.S., Europe and China, where they could witness these issues firsthand. The paper presents preliminary results of applications of the CONCERN CANVAS in corporate and educational contexts, as well as new ways to engage in the fight on climate change through the DEFT framework. While still in progress these frameworks provide tools for the emerging communities that reconnect designers with their roots as agents of change.

KEYWORDS | TRANSFORMATION, CONCERNS, CANVAS, CLIMATE CRISIS, STORYTELLING
I am pitting a world-around, bloodless, constructive, design transformation revolution against a world-around destructive bloody revolution. The Design Science revolution can be won by all. The bloody revolution can be won by none.

R. Buckminster Fuller 1969: Utopia or Oblivion

1. Context and Approach

1.1 Design for social innovation in a new context

In recent decades design has been reconnecting with its roots in social innovation. New fields of design research and practice were established, including design for social innovation, socio-ecological design, transition design, and transformation design. There is already much consensus for these design efforts in the academic world. However, with growing social and environmental pressures these design responses may not be enough. There seems to be a large gap between design’s best intentions and the still rather poor effects of ambitious designs for social innovation, suggesting the latter may be ill suited to address the contemporary context.

1.2 Where we stand

The complex challenges individuals, communities and societies face can be designers’ opportunity to shine. After all, designers are well equipped to address wicked problems and have expanded their scope beyond products and experiences to designing organizations and systems (Norman & Stappers, 2015). However, designers, as well as design educators are generally hardly able to offer ways for transformation. We believe the crucial point is to better align design knowledge with the changing contexts, so designers can work within different systems to eventually transform them. As current frameworks of design provide only little guidance on how to do this, we propose new concepts of how to engage in strategic design for transformation.

There seems to be much consensus on the WHY and WHAT of socially engaged design, but at the same time there is a lack of understanding on HOW to proceed. Tools and methods are crucial for delivering measurable empirical results, broaden the knowledge base of designers and make them legitimate members of heterogeneous teams working on transformation and social innovation.
1.3 Closing the gap

To overcome the gap between social ambitions and real-world projects, as well as the abovementioned shortcomings we present two frameworks: DEFT and the CONCERN CANVAS. These frameworks were developed based on the authors’ research and work in the U.S., Europe and China, where we could witness these issues firsthand. The presented tools are work in progress. They are published open source for co-development by a community that we hope to build of designers and non-designers alike.

The overall goal of these frameworks is to provide designers with new possibilities of action to address society’s critical needs, such as the climate crisis. Similar attempts for paradigmatic change in fashion (Fletcher & Tham, 2019) and architecture (Architects Declare, 2019) are still in nascent stages, but at the same time there is a growing understanding that design needs to move beyond focusing mainly on increasing economic value in the narrow sense of the word (Sheppard, Sarrazin, Kouyoumjian, & Dore, 2018). As IDEO’s Tim Brown (2019) pointed out recently, the challenge is to redesign design in order to address urgent societal problems.

2. DEFT: Define, Evaluate, Feel, Tell

2.1 A Design Framework for the Era of Climate Crisis

Climate change is considered the most critical issue of this era, but designers do not seem yet up to the challenge, at least not in terms of making the issue central to their work. While there are some emerging signs of designers focusing on the climate crisis\(^1\) and organizing to declare climate emergency (Architects Declare, 2019) — for the most part designers still apply design thinking and other design methods that pay very little attention to climate impacts.

Exploring effective ways to engage in the fight on climate change will require designers not only to be truly human-centered, but also to have adequate tools that are grounded in this new context. The DEFT (Define, Evaluate, Feel, Translate) framework was created to be such a tool, offering a roadmap for designers navigating their way in a rapidly changing environment that is shaped by the climate context. It synthesizes existing design tools (i.e. back-casting, storytelling) together with more radical lens around systemic changes.

The DEFT framework includes four steps:

1. Define the journey – articulating a desired mental model and backcasting to the present

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\(^1\) See for example https://www.climatedesigners.org/
2. Evaluate your solution – using affordability, practicality and meaningfulness to assess potential solutions
3. Feel the Bern – deciding whether to accept or reject the system in which you operate
4. Translate your solution into a compelling story (see Figure 1).

The following part will describe each one of these steps in detail.

**DEFT: Design For the Climate Crisis**

<table>
<thead>
<tr>
<th>1. Define</th>
<th>2. Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>The desired mental model?</td>
<td>- is your solution affordable?</td>
</tr>
<tr>
<td>backcasting</td>
<td>- is your solution delightful?</td>
</tr>
<tr>
<td>The current mental model?</td>
<td>- is your solution meaningful?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Feel</th>
<th>4. Translate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you trying to fix the system or make it obsolete?</td>
<td>Can you frame your solution in engageable terms?</td>
</tr>
</tbody>
</table>

*Figure 1: DEFT Framework’s Four Steps: Define, Evaluate, Feel and Translate*

### 2.2 Define the Journey

The first step in the DEFT framework is to formulate the journey: Articulating a desired future in terms of a mental model and identifying a desired or ideal future and projecting backwards from it, i.e. starting with the mental model the designer wants to see in place in five, ten or twenty years from now and working their way backwards to the present.

Backcasting through the lens of mental models allows designers to lead from the future (Scharmer, 2009) giving them permission to ignore the (mental) limitations of the status quo. It also allows designers to maintain flexibility – similarly to The Natural Step’s process of backcasting from sustainability principles (Broman & Robèrt, 2017) it allows designers to consider different solutions as long as they are aligned with the new desired mental model.
2.3 Evaluate your solution(s)

With the scaffolding provided by the first stage, the designer can move on to consider and evaluate different potential solutions. Choosing the evaluation criteria is critical as it provides a clear understanding of the most important elements we believe the designer should be looking at: Affordability, delightfulness and meaningfulness. These elements are translated into three questions:

*Is it affordable?* This question reflects the need to ensure equitable access to climate solutions, acknowledging that the climate crisis is a social justice issue. It suggests that designers should redefine climate solutions around affordability and assess when they consider possible solutions in transportation, housing, energy, food, etc. if the majority of people can actually afford it.

*Is it delightful?* New experiences we are offered are designed to be more convenient, easy-to-use and frictionless. Solutions offered to fight the climate crisis cannot be any different and need to meet the same level expected from all other experiences in order to be adopted at scale. This question requires designers to prioritize innovation offering consumer delight and as little trade-offs as possible.

*Is it meaningful?* Designers should consider the impact and materiality of the solution evaluated, i.e. does the solution support rapid reductions in carbon emissions along the lines of the IPCC report’s (2018) recommendations? This question is also meant to ensure that solutions to be considered offer more than just an incremental response, i.e. “a slow process, which modifies the landscape only slightly” (Roggema, Vermeend, & Dobbelsteen, 2012).

2.4 Feel the Bern

Framed as homage to Democratic presidential candidate Bernie Sanders this step is focusing on the designer’s posture. Similarly to the Transition Design framework (Irwin, 2015) it acknowledges the importance of designers’ mindset and posture. Designers need to ask themselves a fundamental question: Do they believe in trying to fix the system in which you operate (i.e. mobility, energy, healthcare, fashion, etc.) or in replacing it with a new one?

The climate crisis requires designers not only to consider what is at stake, but also to reflect on their own values and whether they are willing to stand up for them. Designers may need to go against the inherent preference of any system to preserve itself and reject significant changes. Eventually, the real question they may be asking themselves is about courage, reflecting E.F. Schumacher’s notion that “any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius — and a lot of courage to move in the opposite direction.” (Schumacher, 1973, p. 22)
2.5 Translate your solution into a compelling story

In the final stage of the process, after considering the overall alignment with the desired end point (step 1), the assessment criteria (step 2) and the designer’s posture (step 3), designers are ready to narrow down and focus on the proposition they find most suitable. The focus of this step nevertheless is not on prototyping or testing, which will be pursued along the lines of the design process, but about shaping the narrative of the proposition.

Storytelling has been key to sustainability and the climate crisis is no different – as Segal explains climate change “has a considerable narrative weight and that it is something we understand through storytelling” (2017, p. 122). For designers it suggests that the effectiveness of the solution also depends on the story developed around it. In order to translate a climate-based solution into a compelling story designers will need to pay attention to three questions: Is the story clear? Is it relevant (to the audience)? And is it exciting? Synthesizing these factors (clarity, relevance and excitement) is key to realizing the solution.

2.6 Testing the DEFT framework

The DEFT framework has been initially introduced in a couple of design courses, where students experimented with it to explore questions around the future single-use soda bottles, circular models in the furniture industry, and the value of recycling. These exercises helped refine the framework and further articulate the questions it poses for designers.

Our ongoing interaction with design students, educators and practitioners suggests there is a growing interest in frameworks with the contextualization offered by the framework – grounding solutions in the urgency of the climate crisis, while integrating radical thinking with practicality (e.g., Fletcher & Tham, 2019). We plan to continue testing the DEFT framework in the upcoming months in workshops with different organizations, looking into the value the framework creates for designers in different environments (corporate, entrepreneurial, educational, etc.).

3. The Concern Canvas

The ConcernCanvas (CC) is a diagrammatic tool that helps to render a comprehensive view of complex socio-technical contexts and facilitates to find starting points for design and interventions. The canvas traces the driving forces of the stakeholder’s mindset by linking the psychological and material factors and thus overcome a traditional perspective that treated both of these influences separately.

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2 The ConcernCanvas is part of a series of tools for transformation design including the “Hypercycle of Transformation”, “Cultural Formats”, and the “Two Layers of Scenography”, see www.designingtransformation.org
Figure 2  The ConcernCanvas links facts and values and asks for their designability

3.1  The design of the Concern Canvas

At its center the CC asks about the relation of events and frames for different stakeholders. Observing and discussing relevant events and their impact on the mindset of people is important to build a common understanding of the situation that is the design objective. In the diagram events and frames both are linked symmetrically up to the most comprehensive view and down to the most concrete details. In the direction up frames are influenced by values and concerns. In the direction down frames are influenced by the mediated or material set of circumstances that are identified as issues and facts.

The CC challenges the design team to explore the causalities and interdependencies of values, concerns, events, frames, issues and facts by asking questions that address each of these aspects like: Which events can you identify in the stakeholder’s world? Or: What are the facts that determine the stakeholder’s experiences? To answer these questions the design team needs to observe, find, describe and discuss their views on the situation. This is how the ConcernCanvas can work as a catalyst to build a “trading zone of knowledge” (Galison, 1997) for the design team.
3.2  »Concerns« as a foundation for Transformation Design

The ConcernCanvas introduces the new category of »concerns«. Concerns are conceived as »values in action« that drive the motivation and decisions of people. Whereas values are more stable over time and more general, concerns are specific and may change more quickly. An individual's situation at a given time may be described by a set of concerns. Everything that has an impact on your subjective view and feeling of »being in the world« can be considered to be a concern.

Concerns are a mix of rational and irrational aspects, and large- and small-scale topics that raise enough energy to influence your mind and behavior. Concerns are non-normative: The concern »health« might mean not eating too much in some countries, whereas in other places it might mean to have access to clean water. Concerns are non-hierarchical (in contrast to Maslow's pyramid of needs): A lost match of your local soccer team might have more impact than some distant war. Also, for concerns there is no natural or authentic status: »Nature« used to be a threat to man and became a concern. The concept of concerns acknowledges the fact that trends, memes, images and narratives are designed, produced and controlled by an industry. The non-normative concept of concerns replaces the normative concept of needs and thus opens new perspectives for design especially in its functions as social innovation and transformation. If the concept of Transformation Design is based on concerns it is not limited to socio-ecological issues but addresses a broader range of topics. We suggest using this starting point in order to first describe and understand transformation as a universal process that is happening for better or for worse and that does not wait for designers. We can always bring in normative socio-ecological issues later but the foundation of a science and design of transformation should not limit its analytical perspectives from the start.

3.3  Context, culture and concerns

Especially in western cultures there is still a gap between the humanities on the one hand (concerned with values and sensemaking) and the hardware on the other hand (concerned with trivial materials). Only recently the cultural and social sciences took a material turn trying to close this gap. Designers of course were always concerned about material culture and can only wonder that it took the humanities so long to catch up. Designing for transformation and social innovation will largely depend on tools and methods to

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3 The notion of »Concerns« is a terminus technicus with a more specific meaning than in its usual use in the English language. It was first introduced by Bruno Latour in his Actor-Network-Theory (Latour, 2005) that built upon the difference of matters of concern and matters of fact (see Author, 2016).

4 For an example see the magazines at a newsstand with titles such as Happy Way, Slow and Hygge to push concerns such as happiness, security, and cocooning (see Cabanas & Illouz, 2019).
understand the “two kingdoms” of values and facts comprehensively and provide a starting point for designing interventions.\(^5\)

One of the attempts to do so is the *Causal Layered Analysis – CLA* (Inayatullah, 1998). Here the mechanisms of sensemaking are traced in cultural settings and structures. Another approach aims for “Positive Design” (Pohlmeyer & Desmet, 2013). Both concepts introduce psychological foundations that are more sensitive to the possible impact of design than the “rule of thumb” used in design so much. The notion of positive however implies a normative direction that might be naive at best and dangerous at worst. Both concepts, as well as other approaches that are ethnologically inspired, ask the proper questions: As traditional structures, narratives and sensemaking processes vanish how will the new cultural formats be defined? (e.g. What is a workplace? What is a family? How can we design trust and organize mobility, energy, education, and security?).

All of these questions can be addressed by using the concept of concerns and the ConcernCanvas together with the aforementioned approaches. There are differences in focus and direction of the presented approaches. But as for now Transformation Design is still in its infancy we should concentrate on the common goals first and try to build a toolbox as rich as possible. We might shift attention to the differences of concepts later when a more mature field of socially engaged design will have emerged.

### 3.4 Do we need another canvas?

A canvas is defined as “a two-dimensional, poster-based tool that guides a heterogenous team with a particular challenge or task” (Thoring, Mueller, & Bakde-Schaub, 2019, p. 595). Canvases offer a method to go from linear thought to planar action or even space if used by groups simultaneously and became popular tools used in processes of innovation and creation.\(^6\) Canvases structure group thinking and facilitate involvement. By the means of graphical representation and interaction crucial issues are detected more easily and become more approachable.

If the concept of concerns is adopted a proper way of putting them in context is needed. With the complexity of concerns given there is no way of rendering their context linearly. A canvas however can display the interdependencies of different aspects and can also show the areas that need to be explored. Just like a map that does not only chart the known territories but also gives hints to the address the unknown a canvas can not only show existing issues but can also ask for the missing elements that need to be researched.

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\(^5\) This also was Buckminster Fuller’s mission: “(...) I am confident that we have, in reality, closed the science-humanities gap with kindergarten conceptuality.” (Fuller, 1969, p. 144)

\(^6\) In an empirical study 123 canvases were analysed (Thoring et al., 2019). However there are some approaches that pretend to be a canvas but do not meet the requirements. The “Digital Transformation Canvas” for example is only a list of Do’s and Don’ts, see https://kmu-transformation.ch/der-digital-transformation-canvas
3.5 Working with the ConcernCanvas

The ConcernCanvas was developed based on experiences in Transformation Design projects. One of these projects was a redesign of a mission statement and its communication for a German bank.\footnote{See https://www.deginvest.de/International-financing/DEG/%C3%9Cber-uns/Wer-wir-sind/Unser-Leitbild}

![Figure 3 Mission Statement and visualization for the DEG, a subsidiary of KfW, the third biggest bank in Germany, June 2018](image)

Introducing the concept of concerns opened new ways to articulate the non-normative drivers of people’s mindsets that could not be covered by the traditional concept of needs. The ConcernCanvas proved useful as an additional module for the designer’s toolbox just as other tools like design thinking, user journey, personas etc. These modules can be combined for an individual set of tools that fits the given task and situation.
3.6 Workshop on »Re-starting Development Aid«

At the Weizenbaum Institute for the Networked Society – The German Internet Institute we conducted a workshop on “Re-starting Development Aid”. The ConcernCanvas was helpful for identifying the different stakeholder’s perspectives such as the beneficiaries and the benefactors, political institutions, banks and NGOs.
3.7 Workshop on »21st century design education«

At the Beijing Institute of Fashion and Technology – BIFT in Beijing/China we conducted a workshop on redesigning design curricula. Stakeholders such as the students, the faculty, the industry, the party, and the family/parents used the ConcernCanvas to articulate their concerns. It was the first time for this Chinese university to articulate these different perspectives and take them as a starting point for discussing further development.

3.8 Results and Outlook

The results of the mentioned workshops were quite promising. The ConcernCanvas proved useful to open new ways for the participation of stakeholders and to deliver new insights for the design team. The Canvas was revised and fine-tuned and is now part of a series of tools for transformation design. Further development is expected from the use of the ConcernCanvas by other design teams. As to date no empirical data is available as there were no means to integrate an independent and parallel observation from social sciences (as is the case most of the time in design). Paradoxically most data on the impact of designing concerns comes from marketing analysts. These inquiries were made for commercial purposes that are fundamentally different from the goals of design for social innovation and transformation. Metrics to measure the non-commercial impact of design are hard to find.

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8 see www.designingtransformation.org
but will be most welcomed. We hope to gather empirical data in the future thanks to a growing community of developers sharing their experiences with the new tools for transformation design.

4. Conclusion

The new tasks in the emergent fields of socially ambitious design demand new forms of research, practice, and education as well as new frameworks and tools. We suggest that the frameworks presented in the paper can help close the gap between designers’ ambition and results in the emergent fields of socially ambitious design.

The proposed frameworks should serve the community of design researchers, practitioners and educators in coping with the rapidly changing context of their work, adding to their knowledge base and providing them with new lens to address the challenges they work on. We hope these frameworks can help designers play a more prominent role in the public discourse and make a greater impact in real world projects. Educators can use the frameworks as a starting point for discussion and development for a new generation of designers.

Designers are at a crossroads now. They are uniquely positioned to be agents of change (Banerjee, 2008), and the need to fulfill this premise has never been more critical. At the same time, most designers still work on projects with limited societal impact. Designers need to make a choice if they want to shape and drive change or be driven by it, working to execute change strategies and policies created by others. As Fuller noted: “We need the philosopher-scientist-artist – the comprehensivist, not merely more deluxe-quality technicians-mechanics.” (Fuller, 2001, p. 114). We agree with Fuller and hope the frameworks we present in this paper will serve as an invitation for designers and researchers to further explore opportunities to reshape this field.

References


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Time and Design. Time as a key parameter for a survey on contemporary design

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Abstract | This paper defines an exploratory pattern that, employing time as a key factor, reviews its recent dynamics, evolutions and interpretations critical to the field of Design, to establish which are urgent issues to be challenged and to select and map relevant approaches, methods and agencies. Starting from an analysis of the obsolescence of the linear conception of time, based on the Modernist ideal of progress and undermined by the manifestation of humanity as a planetary-scale geological force (Anthropocene), it is proposed a contemporary characterization of it. Time is presented as Object-Oriented, Archetypical and Topological and it calls for updated design roles, methods and objectives beneficial to a sharp understanding of our present. Para-fictional and Material Speculation are proposed as suitable approaches and sustainability, information and hybridization as crucial issues for our time. They are explored through the time parameter: Time and Objects, Time and Knowledge and Time and Making. Some case studies are selected to discuss which design practices respond to the contemporary time challenges. This recognition identifies also some tools and modalities which support and help the design to accomplish its critical, reflective and political role.

KEYWORDS | TIME, GREAT ACCELERATION, OBJECTS, KNOWLEDGE, MAKING
1. The Great Acceleration: the linear time of Modernism

The Earth contains, along its whole circumference, a thin layer of radioactive materials sedimented starting from 1945 (Morton, 2013). This layer represents a decisive shift towards a new geological era characterized by an impressive terraforming of our Planet, named Anthropocene (Crutzen et Stoereman, 2000; Crutzer, 2002). After the Second World War, we assist at the beginning of a phenomenon called “the Great Acceleration” (Mcneill, 2014), an exponential increasing growth rate of human progress leading to such an uncontrollable increasing impact of humanity on the planet that “in a single lifetime humanity has become a planetary-scale geological force” (Steffen et al., 2015). The machine became the icon of the progress and the assembly system the base of the Industrial Capitalism. The myth of a global and endless space for both production and consumption generated a model of time associated with the Enlightenment idea of endless progress and with the Modernist ideal of mass production. The nineteenth century narrative in based on a linear conception of time, where the future would automatically bring progress, improvement and endless development.

Today, humanity is facing the consequences of its anthropocentric, modern and technological attitude. Catastrophic scenarios are arising, which are the manifestation of what Morton (2010; 2013) defines the end of the world, intended as the end of what we have been considering, for the last three centuries, as “world”, that is the projection of the human being’s space, time and activity. He claims that big entities, called hyper-objects, shows up as uncontrollable objects, distributed in time and space, of which we can know, experience and visualize nothing but a very small part of the whole. They can be a black hole, the global warming, the solar system. They make the ecological denialism and the apocalyptic environmentalism obsolete and inaugurate a new phase of hypocrisy, weakness and instability. Man has lost his central position of absolute control and power on the world and he has to rethink human existence on the same level of the existence of nonhuman objects (Harman, 2002). This circumstance asks for a new way of thinking, subvert our certainties and even break them up.

The Design discipline, view its responsibility and role in the anthropocentric vision of global production and consumption, of progress and, above all, in defining the relationships between objects, contexts and the human being, is facing a questioning phase: which are, in this scenario, the reflections, directions and decisions taken or to be taken?

This paper highlights the need to bring the thought, the philosophical reflection and the cultural dimension at the centre of design, starting from an exploration on the concept of time, and its influence on the project dimension. Time is investigated as both a quantitative and a qualitative variable and it is proposed, on the base of meaningful intellectuals’ theories, such as Serres, Latour, Jung and Zolla, a contemporary characterization of it.
2. Another Time: Object Oriented, Topological and Archetypical

The loss of an anthropocentric perspective requires philosophical reflections to reconsider human activities and, for the purpose of this paper, design priorities. A valuable support comes from the Speculative Realism, which is a movement in contemporary continental-inspired philosophy that defines itself in its stance of metaphysical realism (Meillassoux, 2008). In metaphysics, realism about a given object is the view that this object is ontologically independent of someone’s conceptual scheme, perceptions, linguistic practices and beliefs (Armstrong, 1980). One of its approaches is the Object-Oriented Ontology, OOO (Harman, 2002, 2018; Bryant, 2011), a 21st-century Heidegger-influenced school of thought that rejects the privileging of human existence over nonhuman objects.

The Modernist conception of Time, as a linear sequence of events motivated by the dream and the design of the future and interpreted in terms of human history, is clearly renegotiated according to a new object-oriented perspective, where time can be considered an object such as the humanity itself. We could imagine time as a hyper-object of which man can only get and experience small parts, moments. This feature of the object-time to be unintelligible in its entirety, escaping the rules of only human will and purely scientific and technological reason, requires an effort of reconciliation and collaboration between science and humanities and the redefinition of archetypal imaginations, or, in Jung’s words (2014; [1968]), of a collective unconscious, to mitigate the sense of anxiety, frustration and helplessness and rather to direct them towards an awakening. As Morton (2013) states:

“[…] the ostentatious conviction that the world will end if we don’t act immediately is, paradoxically, one of the factors that most inhibits an aware and effective commitment of human beings to an actual ecological coexistence on the Earth. The end of the World already happened, and we only have to wake-up from the dream and start acting in a conscious way.” (p.20)

In this perspective, an interesting consideration arises to inspire new human professional attitudes: there is no need for acting in a rush; on the contrary, we should accept the reality and take time to reflect and speculate as much as possible on it, breaking the chain of a defective consideration of time as velocity and outrageously future oriented. This seems to be a good starting point for Design to rethink its priorities and agencies. Isn’t it the time for designers to make substantial decisions? It’s time for reflection, speculation and new commitments.

In order to understand the more intimate human condition, it is beneficial to refer also to theories of recent psychoanalysis. Jung (2014; [1968]) speaks of a loss of a collective unconscious, that is, of archetypes that help man to orient himself in the world, deprived of symbolism by the modern logic. Logic is a prerogative of conscience: man selects, makes sense, recognizes. His unconscious, however, is guided by instinctive tendencies,
represented by those “ancestral” forms of thought, which are precisely the “archetypes”. The “archetypal memory” therefore remains the main structure of our being men.

Our present, in order to be comprehended, needs the invention of new forms of thought. A substantial contribution is Michel Serre’s work about the spatialization and topologizing of time (1995; 1997). He offers ways of thinking time spatially and morphologically. Serres, in fact, discloses topologies of space and time which are inclusive forms holding together science and culture, and incubating new forms of historical poetics (Abbas, 2005). He provides a model, topology, and tools, such as maps and storytelling, for a reinterpretation of history, in order to know and reconcile who and what we are in relation to the world (Connor, 2004). Topology may be defined as the study of the spatial properties of an object and it is not concerned with exact measurement, which is the domain of geometry, but rather with spatial relations, such as continuity, neighbourhood, insideness and outsideness, disjunction and connection (Croom, 1989). In place of the line of history, Serres proposes a series of different configurations of time, based on dynamic volumes, or topologies. It can be a crumpled handkerchief, in which apparently widely separated points may be drawn together into adjacency (Serres and Latour, 1995, p.60-1).

Through this investigation about a renewed conception of time, it is proposed its contemporary characterization which might drive current design directions and engagement. Our time is Object-Oriented, since we have lost an anthropocentric vision of the world, that is, also, of history and time. In this perspective design must enhance its ecology-driven approach and methods. Time is Archetypical, as we need to restore and redefine an archetypical memory or collective unconscious to face “the end of the world” and to wake up our political actions and decisions. From this point of view, design must focus on its semantic, symbolic, anthropological and social value. Time is Topological, as it is no more based on a linear line but on a fluidity of polychronic connections between local and global and design must engage with complexity empowering its holistic and interdisciplinary attitude. This definition of time is instrumental to outline contemporary design perspectives and to inspire decisions. These three features meet and merge in a state of emergency where the human actions need to be affranchised from the anxiety for the future through a deep critical and speculative focus on the present, intended as the moment of actual knowledge (Zolla, 1981).

3. Design approaches with a Time perspective: from Design fiction to Para-fictional and Material Speculation

Design, operating on the boundaries between technology, science and society and through both cultural, economic and social lenses, has an active role in this current scenario and is called upon to contribute to its understanding and evolution, inquiring the present and forecasting possible futures. The supremacy of a techno-scientific thought has been influencing our society sharpening the contemporary condition with apocalyptic scenarios as
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a means to criticize human behaviours and choices in a brutal and destructive way through a sensationalist and dehumanized aesthetic. Above all, the trend of Science Fiction has been proposing scenarios loaded with anxiety and tension, which, thanks to technological potentials, are extremely falsified and deprived of any form of balance, desire and care for the present hopes, the past teachings and the eternal human fears. Here the Design can make the difference. It can intervene with its care for the balance between both technical, semantic, anthropological and emotional variables. To respond to this task, in the last decades, Design has been setting up established approaches, such as speculative (Dunne & Raby, 2001; 2013) and critical design (Ratto, 2011), largely incorporating practices of fiction design (Sterling, 2005; Retzinger, 2008; Bleeker 2009), aimed at exploring and questioning emerging issues to imagine and discuss possible, probable and more suitable futures (Gaver and Martin, 2000). Design fiction works to offer an alternative to science fiction binary utopian/dystopian environments. The co-founder of The Near Future Laboratory, Fabien Girardin, distinguishes design fiction from science fiction: “Design Fiction doesn’t so much ‘predict’ the future. It is a way to consider the future differently” (Girardin, 2015). The emphasis of speculative design has been on building alternative versions of the future and constructing different fictional environments within which new objects, products or services can be re-thought and virtually trialled.

This paper, in light of its premise and goal, identifies Design Fiction as a legitimate and suitable design approach, but argues that its evolutions of Para-fictional (Norris, 2018; 2019) and Material Speculation (Wakkary et al., 2015) fit better for our time.

Jane Norris claims that Design fiction is still largely trapped within Modernist linear conceptual structures that continually prioritize the new (Norris, 2018; 2019). What this approach does not address very effectively, are issues focusing on material use in the present, unless it is by inference or contrast. She focuses on the possibilities of a ‘para-fictional’ approach to design. It is a provocation to rethink how we view materiality. As Leith et al. (2018) state:

“This use of para-fiction is a design strategy she has developed by assigning narratives to contemporary objects in use, [...] This strategy offers an alternative form of design fiction to the established use of speculative design that is more future orientated. She situated her use of para-fiction, within a current, wider cultural debate on how post-enlightenment thinking might be used to consider fresh design strategies.” (p.4-5).

As complementary to design fiction, Wakkary et al. (2015) introduced the concept of Material Speculation and stated that:

“Material speculation emphasizes the material or mediating experience of specially designed artifacts in our everyday world by creating or reading what we refer to as counterfactual artifacts. Material speculation utilizes physical design artifacts to generate possibilities to reason upon. We offer material speculation as an approach to critical inquiries in design research.” (p. 97).
This approach advances the notion that the material existence of specifically designed artifacts situated in the everyday represents a unique and productive approach to critical inquiry.

As we can see, both of the approaches show a focus on the present and on the materiality, which evokes ancestral feelings and impulses laying in the deepest layers of the individual, generating modes of immediate and multi-sensory narrative (Hekkert & Karana, 2014).

The main focus of Design are no longer products, services, systems, but rather ways of thinking and doing that challenge, critically question and design solutions to or opportunities for complex social, environmental, economic and even political issues. In fact,

“Before being a technique, design is a capacity for critical analysis and reflection, with which design experts produce knowledge, visions, and quality criteria that can be made concrete in feasible proposals.” (Manzini, 2016, p.54).

4. Design priorities and practices for re-thinking Time: a recognition through case studies

After the investigation about a new perspective on the present time and the proposal of approaches suitable to respond to the emergent situation, this paper identifies crucial issues to be challenged by the discipline and undertakes to depict contemporary patterns of practices. In light of the analysis on the urgent reflections about a) the human impact as a geological force, b) the lack of an understanding of unintelligible entities, in this paper treated as hyper-objects, and c) the call for reconciliation between humanities and science, which also means for interdisciplinarity, the paper highlights and select three main critical issues: sustainability, information and hybridization. They are explored through the time parameter: Time and Objects, Time and Knowledge and Time and Making.

Time and Objects is an inquiry on the concept of sustainability, in terms of obsolescence and impact of objects and materials on the ecosystem, from the perspective of geological eras and not of historical times, following the Object-Oriented Ontology theories (Harman, 2018) and considering time as a hyper-object (Morton, 2013) of which we can know, experience and visualize nothing but a very small part of the whole. Time and Knowledge highlights the correlation between human awareness and information with respect to past, present and future and responding to human obsession for prediction (Vespignani, 2019). Practices of contemporary design acting as knowledge facilitators that mitigate human fragility with respect to time, through the design of polychronic experiences (Serres, 1997; Herzogenrath, 2012), are illustrated. Time and Making explores experimental practices where time is highlighted as an opportunity for interdisciplinary collaboration and exchange, but also the different connotation that time takes in each discipline, i.e., linear vs. circular measurement, making through temporal sequences vs a non-chronological kind of time (Bennett et al., 2011).
4.1 Time and Objects, Sustainability

Talking about objects, it is necessary, today, to redefine, understand and redesign the material apparatus, the relationship between the user and the products' physicality, in accordance with the new paradigms of a more conscious, ethical and demanding consumerism. At the same time, the experience of the physicality of things is, today, both disorienting and exciting. It is displaced by the lack of connections between the material and the place of origin, fruition and processing; between the material and its place in our individual and collective memory made up of associations between aesthetic and functional properties and resources, geographies, landscapes, traditions, skills, tools and processes. The concept of a non-anthropocentric time asks for design agencies which try to make an understanding of it through empathy and ancestral thoughts and borrowing, from art, the performative dimension of the project. The performance seems to convey the contemporary paradigm. It "happens" in the place of the outdoors, of the displacement, of the fragmentary, of the experience. The performance is a hypertext in which the artist's action and audience experience are mutually inscribed. (D’Alto, 2017). The experience of the event refers to the behavioural and procedural sphere, and therefore actions do not represent something, rather they define or build something.

In the case of design, the performativity of the project consists mainly in bringing to light the process, the phenomenological value, the invisible hidden behind the shape and function of the object, which becomes less critical. The performative aspect represents the political dimension of the project. A significant example is Olafur Eliasson and Minik Rosing’s project ‘Ice Watch’ [fig.1], whose first edition was in 2014. Twelve large blocks of ice, calved from the Greenlandic ice sheet, were harvested from a fjord outside Nuuk and brought to the centre of Copenhagen, and then to other cities such as London and Paris, in response to the publication of the UN IPCC’s Fifth Assessment Report on Climate Change. The designer didn’t create any objects but displaced “objects”. He calls for attention about the hyper-object called Climate Change making the ice itself talk about the consequences of human actions and decisions on the planet and triggering an ancestral, emphatic connections of people with the destiny of the melting ice.
In the last years, the exhibiting and narrative choices made by distinguished curators, museums and designers are representative of how the attention and priority are shifting from the physical results to the crucial role that design can play in our environment and its responsibility to look beyond the edges of its borders. Emblematic are the cases of Geodesign and Cambio. The first is the exhibition platform of the Design Academy in Eindhoven, that, from 2018 carries on a stratified narration about different global complicated situations capturing the deep transformation phase of the productive and cultural system, in an osmotic relationship with the world of design. This year the topic has been “Sand. The Building Block of Modernity”, curated by Martina Muzi at Van Abbemuseum [Fig.2]. The exhibition uses sand as a raw material in order to narrate the imbalances which dominate the increasingly interconnected global scenarios. It is considered as the second most used natural resource on the Planet Earth after water and its extraction is often one of the primary causes of ecosystems collapse.
This year, 2020, Formafantasma began an investigation into the governance of the timber industry, called Cambio and commissioned by the Serpentine Galleries [fig 3]. It is explored and displayed the evolution of timber’s commerce over time, and its tentacular expansion across the globe. It grew during the nineteenth century becoming one of the largest industries in the world both in terms of the revenue it generates and the impact it has on the planet’s biosphere.
4.2 Time and Knowledge, Information

Our way of exploring and experiencing the new conception of topological time and also the kind of data we get from the outside, from the natural and cultural world we inhabit, ask for new ways and tools to visualize, interpret and evaluate information in order to produce original knowledge. Moreover, we need Public information, awareness and engagement towards the complex dynamics that regulate our world and society. Design, through its aesthetic production, makes the complex dynamics that regulate our expectations more visible and tangible (Krippendorff & Butter, 2008).

A powerful way that Design exploits, today, for manage and interpret complex systems is that of Data visualization, used both as a tool for analysing the amount of fragmented and networked information in a visual synthesis and as a modality to return that knowledge. An interesting case of design praxis making use of a singular form of data analysis and visualization is that of Polychronic objects by Jane Norris [fig 4]. Her research combines temporal theories with material experimentation to identify possible paradigm shifts in making for a networked society. Norris (2016) uses time-based making strategies to combine materials from different historical eras, integrating these material times into one polychronic object. This approach opens up a different set of making possibilities by folding together
Time and Design. Time as a key parameter for a survey on contemporary design materials and techniques unlikely to have been combined in previously historically linear and hierarchical approaches to materiality. (Norris, 2016, p.2)

Figure 4. Jane Norris, Polychronic Objects, digital time and our choice of materials, 2014.

She proposes an aerial view that connects many different times and events laterally in a single object, offering a new knowledge about materials and manufacturing through the visualization of unusual, non-chronological combinations.

Another meaningful example is the work of Rhyzomatiks, a Japanese Design Studio with a strong research approach based on digital media and especially on data visualization that makes it simpler to understand very obscure and/or complex systems and phenomena. Their 2013 project named “traders” [fig 5], is an installation with bit coins, which, in addition to experiments using automatic trading system, develops a system to visualize block chains. It is a work raising a problem for contemporary finance and trading system. Another example is the 2016 project "3776: the digital anatomy, Dissecting Mount Fuji" [fig 6]. Data around Mount Fuji were visualized to create a spatial performance and projected on an outside monumental installation 6m tall and 23m wide, made by Seijun Nishihata. There is also a special website made from the 3D data of Mount Fuji.
Figure 5. Traders, 2013, GLOBALE: New Sensorium.

Figure 6. "3776: the digital anatomy, Dissecting Mount Fuji", 2017.
4.3 Time and Making, Hybridization

In order to understand and manage the complexity of our Topological Time, made of infinite connections, we are exploring approaches other than disciplinary, because, as Neri Oxman (2016) says:

“knowledge can no longer be ascribed to, or produced within, disciplinary boundaries, but is entirely entangled. The goal is to establish a tentative, yet holistic, cartography of the interrelation between these domains, where one realm can incite (r)evolution inside another; and where a single individual or project can reside in multiple dominions.” (para.1)

To really succeed handling emergent issues researchers and professionals in different disciplines have to engage with their mutual activities. This paper embraces the idea that, as a method to trigger this engagement, they have to get used to work together, literally meaning sharing the same workspace and work time, even not necessarily collaborating on the same project, but becoming mutual supervisors, because “Each expert knows a piece of the puzzle, but the big picture is too big to comprehend.” (Hillis, 2010). An effective way to trigger and enable interdisciplinary practices is to hybridize methods, such as mixing the deductive approach of making experiments typical of science with the synthetic one of creative disciplines. A credible circumstance is to involve designers in projects dealing with hardly scientific content and, vice-versa, scientists in creative ones. This interdisciplinary practice starts to be applied in educational programs in order to shape new figures of designers capable to deal with extremely complex issues, scenarios and topics.

One example, among others, is the collaboration settled by the Paris-Sud University / CNRS and the design school, ENSCI-Les Ateliers, called Design and Physics. Between 2010 and 2017, physicists and designers collaborated on fundamental physics topics such as quantum physics, superconductivity, optics. Each time, a workshop of 4 months allowed about fifteen students supervised by professional designers to explore one of these subjects, in close collaboration with the physicists. Students have produced popularization and science communication tools, in other cases they have been inspired by physics to produce design objects or installations, sometimes they even imagined the future; the results are productions with a hybrid status [as in fig 7].
A sensible field where, today, this hybridization turns to be useful and meaningful, is that of healthcare. The designer Jetske Visser with the project “Forgotten memory”, 2012 [fig 5] steps into the world of dementia. An invisible and hidden world is exposed. She wonders how daily things look like with the view of a demented person. How do they experience their environment? What is a teapot if you don’t know what a teapot is? She states that, as a designer, we study how people experience environment and we always should be aware of the perspective of someone else. For this project, she collaborates with the care home “De Landrijt”, with scientists and researchers and directly with demented elderly, trying to show their shadowy and uncertain world. The result of this collaboration is an associative movie. You see recognizable objects being transformed combined with demented elderly as a metaphor for the disease.

Figure 7. No-Contact, Marion Gros, Design and Physics, superconductivity demonstrated in sport accessories, Paris-Sud University / CNRS and the design school, ENSCI-Les Ateliers.
5. Conclusions

This paper's contribution to the field of Design consists in a characterization of the present time which helps to identify priorities for disciplinary research and practice and to inspire relevant directions through a critical overview of methods, tools and approaches.

Starting from an analysis of the obsolescence of the linear conception of time, based on the Modernist ideal of progress and undermined by the manifestation of the Anthropocene, it is proposed a contemporary interpretation of it.

Time is presented as Object-Oriented, Archetypical and Topological. In this perspective, man has lost his central position and his certainties (Object-Oriented Time) and needs to rebuild his role in relation with the world, restoring an empathic connection with his present, to identify himself with his time (Archetypical Time). Moreover, he needs new tools and ways to understand a time that is no more intelligible as the Modern linear history, but relative and based on infinite space-time connections (Topological Time).

To deal with this kind of time, the paper identifies Design Fiction as a legitimate and suitable design approach, as an alternative to the Science Fiction binary utopian/dystopian
environments and argues that its evolutions of Para-fictional and Material Speculation fit better for our time. Both of them are based on a focus on the present and on the materiality, which evokes ancestral feelings and impulses laying in the deepest layers of the individual, helping to rebuild a set of values, symbols and believes, archetypes.

After the characterization of the current time and the identification of disciplinary approaches to deal with it, the survey highlights the priority for Design to reflect on three main issues: 1) the human impact as a geological force, 2) the lack of understanding of unintelligible objects, in this paper treated as hyper-objects, and 3) the call for reconciliation between humanities and science. These reflections are addressed as Sustainability, Information and Hybridization and explored through the time parameter: Time and Objects, Time and Knowledge and Time and Making. Few emblematic case studies are selected to provide a recognition of representative design directions, agencies and tools, as, among others, the performative dimension over the representational one, the political engagement of curatorial projects, the polychronic data visualization, both with physical and digital means, and the interdisciplinary hybridization.

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Walking the Line: Creative Research as Critical Activity for Design

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Abstract | Most acknowledge a lack of specific and unilateral criteria for defining creative research. In some cases, it is defined by the activity itself (i.e. being creative in how research is conducted by the researcher) and in other cases defined by the outcome of the research project (i.e. as a creative artifact.) Creative research in the world of fine art has often been a means by which to examine the impact of cultural and social attitudes as well as practices on the world. In design, creative practices have been incorporated less into the upfront research process, instead relying on more positivistic methods in an attempt to isolate and examine how users interact with design artifacts. But as designers are increasingly interested in addressing systemic and root cause issues, many of the current design research methods show limitations in their ability to forecast and imagine the future at this larger scale. This paper will examine the ways that creative research is increasingly used in design as well as the humanities, social sciences, math and sciences as a means by which to examine the longer-term impact of design and research activity as a speculative, critical and participatory tool.

KEYWORDS | DESIGN RESEARCH, CREATIVITY, CRITICAL THINKING, DESIGN THEORY, DESIGN PRACTICE, TEACHING
1. Introduction

Most designers consider themselves “creative” but often notions of creativity are relinquished to the conceptualization, ideation and production phase of the design cycle. Research is done as a means to help one become creative, but the activity itself is not necessarily considered creative. We are interested in exploring how creativity, specifically the act of creation, can be a means to engage in the research process. We suggest that creativity itself can help designers gain new insights and be more critical of the conclusions that they are drawing in the research phase because the very nature of it forces us to consider alternatives, test assumptions, and evaluate research as a product that is pressed out into the world for others to engage with—as a form of creative research. But there is little agreement as to what defines creative research, especially in design. By first outlining the various terminology and definitions underscoring how creative research is understood, we provide a preliminary foundation for how creative research is applied across many disciplines, including design. This foundation is then used to define three key outcomes or uses of creative research in design, and to evaluate and explain design-specific case studies that the authors have engaged as further evidence of the multi-dimensionality and unique outcomes that it affords for design research and practice. By exploring creative research from multiple disciplines, we seek to define the specific ways creativity might be used to critically engage with information and findings in the design research process.

1.1 Creativity + Research ≠ Creative Research

There are multiple dimensions and interpretations among all disciplines of the term’s creativity and research. In some cases, creativity is looked at as an individual activity—such as Edward De Bono’s (1972, 1995) work on lateral thinking. Mihaly Csikszentmihalyi (2015), on the other hand, characterizes it as a much more complex system that expands from individual to field to discipline. Still others look at creativity

“as a parallel construct to intelligence, but it differs from intelligence in that it is not restricted to cognitive or intellectual functioning or behavior. Instead, it is concerned with a complex mix of motivational conditions, personality factors, environmental conditions, chance factors, and even products.” (Feldhusen and Goh, 1995, p. 231-232)

In each of these definitions, that act or state of being creative reinforces ideas of production that are usually associated with ideation. However, they are also useful in thinking about the construction of research because they encourage an approach that is multi-dimensional, multi-scalar and constraints-based.

In a field that relies on novelty and invention, devising strategies for discovery is paramount. Much of the background research used for design practice has relied on more positivist methods that isolate and examine how users interact with design artifacts, thereby testing what exists, rather than what might be. This is not a universal truth—the emergence of
research methodologies like participatory design and design anthropology seek to discover new opportunities for design intervention. While creativity is sometimes used in the design of the research, it is not necessarily central to the methods themselves. Designers acknowledge the value of creative research mostly as a speculative and critical activity. A well-deserved critique of this speculative method is that often its final resting place is in the museum, or in books, rather than out in the world where the artifacts of design are meant to be encountered and manipulated. As designers are increasingly interested in addressing systemic and root cause issues, many of the current design research methods show limitations in their ability to forecast and imagine the future at this larger scale. Designers are trained to be creators, to model phenomenon in form, to visualize patterns, and translate the abstract into the concrete. How then, can we use the relevant components of creativity which are propositional in nature—modeling, visualization, the pressing out of something “real” into the world to act as a mediator? How can these methods also force critical thinking with both designer and participants and act as a primary method for design research? In what ways can this method of research raise critical questions in diverse contexts? The answer is not simply to inject creativity into the research design process, but rather to use creativity as a key strategy for raising questions, interacting with users and reflecting on the discipline.

2. Creative Research Across Disciplines

Reviewing the ways that creative research has been developed across disciplines provides a critical first step to evaluating its usefulness as a critical activity. More specifically, the value of creative research across disciplines might be understood in the following ways:

- Using creative methods as a mechanism of critique and participatory dialogue;
- Using creative methods to engage in data collection, analysis and evaluation, and to facilitate critical discovery.
- Using creativity to look at problems from divergent perspectives.

Different disciplines naturally gravitate towards one or the other of these dimensions. But what becomes particularly apparent is the value that comes from the combination and recombination of them in different disciplines and contexts. Below is a preliminary overview of some of the more innovative researchers and contexts for creative research through the disciplines and across the years. While not necessarily self-characterized as such, they provide interesting insight into how creativity can be used to explore and expose critical questions.

2.1 Creative Research in the Arts and Humanities

Probably the most obvious and notable is the long history of creative research in the fine arts, which began as early as the Renaissance. Research for artists like da Vinci meant the
practical application and deep integration of design knowledge, engineering processes, and the sciences alongside fine arts.

More recently, creative research in the fine arts is a mechanism for critique and participatory dialogue. In 1967, Experiments in Art and Technology (E.A.T.) was started by artists Robert Rauschenberg, Robert Whitman, and Bell Labs engineers Billy Klüver and Fred Waldhauer. In an interview Billy Kluver (2000) stated that “E.A.T. saw itself as a catalyst for stimulating the involvement of industry and technology with the arts” (Kluver, 2000). Over 2000 artists and 2000 engineers were recruited and paired, the collaborators were encouraged to create works that both investigated and catalyzed dialogue on emerging technology. Artist Lillian Schwartz, was a participant in the 1960s group. She worked with computer graphics innovator Ken Knowlton to develop animation techniques that laid the foundation for Hollywood special effects and the computer games industry.

In a more recent example, artist Joe Davis and Dana Dal Bo (2019) partnered with scientists from the University of Kentucky to create the Lucky Mice Project as a means of critique and dialogue on genetic engineering and the human-animal relationship in the sciences by asking the hyperbolic question, “Can we breed luck?” In their work, Davis and Dal Bo set up the conditions to study the correlations of serendipity and genetics by selectively breeding mice that rolled unique combinations of die (i.e. “snake eyes”). The project aimed to address issues of genetic selection while simultaneously questioning the policies that drive the humane and ethical treatment of animals in scientific experimentation. While both of these examples demonstrate the potential for creative research to raise questions, in other fields they are equally as critical for better understanding the dimensionality of complex issues (Davis, J., & Dal Bo, D. 2019).

2.2 Creative Research in the Sciences

In the social sciences, Helen Kara (2017) argues that expanding methodological boundaries across all of the social sciences are driven by the fact that researchers are tackling more complex questions and traditional research methods are too limiting to adequately handle these complexities. Kara states that creative research methods allow researchers to accurately reflect the multiplicity of meaning that exist in social spaces, such as arts-based research, research using technology, mix-methods research and transformative research frameworks (Kara, 2017).

Narrative research—perhaps one of the most widely used forms of creative research—can be defined as using narrative and storytelling as a participatory means by which to collect information (Manney, 2016) or as a methodology for synthesizing, analyzing and ultimately disseminating qualitative data (Crouch and Pearce, 2018)

“...which place research participants as collaborators and give rise to emotion and sensory understandings of the self as well as allowing for unexpected experiences and knowledges to emerge” (Bryant, 2015, p.1).
This definition is important because it integrates narratives into the information collection phase and gives rise to the potential of unexpected and undirected outcomes.

W. E. B. Du Bois, a famed African American sociologist, academic and civil rights activist practiced creative research in the late 19th century. He along with his sociology students were engaged by the US government to collect and represent data on newly emancipated slaves in the US. They crafted beautiful hand-drawn and colored visualizations. When the government failed to publish the data portraits, DuBois curated them into an exhibition for the 1900 Paris Exposition—in part to reframe American and European perceptions on race and the lives of African Americans living in the south. The authors, Whitney Battle-Baptiste and Britt Rusert (2018) write that, "[t]he cross-fertilization of visual art and social sciences here marks an important transition moment in the history of the disciplines while offering alternative visions of how social scientific data might be made more accessible to the populations and people from whom such data is collected." (Battle-Baptiste & Rusert, 2018, p.13)

As a companion to narrative research, the activity of visualization is perhaps the most obvious, and relevant, mode of creative research. Through the crafting of the visual story, critical decisions are made about how content and data is framed. The combination of qualitative and quantitative data most evident in the social sciences provide a rich context for this intersection, as a form of convergent thinking. But there are also opportunities to think about how creative methods might enhance divergent thinking as a complement.

In the physical sciences creativity and creative research is often used to examine problems from divergent perspectives. In the following example, we can see the importance and value of using alternative forms of knowledge, in this case the embodied knowledge that manifests itself in a physical model. Hyperbolic geometry, and also known as non-Euclidean mathematics is the math that underlines general relativity, and helps explain the shape of the universe, animals such as corals, jellyfish, and plants for example, lettuce and curly kale.

The Institute For Figuring (IFF) was begun by Margaret Wertheim, a science writer, and her sister Christine, an arts professor, to explore the aesthetic dimensions of science, mathematics and engineering through the playful use of materials. The Crochet Hyperbolic Coral reef project uses Diana Taimina’s (2019) concept of crochet as a means to understand hyperbolic geometry to model a crocheted coral reef, inviting participants to have a hands-on playful interaction with the complex math of Hyperbolic geometry. In a 2009 Ted talk, Wertheim (2009) argued for the value of creative research, stating that “we live in a society that completely tends to valorize symbolic forms of representation, algebraic representations, equations, codes. We live in a society that’s obsessed with presenting information in this way, teaching information in this way” (Wertheim, 2009). She continues with the proposition that crochet is a form of play that engages abstract theories and makes them concrete.
In a similar way to the craft of crochet, origami—the ancient art of paper folding—has helped spark a scientific revolution, propelling a wave of innovation related to how we understand both man-made and natural structures. Origami is informing scientists like David Baker, who studies how amino acids fold in our bodies or the engineers building a satellite telescope’s star shade at NASA’s Jet Propulsion Laboratory (Allington et. al. 2017). As a creative method, this act of prototyping is another form of visualization, and allows the researcher to iteratively “write” and “read” the model and to test out cause and effect in addition to a divergence of ideas about how something does (or might) work. As we look to the arts, humanities and sciences for evidence of the origins of creative research, the question that emerges is to what degree the mode of creative research is similar and different in design?

3. Creative Research in Design, Principles and Case Studies

Like many of the previous examples, creative research in design is often used to raise questions and test out answers. Nowhere is this more evident than with the interactive design pioneer Muriel Cooper, an educator at the Massachusetts Institute of Technology’s Visible Language Workshop—today known as MIT Media Lab. Cooper was highly experimental in her use of tools, and technology, finding new and experimental ways to test out visual interfaces before they existed. She also didn’t limit her work efforts to a single format or material—her work spanned from print to software interfaces.

In the early days of interactive and screen-based interface design which Cooper was developing, there were no models for Cooper and her students to interact with—to iteratively test out the cause and effect of certain design decisions. What’s relevant for this paper was the absence of a model for Cooper and her students to interact with screen-based interfaces. Cooper engaged in the creative process to form critical opinions, collect data and evaluate the new technology. In a 1994 lecture Cooper states,

“Our goal has been for a very long time to try to examine in the so-called emerging technologies what the new form and content of design, of communication, might be. And to that end for many years we have been building prototype visualization tools that would allow us to do something that seems relatively intuitive in order to say “What if we did this, then what would happen?” but to really visualize this stuff in as tight an iterative loop as we possibly could. So, we’re looking for the new design principles, umm we’re not at all sure what they are.” (Massachusetts Institute of Technology Media Lab, 2018)

Cooper is a prescient example of the ways that creative research—through experimentation in visualization, modelling and prototyping—can be used to raise critical questions.

Based on the survey on creativity and creative research in the different disciplines outlined in the first section of this paper and related to the three purposes of creative research also
mentioned, we suggest that creative research holds the most potential for design research in the following ways:

- As a means to engage in critical discourse about what is “true” and “factual” and to challenge the biases that are informing design decisions;
- To design better data gathering, analysis and evaluation methods that help designers see a problem from multiple perspectives;
- Building trust and openness between participants and researchers in participatory and co-creative methods.

Most importantly, creative research holds myriad possibilities for opening up new paradigms of design research, challenging the biases that are inherent in any design approach—from the context of the project, to the way we conduct our research, to the solutions that we ultimately propose—and engage people (i.e. users) in both creative and critical research methodologies.

Design research and design research methodologies are still very much in their infancy. Over the past 30 years, discourse surrounding methodologies have been trying to decide if design research is a science, a liberal art, or a new domain in and of itself (Cross, 2011; Poggenpohl, 2009; Margolin & Buchanan, 1996). With roots in engineering, computer science, and manufacturing, the historical perspective of the designer has been to aim for objectivity, using research to “collect data” in order to make informed, and unbiased decisions. But increasingly designers are recognizing the act of interpretation as key to the design research process, and that biases are inherent in any process that is propositional. The use of abductive reasoning, core to the design process involves judgement, and that judgement is closely tied to research, experience and habitus—or the way we view ourselves in the world, and as part of a field of study (Cross, 2011; Crouch and Pearce, 2012). Paramount to decolonizing the activity of design is to situate the act of interpretation at the center of design research and dislodge the notion of the designer as an objective actor. We think creative research is a good opportunity to reframe this, as it positions the designer at the center of the interpretive process, confronting them with qualitative analysis and decision-making as a core part of the research process. As Crouch and Pearce (2012) quote the French philosopher Jacque Bourdieu on the value of creativity—it is an ‘acquired system of generative schemes’ (pp.36-37) and

“[t]hinking of creative practice in design as a dynamic relationship between the habitus and field empowers the researcher because it locates design thinking in the context of a dialectical engagement between ideas and the material world, positioning design in a continuously changing social environment (Bourdieu, 1977, p. 95).” (Crouch & Pearce, p. 37)

Creative research as a critical activity is based on the idea that through the creative process—one that involves making decisions in the very act of productivity—creativity can help designers challenge their own research findings and give a means by which to test the assumptions and conclusions they are drawing. Embedded in the act of creation are the
qualities of framing, orientation, organization and scale, which all contribute to the activity of synthesis, analysis and evaluation. In addition, the process of creativity requires translation from one form to another, which necessarily involves encoding, summarizing and including certain pieces of information while excluding others (Allen & Queen, 2015).

3.1 Case Study: Creating visualizations that illuminate gaps in research and knowledge

In “Groupthink: The Brainstorming Myth”, social scientist Charlan Namath argues that “debate and criticism do not inhibit ideas but, rather, stimulate them relative to every other condition...because it encourages us to engage more fully with the work of others and to reassess our viewpoints” (Lehrer, 2012, para.10). Creative Research—and in particular visualization as a means by which to engage in the examination of a phenomena, can be particularly effective in prompting this critical discourse because the visualization acts as a sort of “truth” that can be contested. In visualizing causal relationships, visualizations can also foreground the relationship between cause and effect; as a movement it can visualize the collective consciousness through pattern-creation; and in both structuralism and post-structuralism it can emphasize the myriad network and connections that inform the interpretation of an problem—potentially bringing in more diversity and depth of understanding to similar or related sets of information.

In a graduate seminar at NC State entitled DIY cartography, students created a series of maps that looked at the history of urban development in Raleigh, NC with the aim of better understanding the myriad complexities of how a small southern US city had grown over the last 150 years. In using maps to engage in research, this class used creative research in its most basic form—as a mediator to disseminate and explain research findings. Invisible social issues such as segregation, civil rights, and discrimination are also formally manifested in the map, thereby becoming “real”.

In the class, maps were used as a critical tool to raise questions about what the gaps were in the existing narrative of urban development in the city, but also in the student’s own research. In one example, a student used the map to examine the role that public schools played in the city of Raleigh’s development. Do schools crop up as a result of housing development or is there a concerted effort to develop both simultaneously? Of particular concern was the disparity between neighborhoods where housing value and income was low, and the access those students had to quality public education. Through the creation of the map, the student looked broadly at such data as land value and the proximity to schools (Figure 01). Additional information such as the “score” the school had was included to overlay a more qualitative angle to the research. Finally, the student included a series of case studies that highlighted two houses in close proximity to each other, and where the children in each attended school. These case studies added yet another layer of qualitative examination by visualizing the incredible difference in distance of travel between the two. The lower income student had to travel 3 times the distance as the higher income student. Students then created additional visualizations that looked at the “network” of information that contributed to their findings (Figure 02). Their final visualizations were more experiential—specifically about a site that was pivotal to their research. This final visual was
meant to test their findings “on the ground” (Figure 03). For the student conducting the research, the map itself became a powerfully persuasive tool. It also encouraged the student as well as the whole class to think through the implications of this disparity, and what is “fair.” Of primary concern through these maps was to illuminate gaps in knowledge, to use the map as a creative tool to force synthesis of information and as a critical tool to discuss correlation and causation of observed patterns and phenomena.

Figure 1. Geospatial Map: Education and Housing.
Figure 2. History of Education Access.
3.2 Using Creative Engagement in Participatory Design and Co-creation: Building Trust and Critique Through Games and Play

Participatory research has roots in anthropology in the sense that often the researcher is a participant-observer—simultaneously observing the culture or condition they are studying while also recording and interpreting their observations about its “peculiarities” (Geertz, 1973). It often implements a co-creative approach by asking participants to actively engage
in finding the answers to design problems. Participatory methods are inherently creative in the sense that both the designer and the user are making something together.

Creativity within the participatory process could help raise new and novel questions—and potentially set up conditions for entirely new problems to emerge because of the open-ended nature of the creative process. In addition to engaging in a mutually creative experience, the creative process can help engage in a more critical examination of the problem definition. Could creative methods be used to augment or re-define the problem at the end stages of the design process? How might the tools that we are generating as a part of the research process be rethought as more inherently discursive tools? In traditional definitions of creative research, the idea of the research instrument as a mediator between the researcher and subject is not a new one, but possibly one that we can look at again in terms of how to negotiate meaning in novel and unique ways. Especially if we look at the purpose of the interaction as a reciprocal tool for this negotiation.

One of the challenges with participatory research is in building the trust necessary between audience and researcher, and between users themselves. In her Book, Reality is Broken, Jane McGonigal (2011) argues that one of the main values of gameplay is the trust that is built between the players—trust that is built as a result of mutual expectations of “following the rules” of the game. McGonigal also argues that games encourage us to take risks because the stakes are contained within the space of the game itself. How can we take advantage of the liberation of the game, and use creative research to build that trust to take risks and engage in meaningful critique as part of a participatory design process?

In a research project examining collaboration in online environments, ideas of gameplay were implemented to help participants build trust and spark conversation throughout the design process. As the study was focused on design collaboration, all of the participants were designers. Each time the group met, there was a different goal for what was to be produced with the end results living in the written journal, Margin. The research was also set up for both synchronous and asynchronous work. One of the first tasks was a writing exercise similar to the “telephone” game that children play. In that game, an initial statement is made. In this case, the first participant was given a passage from Shakespeare’s Merchant of Venice—which they created a response to (Figure 04). Some participants translated line for line, others created a more original piece that responded to the ideas presented in the excerpt. Participants were also tasked with collecting and generating images that would complement the writing. The images were put into a shared repository for all to draw from and ultimately turned into a series of visual essays (Figures 05-07). Ultimately, this charrette provoked important conversations about the nature of collaboration, especially as it related to scale, authorship and outcome. The project was meant to engage participants in deeper conversations about collaboration, and in many ways, it was successful in breaking apart a collaborative process for closer examination. But more so as a creative exercise it helped participants gain a measure of trust with each other, and facilitate conversation. Through the activity of creation, it also gave specific testament to the way that collaboration was happening—as a proof of concept. And because of the
constraints imposed on the participants, it forced a measure of risk-taking and liberation in the process.

Figure 4. Writing “telephone”.

The artifacts generated from creative research are powerful tools that have a multiplicity of purpose. They capture and illuminate the intricacies of a problem, they help synthesize research gathered, recognize gaps in individual or group knowledge and help users form critical opinions on the inquiry.
Figure 5. Visual Essay by Author.
In truth,
I have no clue
why I am
feeling

depressed:
moths flutter
at the bulb,
each
lost
in the cloud they make
Upon hitting
the light, their dust is filling the room
I asked and he didn’t know, where did it go

Why look if it’s going to be missing
Fade in, fade out
Remember
when
you
were
young

Figure 6. Visual Essay by Erin White.
Figure 7. Visual Essay by Rebecca Tegtmeyer.
4. Conclusion

Looking at examples from the humanities, social sciences, math and science, we start to see the value of using creativity in myriad ways throughout the research phase. We are not suggesting that creative research should be a substitute for other methods, nor that creative research should be the only type of research designers engage with. Rather, we are suggesting it as a critical part of a mixed methods approach that encourages designers to challenge their assumptions, seek new perspectives and engage in critical dialogue with participants and with their own ideas. The figure above (Figure 08) is a preliminary visualization of the way that creativity and criticality intersect, and the reciprocal relationship between the two. The act of creativity, and the thinking that is involved, is directly linked to critical thinking through analysis and selection. Critical thinking is enhanced by creative thinking through the need to remain open-minded, while simultaneously rationally examining what is in front of you.

In her book, *Creativity from Constraints*, Patricia Stokes (2016) argues that, “Successful solutions are reliable, not surprising; predictable, not novel; already accepted, not creative”.

Figure 8. A model for critical and creative research in design.
As the problems that we engage with become more complex, messier, more “wicked”, it’s increasingly critical to move beyond historical ideas of what is successful—and challenge our deeply-held assumptions about how to engage in design and research. Using creative methods to encourage a more open-ended approach to design research might be a critical first step in fundamentally rethinking the approach we take in this regard.

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Brooke Chornyak is an experienced designer, educator, and collaborator who has presented papers both nationally and internationally in a wide variety of settings. In 2004 she earned her BFA from Rochester Institute of Technology and her MGD from North Carolina State University. She currently teaches systems and interaction design at Maine College of Art in Portland, Maine and Northeastern University in Boston. Brooke is the co-founder of Collective IQ, a human-centered design research lab located in Portland, Maine.

Tania Allen is a visual designer, consultant and Associate Professor at North Carolina State University. She is the co-director of the design research group co-lab, which focuses on critical mapping as a participatory design research tool. Through teaching and community-focused projects, co-lab is currently developing a methodology for critical mapping that simultaneously embraces cartography as a powerful analytic and synthetic research tool, while also challenging the assumptions that the mapping and visualization process embeds within it. Recent publications have included “Beyond the Map: Unpacking Critical Cartography in the Digital Humanities” in Visible Language (Fall 2015), co-authored with Sara Queen.
Why we need more somatic culture in design

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Abstract | Drawing from multi-disciplinary literature, this paper argues why somatic culture is essential to designers and can promote a radical change in the way we respond to contemporary challenges. Somatics is “the field which studies the soma: namely the body as perceived from within by first-person perception”. Somatic practice can influence design on several levels. It can shift our focus from a neutral point of view to a situated one; prepare us for intersubjectivity; help us develop relational and empathic skills that contemporary designers should be equipped with; and enhance our perceptual skills to widen the knowledge of ourselves and our environment. Finally, in a field where professional uncertainty is ever increasing, it can give us tools to counteract negative side effects. A turn towards somatic culture in design practice and educational approaches can therefore be an appropriate answer to the complexities that design is encountering.

KEYWORDS | SOMATICS, DESIGN EDUCATION, MOVEMENT, PERCEPTION, AGENCY
Introduction

Confronted with the continuous evolution of the social, economic and technological contexts in which it operates, design is a practice in constant redefinition. Studies and reports strive to establish new areas and required skills (AIGA Designer 2025) while designers and institutions struggle to keep cognizant and up to date. Hasty curriculum innovations run the risk of only providing buzzwords and superficial answers; expectations towards design and its ability to bring solutions to complex problems are increasing; new solution-oriented design practices are emerging but at the same time are being criticized for having a weak and reductive culture (Manzini 2016). So how can designers prepare themselves for the inevitable changes to come?

In this paper I will argue that somatic culture can provide a foundation to a new design culture and can also promote radical change in practice and education.

Somatics: a definition

Somatics was defined by philosopher and movement therapist Thomas Hanna as “the field which studies the soma: namely the body as perceived from within by first-person perception” (Hanna 1986, p. 341) as opposed to the third-person perception prevailing in science. Somatic learning relies on the ability of the soma to sense actively and regulate itself: through focused awareness it allows us to learn the unlearned (Hanna 1986). This term now includes many different methods and practices, ranging from Feldenkrais Method and Alexander Technique to dance forms such as Contact Improvisation, which all share the intent of bringing individuals to a higher awareness of themselves and their environment through conscious movement experiences. According to Hanna, “somatic learning (...) expands the human soma’s range of action as well as perception” and “the more [that] is learned in this manner, the greater the range of voluntary consciousness for the constant task of adaptation with the environment” (Hanna 1986, p.351).

The purpose of this paper is to underline the (self)-educational relevance of somatic practices, which are always grounded in experience, which aim at awareness and integration, and which can provide a rich and fertile terrain for the development of design practice.

Contemporary design culture and human experience

The international design community is trying to address the changing scenarios affecting it by way of discussion and debate, most often through the forms of scholarly conferences, papers and reports. One such example is AIGA’s Designer 2025 report, which proposes seven trends that should inform the evolution of design and its education in the medium term,
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listing what college students and educational institutions should do to respond to each of these expectations (AIGA Designer 2025).

Design is a collaborative practice and requires practitioners to be receptive towards people, behaviours, environments, materials, and much more. Any kind of design, even at the smallest scale, requires interaction with a number of “others” – be they institutions, clients, regulators, collaborators, experts, producers, publishers, distributors, etc. – along with the great number of other people who, in many design projects, are still placed at the receiving end of the process: users, citizens, audiences, consumers, participants are only some of the different names designers use, according to their culture, to define the people they design “for”, or sometimes “with” and, unfortunately, even “against” (Sfligiotti 2011).

Many methods have been developed over time to interact with and account for this “receiving end”. As a result, essential words originally used to define human life and relationships, such as empathy, experience, collaboration, sharing, have been co-opted into the design vocabulary with a purely functional – if not perfunctory – intention. For instance, in design thinking methods (as if anything such as a unique way of thinking shared by all designers actually existed), a designer is usually asked to “empathize” with someone as a required step in the process of delivering a new or better product or service to that individual or entity. In order to develop this empathy, activities are suggested such as conducting interviews with users and visiting their living environments (IDEO 2015). This approach, however, seems to take it for granted that a designer who uses specific methods, will automatically be able to empathize with others - indeed a questionable assumption. As discussed by Devecchi and Guerrini, the heart of the issue depends on what we mean by “empathy”. We can see it as a tool for “understanding others’ experiences and emotions”, or we can give it a deeper meaning as an intersubjective experience, as “the skill to be (...) really involved in the face-to-face encounter with a concrete Other, acquainting and accepting his/her otherness”; in short, from empathy as a tool to empathy as an end in itself, as a response to a widespread need for meaning, dialogue and sociability (Devecchi & Guerrini 2017, p. S4361-2).

Several authors agree that these empathic skills can be developed through somatic practices. Albright (2019) believes that we can “learn how to engage with one another in the face of (rather than in the absence of) difference” (p.15), and Höök (2018) claims that somatics “connects the self (...) with empathic engagement with others” (p. XVIII).

Methods and processes

Designers and design institutions rely on methods to improve their effectiveness, to claim authority over their field of practice, to gain credibility, and to promote their brands. Design methods are usually presented as procedures, with steps to be undertaken in order to find a solution to a given problem: their description seldom takes failure into consideration. Whatever method we adopt, however, needs to be supported by our capacity to see its limits, to adapt it, and to consider each situation at hand whilst engaging with it and acting
within it, without being blinded by assumptions and preconceptions (which are usually a side effect of methods learnt top-down in abstract environments). As dancer and scholar Ann Cooper Albright (2019) points out, “practice is a way of committing oneself to being present in a situation, no matter what the outcome. In this sense, it is always an act of improvisation” (p. 5).

This requires abandoning the idea that design should always be fast and deliver predictable outcomes. In order to develop an open and receptive attitude, designers can use somatic practice to reach a state that – borrowing a title from psycho-somatic therapist and educator Thea Rytz (2009) – could be described as “centred and connected”, where they can “attune their awareness toward themselves, others, and their environment” (p. 15) and learn to be responsive instead of reactive.

It also implies allowing more time for the process: only over time can relationships be established, situations understood, and proposals organically developed without recurring to default, standardised “solutions”. This slowing down might prove itself revolutionary because it requires a radical change of attitude over the whole spectrum, and it is surely something worth investing effort in.

“*The privilege of partial perspective*”

The way we conceptualize knowledge and practice shapes the way we design. For instance, while the notion that design should be impersonal, objective and neutral was central to the development of Western Modernism, ever since the late 1960s the notion has been seriously questioned. To quote feminist designer and educator Sheila Levrant de Bretteville, “‘Designed’ has almost come to mean exclusive, universal, clear and simple, rather than inclusive, personal, ambiguous and complex” (De Bretteville 1974, p.115). I propose adding two adjectives to the discourse, “situated” and “intersubjective”, which I believe can contribute to a more articulated account of design.

In 1988 feminist scientist and philosopher Donna Haraway introduced the term “situated knowledges” in an attempt to contribute a new perspective to the debate on scientific objectivity. As she argued, knowledge is never separated from its subject and location, and only by embracing our situated, partial point of view can we make rational, responsible, objective claims: “the view from a body, always a complex, contradictory, structuring and structured body, versus the view from above, from nowhere, from simplicity” (Haraway 1988, p.589). This perspective seems to resonate with Hanna’s viewpoint when he states that “the soma has a dual talent: it can sense its own individual function via first-person perception, and it can sense external structures and objective situations via third-person perception” (Hanna 1986, p.346).

If we adopt this perspective, we are likely to recognize that it is impossible for our individual experience and (physical and ideological) position in the world not to shape the way we act as designers; thus, it helps us to eschew the perception of our opinion and ideology as neutral or absolute. At the same time, it allows us to acknowledge other people’s own
“situatedness” and their multiplicity of experiences: that is, it prepares us to design with, and for, a plurality of human beings.

Intersubjectivity is a concept used in philosophy and psychology, defined as “the sharing of experiential content (e.g. feelings, perceptions, thoughts, meanings) among a plurality of subjects” (Zlatev et al. 2008, p. 2). It was used in design theory by Giovanni Anceschi in his discussion of Josef Albers’s teaching approach, which was based on guiding students through a shared observation and evaluation of effects: “the validity of the results is based on a method of acquisition and judgement that is neither objective nor subjective, it is an intersubjective approach” (Anceschi 2010, pp. 45-46).

Somatic practice can facilitate situated and intersubjective attitudes; Höök, for instance, emphasizes how “focusing on our own soma is a preparation for intersubjectivity” (Höök 2018, p. 147).

Movement, knowledge and learning

The fact that forms of tacit knowledge acquired through movement and perception exist in addition to discursive, language- and mind-based knowledge has been part of philosophical and psychological debates for several centuries, just as it has been a principal concern in art and design education. Architecture historian Zeynep Çelik Alexander (2017) coined the term “kinaesthetic knowing” to identify an idea of embodied, experiential knowledge developed over the course of the 19th century and within a German lineage of educational-reform to which the foundations of the Bauhaus can in part be traced.

Introducing somatics in design culture is a way to acknowledge the relevance of this tacit knowledge in learning and in the design process. Moshe Feldenkrais, the founder of the somatic method of the same name, described a “learning in which quantity grows and turns to a new quality, and not the mere accumulation of knowledge”. He affirmed that “most truly important things are learned this way”, referring to all our essential human abilities (Feldenkrais 1977, p. 7).

Furthermore, somatic practices provide us with unique information coming from proprioception (Hanna 1986). According to psychologist James L. Gibson (1968), proprioception “considered as the obtaining of information about one’s own action” does not depend on specialized receptors (p. 34) but is the result of combined (muscular, articular, vestibular, cutaneous, auditory, visual) information. This ecological view goes beyond the traditional idea of the senses working separately in a specialized way and can help us transcend the primacy of the visual that tends to guide many design choices.

Movement and perception at the Bauhaus

The belief that breathing and movement exercises should be an essential part of a designer’s education was a defining feature of the early Bauhaus.
This belief did not emerge in a vacuum, but related to ideas that had developed previously in Germany – such as those promoted by German education reformers in the 19th century (Alexander 2017) and by the Lebensreform movement, which became newly relevant in the wake of the First world war (Ackerman 2019, Wick 2019) – and was parallel to other utopian projects from the same period, such as the Loheland and Schwarzerden women’s communes (Neugärtner 2019). These examples, however different from each other, all shared the conviction that the body was central to the development of a new idea of humanity and society.

In the early Weimar period, Johannes Itten in the Vorkurs and Gertrud Grunow in the Harmonisierungslehre proposed breathing and movement exercises to improve psychical and physical capabilities, to activate artistic expression and to achieve a “spiritual enhancement of the body” (Burchert 2019). Both teachers, even if they relied on different theories, saw regulated, rhythmic physical activity as a remedy to the negative effects of modern life, and as a way to find balance and achieve individual development. Inspired by Mazdaznan philosophy, Itten put an emphasis on the three human spheres of body, spirit and intellect (Burchert 2019); thus bodily care and practice were essential as a means to a higher goal, to develop “the human being as a physical, mental and spiritual entity” (Wick 2019).

In 1923, with the arrival of László Moholy-Nagy – who along with Lucia Moholy had already visited the Loheland and Schwarzerden communes – his organic, integrated view of senses and human experience was introduced at the Vorkurs. Moholy-Nagy embraced modernity and technology, but believed that – in order to fully participate in modern life – human beings need to develop an “organic confidence” before approaching specialized education; his belief was that “each human being is gifted” and has the capacity to “participate in all the joys of sensory experiences” (Moholy-Nagy 1929, p. 11). He rejected, as the Futurists before him, the traditional distinction of the five senses (Botar 2014). His exercises addressed visual, spatial, equilibrium and especially tactile explorations (Wick 2019) with an experimental, comparative, rational approach (Alexander 2017). However, these Grundlerlebnisse (elementary experiences) were not aimed at achieving a direct design outcome because “not the object but the human being is the purpose” (Moholy-Nagy 1929, p. 14).

Even if these early examples of the centrality of the body in design education cannot be considered “somatic” the way we intend it here, Moholy-Nagy’s idea of “organic confidence” strongly resonates with the integrated awareness that can be fostered through somatic practices; they also remind us that any real change can only start from the ground up, by giving a new base to our learning and doing; this is in fact what the Bauhaus’ Vorlehre – also known as Grundkurs – was about.
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Training somatic skills for design

Interaction designer Kristina Höök (2018) discusses several aspects of the connection between somatics and design: in her view, somatic practice can both lay the ground for and be an essential part of design research processes. Even if the author’s research originates in the field of Interaction design, I am convinced that many of her theses and proposals can apply to all fields of design. While it is easier to establish a one-to-one correspondence between specific movement practices and their application to interaction design, in other design fields the relation between somatic training and its effects on design projects is less obvious; it can be found, as discussed above, mostly in a different attitude throughout the design process, and in the capacity to deeply relate to others and the environment, which in turn will affect the outcome of a project.

Höök draws on Richard Shusterman’s concept of Somaesthetics – “the critical, meliorative study of the experience and use of one’s body as a locus of sensory-aesthetic appreciation (aisthesis) and creative self-fashioning” (Shusterman 1999) – to invite designers to learn how to direct and deepen their own experiences and be thus able to use them as a source of information in the design process: “learning about your soma is a prerequisite to designing with it” (Höök 2018). The richer and more articulated the experiences we have are, the better we will be able to fully understand and respond to complex design situations.

Albright (2019) describes six states of being that can be experienced through somatic practice: falling, disorientation, suspension, gravity, resilience and connection; these can be seen as different ways to respond to contemporary conditions, such as social uncertainty, attention overload, digital hyper-connection, and disembodiment, which have consequences on the way we design. She also underlines “how perception is a learned behaviour and how intentional practices can structure new ways of thinking” (p. 7).

“Ways to defy the pressure to perform”

The contemporary design context gives us other reasons to turn to somatics for a new grounding. Many of the current narratives about design describe it in an idealistic way, as if it were always a successful process, where designers act as respected consultants providing effective solutions to like-minded clients. These narratives are often reinforced in design education, both in mainstream institutions educating the next generation of corporate designers and in niche schools catering to a smaller audience of independent practitioners.

Reality is often very different, and designers find themselves operating in the midst of complex power negotiations – where economic, political and social powers come inevitably into play in the decision-making process, adding to and interfering with the design process (as it is expected to be). Moreover, young designers often work in a precarious position (Design Census 2019), frequently as freelancers or interns, and feel forced to adapt to a self-

In his aptly titled article *Exhaustion & Exuberance. Ways to defy the pressure to perform*, contemporary art critic Jan Verwoert points out some of the contradictions that haunt the so-called creative professions: “In a high performance culture, we are the avant-garde but we are also the job-slaves” (Verwoert 2008, p. 90). It is essential to counteract the side effects of this unstable position and develop the capacity to stand one’s own ground; in order not to be continuously pushed off-centre designers need to find their own balance and autonomy: “(...) we then face a two-fold challenge: 1. to understand the conditions of our agency in order to enable us to define them according to our own terms; and 2. to imagine another logic of agency, an ethos, which could help us defy the social pressure to perform and eschew the promise of the regimented options of consumption.” (Verwoert 2008, p. 91).

These issues are not entirely new. Moholy-Nagy (1929) expressed similar concerns: “Today’s creative human being knows (and suffers from it) that the deep values of life are being destroyed under external pressure (moneymaking, competition, business mentality)” (p.13). It was extremely clear to him how this suffering was deeply connected to each person’s body, to the “exploitation of his vitality, from the flattening out of his instincts, from the levelling of his biological tensions”.

Somatic practitioners might easily agree with this idea: the body is the place where the problem is most strongly felt, and can therefore offer the path to overcome it, a way to find one’s own agency. Albright (2019), for instance, suggests embracing physical experiences of falling and disorientation as an opportunity to reorient ourselves and rethink our own assumptions. Hanna (1986) describes “somatic freedom” as “a state of autonomy” and “the optimal human state”. To me this means we can develop the capacity to respond to uncertainty without uncritically accepting the conditions that cause it.

**Somatics in design research and education today**

In and outside academia, there are a number of design research projects, courses and workshops that take a somatic or body-centred approach.

One remarkably articulated example is the Somaesthetic Design project that Kristina Höök and her team have been working on at the Royal Institute of Technology (KTH) in Stockholm. Their approach has led to the development of a prototyping and testing method, a teaching curriculum (Tsaknaki et al. 2019) and several interactive design projects, such as Soma Mat, Breathing Light and Sarka (Höök 2018). In spring 2019 I had the opportunity to participate in one of their workshops in Milan. Before and after a session guided by Elisa Ghion, a Contact improvisation teacher, we were asked to record our bodily sensations on specially made “body sheets”; we were then asked to engage in the testing of several interactive
prototypes. The heightened awareness achieved through the initial session allowed us to give a detailed feedback on the quality of interactions, and the shared experience facilitated the exchange of ideas. This way of working also provides a valuable common ground for teamwork, which is key to all design work.

Other cases, just to mention a few examples in Europe, are Riccardo Blumer’s courses at the Accademia di Architettura in Mendrisio, Switzerland, where students practice specific body movements to prepare themselves to design objects around them (Seratoni 2017); Lotte van Gelder’s teaching in several departments of the Gerrit Rietveld Academie, which includes group movement sessions and individual project work (van Gelder 2016); Emma Hoette’s courses at Goldsmiths and other universities; and Amanda Montanari’s “From body consciousness to design praxis” at the Design Academy Eindhoven.

An analysis of such cases would call for separate research and discussion; nevertheless, these are signals of a growing interest in the centrality of the body in design research and education that cannot be easily dismissed.

My position and experience

I myself have been practising as a designer since I was in my early 20s, and I began teaching just a few years later. This early start made my approach dogmatic at first: I tended to rely on established rules that could give me “authority” towards clients, colleagues and students. In my thirties I started a regular dance practice (Release technique and later Contact improvisation) and more recently began practicing the Feldenkrais method.

At first, I thought these activities were only addressed at personal well-being, while designing and teaching were something I did with and for others. Over time, though, the information I acquired through somatic experiences ended up influencing my daily life, my professional activities and my teaching. Once I acknowledged this, I started creating open and informal spaces for movement in my teaching and developing research workshops (outside the academic context) to test somatic activities that addressed design-related themes such as perception of space, relation with others, and collaboration in a group.

These experiments, carried out in 2018 and 2019 and now collected under the name es_design somatics, have provided me with many useful insights that I can use in my teaching and research thanks to the participation of a supportive group of artists and designers.

Somatic practice can also bring visible changes in teaching attitudes, modifying the quality of interactions with students; in my experience it has caused a move away from typical educational settings and hierarchical roles, a clearer positioning and expression of my views, and a greater openness towards the possible outcomes of the projects I propose.

I must admit I feel slightly awkward discussing somatic subjects in the form of an academic paper; without direct experience many of the statements made here may sound abstract.
However, I decided to take up this challenge anyway, in an effort to add my contribution to the existing attempts at including these issues in academic discussion.

**Proposals and conclusion**

Since most educational institutions tend not to be open to radical change, especially to the kind of innovation discussed here, I invite whoever is interested, students or educators, to pursue this field of inquiry independently and informally. Several somatic disciplines, after initial training, can be practiced in self-organized research groups or labs, where participants work together experimenting, developing and discussing “materials” around commonly chosen subjects. The presence of students and educators who adopt a somatic culture and practice will inevitably – albeit indirectly – bring change to the institution itself. Therefore, I believe a somatic turn should not be an individual endeavour but a collective one, going beyond personal well-being to aim at making a wider and deeper impact. As Martha Eddy described in writing about “Social Somatics” (Eddy 2017), this process can have substantial social and political implications: its potential is explored, for instance, in the practice of Generative Somatics, an activist organisation using a soma-grounded approach to social change and trauma healing. In their view, “a politicized somatic theory understands the need for deep personal transformation, aligned with liberatory community/collective practices, connected to transformative systemic change. (...) A politicized somatics can act as a fundamental collective practice of building power, deepening presence and capacity, and developing the embodied skills we need to generate large-scale change” (Generative Somatics 2014). A political perspective on somatics is gaining relevance in the face of the growing attention to racism and other forms of systemic oppression: its use in the context of design is worth further research and discussion.

A somatic attitude based on self- and collective care can be applied in everyday life. Simple questions such as “How do I feel today?”, “What do I need?”, “What happens around me?” and “What does this situation require?” can activate a conscious and sensitive attitude towards any activity to be undertaken during the course of a day. Allowing time for the observation of ourselves, for recognizing the repetitive patterns we often fall into and imagining alternative ones, for connecting to the needs and desires of the people we interact with, are just a few examples of what can be achieved through practice and what can have a positive impact on our learning and doing.

I would like to conclude with the words of Anna Halprin – ground-breaking dancer, choreographer and educator – as quoted in an article on the pioneers of postmodern dance: “Halprin, who early on saw dance as a social corrective and pathway to personal healing, creating community-based work (...) is also attuned to the more minor injustices of modern life. ‘That one’s a graphic designer,’ she said to me of one of the students in her California studio. ‘When else does he get a chance to connect to his spirit? He doesn’t’” (Guadagnino 2019).

It is now up to us to create space for these possibilities to happen.
Postscript

This paper was written and delivered to the Cumulus platform in February 2020, immediately before the first Covid-19 pandemic outbreak in Europe, and the notification of acceptance came in Autumn, at the beginning of a second wave. As with many other aspects of our lives, our habits and practices in both education and the professional world were disrupted. The international community is still working to figure out better methods for communicating and collaborating in the new conditions, and although these collective efforts have successfully supported professional and educational activities, our daily life experiences have lost breadth and depth, and our perceptual reality has been further limited; most of all, many people have undergone traumatic experiences. The current situation makes a somatic approach even more necessary; when being physically close to each other is not possible, adjustments and new strategies will be required. However, there is still a wide space to be explored, with new motivations adding to the pre-existing ones: through somatics, we can find other ways to achieve presence and closeness, and to preserve intersubjectivity.

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