Reworlding: Participatory Design Capabilities to Tackle Socio-Environmental Challenges

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ABSTRACT

Rising societal polarisations around health and climate crises have brought more attention to the close relations between social and environmental challenges. These polarisations triggered an interest in the participatory design (PD) field in developing approaches that enhance connections between diverse actors operating across societal and environmental sectors. However, the capabilities needed for these approaches have not been sufficiently articulated in PD research and education. To fill in this gap, we define 'reworlding' as an operation of self-critique within PD that engages with capabilities needed to reveal and articulate radical interdependencies between humans and more-than-humans, across social and environmental worlds, and within situated contexts. We propose both the redefinition of the design capabilities needed for (re)connecting these worlds (retracing, reconnecting, reimagining and reinstitutioning), as well as a reconsideration of learning environments where these capabilities can be tested and enhanced.

CCS CONCEPTS

• Human-centered computing • Interaction design • Interaction design process and methods • Participatory design

KEYWORDS

Reworlding, Participatory design, Capabilities, Politics, Society, Sustainability

1 Introduction

The 2021 IPCC report provided clear evidence that the climate crisis is rooted in the way societal life is constructed. While increasing societal polarisations became more obvious during the COVID-19 pandemic, public and scientific discourse has not adequately considered how environmental challenges are interlocked with underlying societal dynamics [1] nor how this lack of discourse eventually may amplify societal divisions.

PD researchers are increasingly exploring these questions by enhancing the connections between actors operating in societal and environmental sectors. Since its emergence, PD has focused on weaving connections between societal and technological questions, starting from the participation of workers in designing their workplaces and working processes. Despite the field's growing experience in articulating junctions between societal and environmental 'worlds' [2], the capabilities required for PD approaches to activate connections between these worlds have not yet been fully articulated in research and education. We argue that exploring such capabilities is pivotal in proposing PD approaches at the intersections of social and environmental challenges. Yet, to enable the articulation of those capabilities, we need first to imagine and co-create research and learning environments able to fully engage with this complexity. By building upon theoretical discourses on "worlding" [3], the authors of this exploratory paper frame this search for capabilities within PD as 'reworlding'. In doing so, we refer to Tornel and Lunden's idea of 'reworlding' as being:

> "based on the idea of thinking and designing politics in a world where many worlds fit. This includes notions like terricide, pluriversal contact zones, community entanglements, entanglements of concepts and neologisms that have given birth to a new language and the possibility of imagining something beyond the apotheosis of modernity in the Anthropocene." [4]

'Reworlding' expresses the need to explore how PD can contribute to defining capabilities and settings that might question artificially constructed and mystifying separations between social and environmental worlds. This leads to two questions:

> How can PD contribute to addressing the separation of social and environmental worlds, while reflecting on other forms of understanding of the worlds that have been traditionally left out [4]?

> Can PD achieve this by articulating its capabilities in connecting these worlds, and defining corresponding learning environments that can help tackle their separation?

We will unpack the concept of 'reworlding' to explore its potentials and challenges for PD in defining both reworlding capabilities and learning environments as sites of connecting between diverse worlds through practice-based experience. As this preliminary research has not resulted yet in a systematic field study, the exploratory paper emphasises the literature and the collective problem-framing that we engaged with in conceptualising reworlding in PD through exploratory meetings, workshops and prototypes of training sessions organised between 2019 and 2021.

2 Worlding and reworlding

Authors such as Blaser [5] and Ingold [6] have enhanced attention to the term 'worlding', capturing a particular anthropological understanding of the meaning of ontology (the science of "what is") [7]. This understanding builds on material-semiotics discussions in STS, such as those initiated by Haraway, Law, Latour, Stengers and Mol, which define reality as always in the making by the continuous formation of heterogeneous assemblages involving more-than-human actors. As Haraway [8] articulates, worlding is an active, ontological process, which differs from the idea of a passive encounter with the world: "Reality is an active verb" (Ibidem, 6). Latour [9] shows how worlding requires an engagement with the world as a collective endeavour of coming "down to earth", by asking what are the common matters of concern we need to share and care for. He urges thinking about how to create shared worlds by: (1) working together, also

with more-than-human agents; (2) tackling multi-scalar socio-environmental issues by working in situated ways and (3) by not separating, but assessing social and environmental issues in their entanglements. Issues such as ecological and democratic crises thus need to be addressed by reframing them as complex, interdependent issues. Via the concept of worlding, Blaser explores what a "political ontology" [10] means, when intended as a pluriversal, ontologically inclusive world-making process: "a world (made of) of many worlds" [11]. This idea suggests that there is a multiplicity of ontologies, and calls for explicitly questioning the procedures that intend to create a unique, one-world common world [12], and hence determine its inclusions and exclusions.

In the design field, Fry [13] addresses how design's ontological agency affects diverse ways of being in the world through its world-making agency. This agency is conflicting: by making a world for ourselves, from an anthropocentric position, we also 'world' a world which becomes "gradually inhospitable to ourselves and other species" [14]. Our material environment (e.g. road infrastructures) has been designed in de-futuring [15] ways, fostering unsustainable ways of being and doing (e.g. car dependency) and excluding or silencing less powerful (human and more-than-human) actors. In line with the idea of political ontology, design disciplines increasingly engage with ontological [16], non-anthropocentric and more-than-human perspectives [17] [18], foregrounding other worldviews and marginalised positions [10] [19] [20], challenging one-world models of development and growth.

3 Reworlding: Situated approach to redefining capabilities

By stressing the re- in 'reworlding', we underline the ambition expressed by feminist, postcolonial and design scholars to move beyond an anthropocentric, Eurocentric and patriarchal position. In doing so, we echo Escobar's thoughts on "redesigning the world" [16], using the prefix of 're' to indicate an act of reweaving diverse models of worlding to understand how 'worlds' come to be as separate. Our intention is to embrace – in line with the conference theme - diverse cosmologies by elaborating on possible socio-environmental implications of worlding in the field of PD in pluriversal ways [12].

Designers can engage with situated [21] learning environments explicitly attending to weave back connections between the societal and environmental. In these situated environments, they can work to stress relationality by connecting humans and more-than-humans in a situated context (what we have previously called 'ontologising' [22]). Such an engagement, focusing on stronger (re)articulations of the radical interdependencies [10], needs to be taken up together with specific actors who are already tackling the intersections of social and environmental challenges. Thus, with reworlding, we refer to embedding PD activities into local networks and collaborations formed around existing and emerging socio-environmental challenges. Hence, reworlding entails "infrastructuring" activities [23] by taking place within 'socio-environmental infrastructures gathering humans (individuals, collectives, communities), as well as more-than-human actors (e.g. plants, viruses, energy resources). We propose that, by engaging with such infrastructures (for example, local food cooperatives or rainwater collection facilities), we can reimagine situated research and learning environments based on the collaborations of actors who design, co-create and maintain these infrastructures. In order to retain the transferable aspects of these situated environments, relevant for other PD experiences, we try to distil the specific capabilities which are formed in practice-based experiences of weaving ties between societal and environmental issues. Hence, we explore reworlding by: (1) reimagining research and learning environments as sites of tackling the separation of worlds, where capabilities can be tested and enhanced and (2) based on these situated experiences, we propose the redefinition and articulation of design capabilities for connecting between societal and environmental worlds.

This exploratory paper focuses on the reworlding capabilities. In our proposal for reworlding, the capability approach [24] [25] offers means to distinguish skills, competencies, experiences, and insights, underlying the need for collective participation in designing socio-environmental transition trajectories by foregrounding

democratic deliberation on redistributing resources by converting them into capabilities, via a public and collective definition of shared objectives [26]. Further, Bonvin and Laruffa [26] for instance discuss the value of connecting the capability approach with ethics of "care" [27] [28] to articulate capabilities in terms of caring for the world. As collective means of taking care of the world, capabilities entail the abilities of an organisation or a system to self-organise and sustain itself [29]. These capabilities are developed when approaching PD as a situated research and learning context while acknowledging the autonomy of participating groups [10] [30]. In the context of socio-environmental challenges, learning from these theoretical insights, we understand PD as a collective design process able to strengthen the reworlding capabilities of a person, group, organisation, or institution to explore a set of issues, relationships, options, and goals as means towards socio-environmental change.

Through literature review, we observed how various capabilities have been articulated in discussing socio-ecological innovation and nature-inclusive PD, for example through co-creation methods facilitating knowledge mobilisation between actor groups [19], that support bio-inclusive decision-making by acknowledging more-than-human actors [31], and that enable making assumptions about socio-ecological actors more visible in design processes [32]. Furthermore, it is becoming increasingly clear that PD capabilities are not merely about facilitating processes with particular sensitivities and ethics, but also require "skills to translate among strategic, mundane, method and design domains, and being aware of how they qualify and permeate each other in order to achieve results." [33].

Below, we describe how a workshop at the Nordes 2021 conference helped us in advancing insights into what reworlding might mean in terms of articulating design capabilities. We collectively outline the design language of PD capabilities by starting from the participants' situated PD experiences, grounded in existing and emerging socio-environmental infrastructures.

4   Lessons from a workshop

During the past two years, the authors of this paper (a group of thirteen researchers connected to seven institutions) gathered around an interest in design capabilities for reworlding by organising internal and external workshops and prototyping training activities at their institutions. The workshops engaged in co-defining reworlding capabilities while simultaneously scaffolding settings for research and learning environments. Due to the limited space in this paper, we focus on the Desis Philosophy Talk workshop at the Nordes 2021 conference as an activity that brought together our insights on reworlding and helped co-define capabilities through a discussion with a larger group of PD scholars.

In this workshop, a group of 40 PD researchers reflected on the concept of reworlding and our proposal for PD capabilities. We started with an introduction to the philosophical framing of reworlding. To make this grounding more tangible, one of the organisers referred to a case study - a project related to designing with water - which she used to probe how capabilities can translate into design practice. The challenges of connecting the social and environmental issues in this project were evident in the mediation between the neighbourhood residents, water companies, and non-human actors (water infrastructures and the species they gather). For example, in designing for activities such as water infiltration or depaving, the project tackled the separation of these actors' worlds by searching for a water language that could mediate between a multicultural neighbourhood and water experts to challenge the dominantly technical perspectives on water issues.

Afterwards, the organisers introduced a position statement on one specific capability translating the proposed philosophical grounding into their own socio-environmental PD practices. These articulations were the starting point for discussions with workshop participants in five parallel working sessions. The participants were asked to bring their own case study tackling socio-environmental challenges. After short individual

statements, the groups discussed their experiences from the perspective of 'reworlding' and 'capabilities', exploring connections to the position statements or proposing a different approach challenging them. We exchanged experiences about the following design capabilities:

> 1. Re-discovering, through situated encounters, collective ways of doing and caring in existing socio-environmental infrastructures;
> 2. Re-connecting these existing ways of doing and caring at specific locations by co-designing translation objects between them;
> 3. Re-imagining caring relationships by improvising and experimenting with situated infrastructures and how they are designed;
> 4. Re-institutionalising them by working across scales, communities and institutions to co-steer and challenge planning and policy; and
> 5. Proposing and practicing an ethics of care to continuously ensure that these capabilities support not only equality and inclusivity, but also challenge the underlying logic of power relations.

The goal was to formulate questions for redefining these capabilities based on the participants' case study experiences, which we summarise in the following critical reflections.

5 Critical reflections on the workshop

After the workshop, the delineation of design capabilities was transformed from five into four relevant directions: retracing (observing socio-environmental infrastructures), reconnecting (connecting between actors across sectors), reimagining (co-designing infrastructures that activate reworlding) and reinstitutioning (embedding the research into larger infrastructures). The capability of practicing an ethics of care was instead considered as a meta-capability, as it is inherent to all other capabilities. The 're' prefix was kept as an indication of our alignment with afore-mentioned Escobar's call for reworlding as 'redesigning the world'. In this section, we further elaborate on how the workshop shaped the definition of these four clusters of design capabilities, and helped us further problematise the learning environments they require. To make more tangible the translation of capabilities into design practices, we will refer once again to the introductory case study on designing with water. Every capability will also be introduced with quotes from the workshop participants.

5.1 The retracing capability

Participant 1*: This capability should also refer to designing as making the field more accessible to participants and to the others.* Participant 2*: I understand this capability as a way of supporting the infrastructure of tracing and retracing, of collecting and sharing data.*

The term tracing replaced words like "discovering", to underline decolonial reflexivity, namely that we as researchers do not discover the world, but rather engage with the traces of multiple worlds. Tracing refers to the ways in which we surface knowledge about human and non-human ways of doing and caring for socio-environmental challenges. Retracing was seen here as an essential first step of reworlding design and learning environments [34], foregrounding a critical reflection on how traditional ways of observing, describing, and explaining are inadequate for dealing with the enormity of factual information about our current socio-ecological crises. In addition, this information comes with affective and emotional responses [35]. Retracing is therefore considered as an acknowledgment of the need to describe and make visible the interdependencies we have ignored so far. It engages with the capability to unlearn the fictional boundaries that come with divisions and privileges (e.g. those knowledgeable of ecological challenges and those who resist this knowledge) and that lead towards socio-ecological separations and imbalances (e.g. between people from

different socio-economic backgrounds or different regions). The workshop participants made a plea for advancing approaches of careful observation within ethnographic methods in anthropology and sociology, by engaging with shifting and multiplying viewpoints of diverse actors and developing new sensibilities and frameworks for seeing the world. For example, in reflecting on our introductory questions about how we can trace challenges together with non-human actors, such as water - we propose how design capabilities can start from tracing different cultures of living with water that challenge anthropocentric assumptions on how water should be used in the house or garden. This can support designers to collectively rethink our ways of being with others (be it viruses, climate immigrants, or neuro-diverse individuals) or to visualise different views on matters of socio-environmental concern.

5.2 The capability of reconnecting actors

Participant 1: *We need to develop capabilities of 'sketching together' as a matter of bridging views.* Participant 2: *There is a great importance of learning to listen, and asking: do we have the 'right' ears? Perhaps actors - like water - are not silent, but it is us who cannot hear them.* Participant 3: *We also need to start acting as bricoleurs: can we use bricolage to reconstruct and reconnect experiences?*

While increasingly seen as key to addressing socio-environmental challenges, connections between expertise and social groups are considered difficult to achieve because collaboration is hindered by differences in practices, structures, cultural assumptions and struggles. The concept of 'translation' [36] was proposed as a way to inform interventions that aim at reconnecting different societal actors to address a common challenge. In these processes, a key role is played by translation objects (a shared project, a document, a vision) which materialise a possible understanding of an idea and the practices, structures and relationships it entails [37]. Reconnecting, as a capability, implies the need to develop a shared understanding of how and why actors develop their specific positions in relation to an issue and to each other, how intentionality, contingency and power are at play in shaping the way ideas are translated across people and groups (Ibidem). This understanding can be used to redesign the paths for involvement (action, advocacy and representation) of different actors gathering around a common challenge. As workshop participants indicated, delineating design capabilities (e.g. addressing equality in reconnecting) requires focusing on how PD can help us grasp different understandings of socio-environmental transformation, negotiate the diverse approaches, and reflect on the valorisation and relevance of this transformation [38]. For example, coming back to the case study of water in multicultural neighbourhoods, reconnecting by engaging with diverse cultures of water can take place by articulating how these diverse cultures contribute to a more-than-human design approach. As one of our participants notes, we need perhaps to listen to the water rather than claim that it is silent - and listening with different ears can contribute to a more multifaceted understanding of water as a non-human actor. The challenge with a capability approach is, as Bonvin and Laruffa [21] suggest, how to critically negotiate the focus of this approach on individual freedoms, which is often in contradiction with principles of sustainability. Another challenge resides in how to expose power dynamics and deal with the resistances that emerge when relations of domination and positions of privilege are tackled [39], to explore ways of reconnecting that ensure just and not only sustainable transitions.

5.3 The capability of reimagining reworlding infrastructures

Participant 1: *How do we deal with radicalised positions in reimagining more open infrastructures? How do we maintain openness under limited resources - e.g. lack of finances?* Participant 2: *We should not claim a utopian position of neutrality.* Participant 3: *How can we design spaces that can respond to diversity and include different species, where they can represent themselves?*

The participants in this group were concerned with how capabilities that build upon tracing diverse worlds and connecting different worldviews, can help reimagine situated socio-environmental infrastructures. How can existing infrastructures bridge beyond physical, digital and disciplinary borders? How can we - by engaging with these infrastructures - address societal polarisations at the local level? How can we collaboratively give shape to novel spatial and organisational conditions for sharing knowledge, orchestrating solidarity and situating innovation through collective imagination? The capability of imagination was closely connected to a situated engagement with and appropriation of socio-environmental infrastructures. A particular challenge that was detected in considering design approaches to socio-environmental challenges through the lens of the capability approach, is that this approach still positively views and values economic growth [26]. To address this, the capability to reimagine the world and its infrastructures needs to be organised around other values beyond economic growth, foregrounding the potentials of collective imagination to devise different forms of organising socio-environmental relations. As suggested in the workshop, there is a need for thinking about how designed spaces can support the representation of diverse actors and move beyond traditional expectations of linear progress in the built environment. For example, coming back to water as an actor, design practices of depaving articulate the needs of diverse species by opening the ground and shifting attention to water infiltration as a design focus. At the same time, these practices, by removing and undoing the built, reimagine traditional expectations of what it means to build by design, and how design materialises ideas of growth.

5.4 The capability of reinstitutioning

Participant 1: *We should not think of institutions as monoliths - they are complex, there are different hierarchies at play, as design researchers we may still lack the language to speak about this complexity.* Participant 2: *Doing things and making them practical can also open space for crossing boundaries between established institutions. How can we exercise this through temporary interventions?* Participant 3: *How can institutioning engage with different cultures of institutions, their temporalities, patterns of stability and negotiation?*

The participants underlined that the efforts oriented towards reworlding - enhancing dialogues between worlds to tackle socio-environmental challenges – need to entail dialectical relations with institutions. These efforts span from the grassroots construction of new institutions to the engagement with existing ones, and should account for the negotiation of new arenas for collective action, in-between institutions and communal initiatives. These complex sets of interactions yet question, translate and reconfigure the directions for collective ambitions and practical actions that can be taken. How can we identify, discuss and develop specific institutioning approaches that may ensure the wide dissemination and application of reworlding strategies? According to the participants, in this context reworlding capabilities should respond to the need to integrate conversations between worlds (the multiple ontological and more-than human perspectives) into long-term networks, institutions and policies for socio-environmental transition, such as the EU Green Deal and the New European Bauhaus, but also critically address these vehicles. For example, how does water enter institutional talks? Water companies often perceive water issues and transformations from a technical viewpoint of infrastructural maps and plans. PD can help shift their perspectives by introducing the multi-species conversations, e.g. by articulating the micro-ecology of rainwater collection which includes diverse actors and species (e.g. the smell of the water or the insects it gathers) that these companies initially might disregard as irrelevant.

6 Conclusions

This paper presents a first screening of literature and workshop results to articulate reworlding capabilities and their learning environments. This initial exploration was not a straight-forward path, and leads to many questions that can be further addressed by the PD community. Nevertheless, this workshop and training

activities helped us scaffold temporary learning environments for reworlding capabilities and engage with the fieldwork experience of how such environments are already built around socio-environmental infrastructures. Together with different actors, we reflected on a variety of questions relevant for reimagining PD capabilities and reconsidering environments needed to foster these capabilities and their (cosmo)political values. Are capabilities the right approach to redefine our learning environments, so that we can tackle socio-environmental challenges? How can we make sure that these capabilities contribute towards environments apt to engage with the political and power dynamics? Finally, how can we avoid capabilities to be instrumentalised or standardised?

Translation of capabilities into practice through design research is supported by tools, instruments and guidelines. Some workshop participants were worried that the approach of capabilities might become linked to a belief that, in a design process, these capabilities can be clearly distinguished from each other. To avoid such instrumentalisation and support (cosmo)politicisation, two aspects appeared to be important. On the one hand, the attempt of categorising capabilities needs to support the formulation of a set of conditions that might help embrace complexity into a political ontological approach of reworlding. We learnt that by framing the development of capabilities as a situated practice, those cannot be disconnected from the actors and spaces they engage with. In that sense, allowing for the capabilities to be rearticulated and reiterated in encounters with each situated learning environment can help in nurturing their critical potential. On the other hand, situatedness does not exclude the possibility for learning from each other and our different contexts. The separation of capabilities should be considered as a working method that helps translate a reworlding approach into educational purposes and learning environments. In summary, devising capabilities for transferring without sacrificing their situatedness, while strengthening relations between different learning environments, presents a challenge for reworlding to be addressed in the next steps of this study.

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