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Social dreaming together: A critical exploration of participatory speculative design

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ABSTRACT

While often seen as an elitist practice found only in artistic and academic circles, speculative design has grown in popularity and is now practiced in more diverse contexts and with a variety of participants. In order to gain a better understanding of this ostensible 'participatory turn', this paper presents an initial exploration of participatory speculative design based on a pilot survey of recent projects. Using a sample of projects we develop an 8-step hierarchical taxonomy of participation in speculative design that moves from 'spectatorship' to 'reflection', 'inspiration', 'generative reflection', 'shared creativity', 'shared authorship', 'initiative' and, finally, 'ownership'. The taxonomy helps to raise important questions about the character and outcomes of participatory speculative design processes and the role played by designers as agents of the public imagination.

CCS CONCEPTS

• **Human-centered computing** → Human computer interaction (HCI); HCI theory, concepts and models; Interaction design; Interaction design process and methods; Participatory design.

KEYWORDS

Design methods, Speculative design, Participatory design

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1 INTRODUCTION

Speculative design employs design as a platform for imagining and creating alternative sociotechnical narratives that challenge our current relationship with reality, opening up discussion and debate about current and emerging issues [3, 21, 29, 37]. In two decades, it has moved from the fringes to the mainstream of design theory and practice. Featured in academic research (as of January 7, 2022, the term retrieves 596 results on the ACM's digital library), discussed in a series of distributed, global informal meetings (Speculative Futures), constituting a category of Core77 awards, featured as a theme for an annual conference (Primer), and practiced by large corporations such as Google and Deloitte and even the European Commission, speculative design has become an influential way of thinking about the intersection of design and futures [39, pp.76-8]. This is for good reasons. The ascent of speculative design reflects growing concerns about the future – from climate change to illiberal democracies, viral outbreaks and 'out of control' technology – and about what Tony Fry [25] calls "defuturing": design's complicity in self-destructive political, economic and environmental programmes. In and through speculative design, designers have found an attitude and approach with a corresponding set of examples with which to critically identify and communicate alternatives to the status quo, while helping to overcome what Amitav Ghosh [27] diagnosed as our collective "poverty of the imagination".

At the same time, the growing popularity of speculative design – appearing in domains as diverse as healthcare, education, and even the military – means that it is practiced in ways that push its limits and, to some extent, redefine its meaning. It has come under attack for the narrowness of its critique [42, 47, 53], for being the exclusive domain of designer-artists or designer-auteurs [37, 57], for pandering to commercial interests [44, 62], and for advancing "market-based futures" [57] and thus functioning as yet another form of value addition-by-design

Such criticisms notwithstanding, one of the most significant ways in which speculative design has changed over the past decade is its opening up to more participatory modalities. But in what ways? In this paper we start exploring this question first by providing a brief review of the shifting landscape of speculative design, and then by presenting the results of a pilot survey of participatory elements in a sample of speculative design projects. This allows us to provide a more nuanced picture of participation in speculative design, while beginning to identify and explicate the kind of challenges faced by designers who wish to extend speculative design as both a participatory and a critical endeavour.

2 OUT OF THE "SHOWROOM" AND INTO THE "FIELD"

Whether or not speculative design has undergone a full blown 'participatory turn', speculative designers are increasingly turning to participatory modalities and co-design techniques to enrich their work. And when taking into account the increasing diversity of the domains in which speculative design is practiced, we can say, in the terms proposed by Ilpo Koskinen and colleagues, that speculative design has ostensibly moved out of the "showroom" and into the

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"field" [33]. Although the designer's authority or auteurship over the outcome may be reduced when including others in the design process, what others have called participatory speculative design (or PSD in short) [7, 16, 32] addresses the normative 'elephant in the room': if speculating about the future liberates the imagination with potentially emancipatory implications, why should that task remain exclusively at the hands of designers? Given the deeply political nature of both design and futuring [37], shouldn't designers seek to engage a more diverse set of stakeholders [61], and in particular the communities most affected by the issues being explored [26, 40, 58]? Apparently Dunne & Raby were aware of the problem when they asked, "why the real is 'real' and the unreal is not; who decides? Is it market forces, evil genius, chance, technology, or secret elites?", to which they answered, "The days of designers dreaming on behalf of everyone have passed" [21, p.164].

As we illustrate in the next section, Dunne & Raby's confident assertion may have been premature, but over the last decade speculative designers have brought into their processes government officials and bureaucrats, businesses, the military, nonprofits and members of civil society at-large. While there seems to be a natural fit between speculative design's future-orientation and what some have identified as the utopian impulse of participatory design [11, 45, 52], the reasons given by designers for including non-designers in their speculative design processes are often normative and/or pragmatic. For example, some designers wish to amplify the voices of marginalized groups so "that those who are most impacted by a future outcome should have a say in shaping that outcome" [40, p.2; see also 1, 14, 26, 28, 55]. Others seek to challenge dominant narratives coming from privileged points of view [26, 41]. Some speculative designers note that engaging non-designers affords the process a more grounded, situated or local-specific quality [6, 16, 58], or helps to instigate social debates on the future as part of a mutual learning process [20, 23]. Whether PSD processes aim to equalize power relations or to spark mutual learning, we can say that while non-participatory forms of speculative design remain focused on the quality of the designed artefacts [57], PSD shifts the focus from artefacts to process, and as such, demands new ways to evaluate its integrity and impact.

As one may expect, moving into the "field" does not come problem-free. Speculative designers wishing to engage in more participatory practices report difficulties in reaching appropriate groups and securing the 'right' kind of participants [6, 14, 17, 26, 36], figuring out which moments are most effective or appropriate for including participants in the process [18, 60], and wrestling with the consequences of working with stakeholders that may not be receptive to the more radical consequences of design speculations [4, 44, 64]. The last issue being the exception, these difficulties are not limited to PSD and have already been raised by participatory designers [45, p.5 see also the contributions to section 1 in 45], and by scholars of public participation in science and environmental policy [15]. That said, some of the challenges faced by PSD emerge from its specific characteristics and practices. The next section provides an initial exploration of the ways in which participation is enacted in PSD projects. Our intention here is not to provide a comprehensive survey of PSD or assess its outcomes, consequences or deeper impacts, but to distinguish between different claims about participation in speculative design and therefore indicate some of the specificities of designing speculatively with others.

3 THE VARIETIES OF PARTICIPATION IN SPECULATIVE DESIGN

3.1 Project selection and mapping

In order to start mapping the different ways in which speculative design projects are participatory we set our sights on projects that self-identified as speculative design[1], that explicitly claimed to include non-designers in the design process, and that provided sufficient documentation to support our inquiry. Importantly, our intention was not to survey the entire field as a whole but to offer a starting point for considering the different types and degrees of participation currently deployed by PSD projects, roughly following what Snyder [48] calls an integrative review. Projects were sourced from academic publications, non-academic reports and white papers, published before 2022, using the combination of search terms "participation" or "participatory" and "speculative design". In addition, we surveyed Tharp & Tharp's [54] comprehensive collection of speculative design projects, SpeculativeEdu's selection of case studies and recent publication [38], and the archive of Core77 Design Awards in the speculative design category (up to and including 2021). Finally, a call for projects was made in the Speculative Futures Slack group to source projects that might otherwise be difficult to find. In total, we analyzed 66 projects (see Figure 1).

Surveyed projects span nearly two decades (from 2003 to 2021), but most projects took place over the last decade (59 out of 66 or 89%), and especially since 2015 (51 out of 66, or 77%). Most of the projects were undertaken in Europe and North America (55 out of 66 projects, or 83%), with a few projects taking place in India, Pakistan, UAE, Australia, Singapore, Malaysia, Mexico, Chile, Peru, Cuba, Colombia and Ethiopia (11 out of 66, or 17%). There was a nearly equal number of studio projects (34 out of 66, or 52%) and academic or educational projects (32 out of 66, or 48%), with studio projects being commissioned by commercial, cultural or non-governmental organisations (11 out of 34, or 32%), by governmental or public institutions (9 out of 34, or 26%), or self-initiated by the designers (14 out of 34, or 41%).

To understand the different ways PSD projects approach participation we coded our selection twice. First, adopting a deductive approach, we analyzed projects and clustered their forms of participation according to established frameworks (relying mainly on Arnstein's foundational 'ladder of participation' [2], but also with an eye on the IAP2's 'spectrum of participation' [31] and Pretty's 'typology of participation' (as illustrated in [17])). After noticing that existing categories of participation did not fully capture the nuances of the projects we surveyed – for instance, the forms of creativity found in PSD processes could not be easily reconciled with the emphasis on decision-making that characterizes existing, public engagement frameworks – we used an inductive approach to revise the categories and then re-coded the projects. In all, we

[1] This is in contrast to the more permissive but therefore less precise approach taken by Mitrović, Hanna & Helgason, who included in their survey of speculative design "all related discursive and experimental approaches in the field of design, which are focused on re-thinking the practice, and which are situated outside the mainstream design world" [39, pp. 73-4].

Name	By	Date	Spectatorship	Reflection	Inspiration	Generative Reflection	Shared creativity	Shared authorship	Initiative	Ownership
Bio Jewellery	Thompson et al.	2003				X				
Evidence Dolls	Dunne & Raby	2005				X				
Material Beliefs	Kerridge et al.	2006				X	X			
Afterlife	Auger Loizeau	2009		X						
Power of 8	Superflux et al.	2009	X				X	X		
Cities Unlocked	Superflux	2010			X		X	X		
Growbot Garden	Disalvo et al.	2010	X		X		X	X		
Designing Policy	Forlano & Matthew	2012		X		X	X	X		
Drones for Foraging	Disalvo et al.	2013				X				
The Welsh Space Campaign	Hefin Jones	2013	X		X	X		X		
Liveable Cities	Pollastri et al.	2013					X	X		
Man & Interior	Pantopicon	2014	X	X						
The Drones Postbox	Davoli & Redström	2014			X					
Metadating	Elsden et al.	2014				X				
Shaping Future	Heidingsfelder et al.	2014		X	X		X			
Senescence: Future of Ageing	Strange Telemetry	2015		X						
The Case of Quantified Cats and Dogs	Lawson et al.	2015		X						
Protopolicy	Design Friction	2015		X	X	X	X			
The Yarn Sessions	Luiza Prado O. Martins	2015				X	X			
Disobedient Wearables	Design Friction	2015		X			X	X		
The Patient Empowerment Kit	Knutz et al.	2015		X			X	X		
Telling the Bees	Maxwell et al.	2015				X	X	X		
Urban Hacking: Outside Rooms	Hojman, A. et al.	2015			X	X	X	X		
The Illegal Town PLan	Ward & Loizeau	2015			X	X	X	X		
Mangala For All	Superflux	2016				X				
Abacus Datagraphy	Elsden et al.	2016				X				
Stop Nigmas	Sandjar Kozubaev	2016	X	X		X				
Heterogeneity in Indigenous Nation Building	Akama et al.	2016			X	X				
Speculating on the Future of Rail	Strange Telemetry	2016		X	X		X			
Global Futures Lab	Cardini & Paniagua	2016	X		X	X	X	X		
On Some Other Worlds	Ann Light	2016		X	X		X	X		
The Future Energy Lab	Superflux et al.	2017		X						
Heartbeats	Eriksson & Hansen	2017			X					
Evidencing Humanitarian Futures	Superflux & Changeist	2017		X	X					
Driverless Governance	Leile et al.	2017				X				
Broadening Horizons	Schroth et al.	2017		X	X		X			
Transition Habitats	Extrapolation Factory	2017		X		X	X			
Parlour of Food Futures	Markéta Dolejšová	2017				X	X			
The Newton Machine	Reconstrained Design Group	2017	X			X	X	X		
Sankofa City	Baumann et al.	2017		X		X	X	X		
Maslow's Palace	Beattie et al.	2017			X	X	X	X		
Futures Visions GSS	Angheloiu et al.	2017				X	X	X		
Office for Bureaucritic Imagination	Lui & Tassinari	2018				X	X			
Mantis Systems	Superflux	2018		X	X	X	X			
Futures of Public Safety	Alix Gerber	2018			X	X	X			
Notes from The Sea	Renee et al.	2018				X	X			
Designing a City of Lies	Søren Rosenbak	2018	X		X	X	X	X		
PDFi	Nägele et al.	2018			X	X	X	X		
Mitigation of Shock (London)	Superflux	2019	X							
Mitigation of Shock (Signapore)	Superflux	2019	X		X					
Urban IxD	Stals et al.	2019			X					
Extreme Biopolitical Bistro	Dolejšová et al.	2019				X				
Grow Your Own Cloud (GYOC)	Seyfried et al.	2019		X	X	X				
What If Health	Design Institute for Health	2019		X	X	X				
Designing an Internet of Dogs	Hirskyj-Douglas et al.	2019				X	X			
Metro Test Zones	Extrapolation Factory	2019		X		X	X			
Futures for the defense of human rights	Gonzalez et al.	2019		X	X	X	X			
Bespoke Booklets	Desjardins et al.	2019		X	X	X	X			
HUM 2035	Quicksand et al.	2019	X	X	X	X	X			
ImaginAging	Tsekleves et al.	2019		X	X	X	X	X		
Africatown Activation	Tran O'Leary et al.	2019			X	X	X	X	X	
Composting Plastics	Lindström & Ståhl	2020				X				
Speculative Design for eductation	Khan et al.	2020				X				
Giving Voice to Silent Data	Wirfs-Brock et al.	2020				X	X	X		
Eliciting Tech Futures Among Black Young Adults	Harrington & Dillahunt	2020				X	X	X		
Climate Futures	Extrapolation Factory	2021					X			

Figure 1: Project collection mapped along the engagement levels.

Deep ↑ ↓ Shallow

Level of Engagement	*Category of participation*	*Description of participation*
Leadership	Ownership	Non-designers maintain ownership over the process by shaping goals, procedures, outcomes, and dissemination.
	Initiative	Non-designers initiate the speculative design process and have the opportunity to influence its direction.
Collaboration	Shared authorship	Non-designers produce the speculative designs alongside the designers.
	Shared creativity	Non-designers brainstorm with the designers before and/or during the design process.
	Generative reflection	Non-designers respond to speculative designs during the design process, and their comments feed back into the design.
Involvement	Inspiration	Non-designers inspire designers before the speculative design process begins.
	Reflection	Non-designers discuss the finished speculative design with designers after viewing or interacting with them.
Non-participation	Spectatorship	Non-designers view or interact with the finished speculative design.

Figure 2: Levels of engagement and categories of participation listed from "deep" to "shallow".

suggest 8 categories of participation along 4 levels of participation: spectatorship, reflection, inspiration, generative reflection, shared creativity, shared authorship, initiative and ownership (see Figure 2). The categories are discussed below according to the influence non-designers can have in the process – from non-participation to involvement, collaboration and finally to leadership. This range is supported by the belief that in a more "genuine" participatory process [12, 43] participants are enrolled as partners with a stake in the process and its outcomes, and with a share of decision-making power.

One important limitation of the analysis is that it focuses solely on the type of engagement. While the categories of participation provide an indication of how participation was approached, the analysis does not specify who was invited to participate (aside from being non-designers). Further, like in other participatory design projects [17], some of the projects we mapped engage non-designers in more than one way, and thus exhibit more than one level or category of participation. For example, the project 'Sankofa City' [6] engaged an initial cohort of students and local residents of Leimert Park, Los Angeles (California, USA) in brainstorming hypothetical scenarios and concepts (satisfying the shared creativity category), leading to the production of initial prototypes and speculative artefacts (satisfying the shared authorship category), and ending with a final public presentation at a local stakeholders planning meeting (satisfying the reflection category).

3.2 Non-Participation

When non-designers act as audiences that view, and possibly interact with finished speculative designs (be they narratives, artefacts or environments) they act as spectators. The communication between designers and non-designers is one-directional: designers present their work to be experienced by audiences, and whatever impact the work has on the audiences does not feed back into the design process. For this reason we do not consider spectatorship to be a form of participation at all. We note it here, however, to help establish a baseline for comparison with deeper types of engagement.

The immersive installation 'Mitigation of Shock' by the design studio Superflux [51] is a good example of the spectatorship category. The immersive installation was created to "make the size and complexity of a hyperobject like climate change tangible, relatable and specific", inviting visitors to "step into a familiar space to confront our fears and find concrete ways to mitigate the shock of climate change" [51]. The designers created two immersive exhibitions, first in London and then in Singapore, showcasing a future apartment adapted to life in a future affected by climate change (set in the year 2050). All elements in the apartment maintain diegetic consistency: a radio broadcast playing in the background and stacked newspapers provide a sense of the events that took place, while experimental food production facilities and recipe books propose tangible strategies for coping with a changing world.

While processes of cognition and meaning-making are certainly active, and forms of interaction with speculative installations are becoming more and more sophisticated, visitors to installations such as Mitigation of Shock have no influence on the design of the artefacts nor on the futures they communicate. In this sense, even when speculative designs are exhibited outside of galleries or museums, if all they offer audiences is the opportunity to be a spectator they remain within the conventions of the "showroom" [33].

3.3 Involvement

The next level of engagement, involvement, includes two subcategories: reflection and inspiration. Here designers include non-designers in the design process but usually without any guarantees that non-participants would actually influence the design itself. This second level can be compared to what other participation frameworks refer to as "Participation by consultation" or simply "consultation": participants are invited to provide feedback or answer specific questions posed by designers, while the latter retain the power to decide whether or not to take into account what they hear [17, 24]. As Andrea Cornwall [17] puts it, "Being involved in a process is not equivalent to having a voice" [17, p.278].

In the category we call reflection, designers actively elicit non-designers' responses to the speculative design, usually at the end of the design process. Non-designers are effectively enrolled into the critical space opened up by the speculative narratives or artefacts. Take for example 'The Case of Quantified Cats and Dogs' by Shaun Lawson et al. [34], where the designers created a dedicated focus group with experts and the general public to discuss the implications of connected devices for pets. Reflection, in this mode, was neither optional nor seen as an appendix to the design process but an integral part of it; it was elicited and used deliberately to inform an open debate. Non-designers were given a voice – even if only in a specific time and place.

Reflection can also be part of research, positing PSD as a form of research-through-design processes [50, 65]. The insights gathered from non-designers' reflection on the speculative artefact or scenario can then be used to inform another design process, or in the case of Strange Telemetry's 'Senescence: Future of Ageing', to inform public policy [60]. In this example, which according to the authors represents the first time speculative design was used in UK government policymaking processes, the design team ran three workshops with elderly citizens using rendered images of possible future scenarios to facilitate reflection on issues of transport, work and services, "acting both as a form of public engagement and a means of capturing public responses – enthusiasm, reluctance, insight – in a way which is legible to policymakers" [60, p.10].

Non-designers can also be involved in speculative design as sources of inspiration. This mode of participation often takes place at the initial stages of the design process, and is exemplified in the project 'Urban IxD: From Ethnography to SD in the Hybrid City' by Shenando Stals et al. [49]. In this project, designers conducted 8 interviews using a walking and talking method to gather participants' emotional relationships with specific urban places in Edinburgh. This data was then analyzed and used by the design team to create a future scenario and speculative artefacts. While the experiences shared during the walking interviews shaped the design direction – in a departure from reflection and spectatorship where major decisions were already made – participants did not have any influence or decision-making power over how this data was used and how it was translated into the future scenarios and resulting artefacts. The designer, on the other hand, takes the role of curator. Although the designer may not impose their own ideas of the future on others, they still retain decision-making power when curating the narratives and thus reinforce the designer/non-designer power dynamic. While inspiration tends to take place during the early stages of the design process and therefore has the potential to inform the speculative design in meaningful ways, there are no guarantees that non-designers' involvement will actually influence the design.

3.4 Collaboration

When non-designers are given a more meaningful creative role in the design process and therefore wield a higher degree of influence over the design outcomes, we can see their participation as a form of what Arnstein [2] calls "collaboration". In this level we identified three categories of participation: generative reflection, shared creativity, and shared authorship.

In the category we call generative reflection, designers seek feedback from non-designers during the design process as a way to evaluate or validate what has already been done. The key distinction between this category and the aforementioned category, reflection, is the explicit intention to integrate the feedback into the design process. Moments of generative reflection usually take place in-between phases of ideation and materialization, and reflect a speculative design process's iterative character. In the project 'Futures of Public Safety' [26], for instance, non-designers helped designers select three alternative scenarios of public safety for further development. After the designers developed the scenarios into more detailed situations, non-designers were invited again to "occupy the scenes, take on the role of someone responsible for public safety, and consider which elements of the world they want to bring back to the present, and which they hoped would never happen" [20, p.3]. The inclusion of non-designers in the speculative design process allowed for the creation of a shared language with which different perspectives could be expressed in and through the design outcomes.

In the next two categories, shared creativity and shared authorship, non-designers move from testing or evaluating the creative ideas of designers to actually (co-)forming them. Here, non-designers not only share their experiences but contribute with their own knowledge and skills. Instead of helping designers to select among pre-existing choices they help to create those very choices [13].

In shared creativity, non-designers take part in brainstorming activities, most often during early stages of the design process. In the project 'Bespoke Booklets' [19], for instance, the designers invited non-designers to first reflect on speculative concepts created by the design team and then to imagine and ideate their own speculative IoT concepts. In this mode, generative reflection turned into shared creativity. That said, although shared creativity signals increased agency for non-designer participants, it has limitations. Tsekleves et al. [59] point out that while non-designers may participate in

brainstorming it is the designers that usually translate those ideas into tangible artefacts, thus maintaining authorial control over the final outcome. This, however, is not the case with the next participation category, shared authorship. Here non-designers are more directly involved in the making of tangible scenarios and artefacts.

In the project 'Sankofa City' [6], for instance, local community members were paired with design students to co-imagine alternative technological interventions in their neighbourhood. Resident-student teams collaborated throughout the entire design process, from making rough prototypes in plasticine, to the creation of future scenarios and the making of concept videos that brought the scenarios to life. These bottom-up, collaborative creations were then showcased during stakeholder meetings, demonstrating how the co-speculation process can serve as a platform for public discourse. In this case, the contributions of non-designers carry over into the final outcome, reflecting meaningful co-authorship.

3.5 Leadership

The last level or participation, leadership, illustrates what Pelle Ehn [22] sees as the most radical political feature of participatory design and what others see as an important step in democratising the future [9, 24, 35, 56]: at this level non-designers assume control over the design process, using the tools and resources provided by expert designers to reach their own goals [17, 30, 46]. This level is somewhat equivalent to what Arnstein [2] calls "citizen-control", and can be divided into two participatory categories that represent the specific form of leadership assumed by non-designers: initiative, and ownership.

In the category we call initiative, similar to what Pretty [17] calls "self-mobilization", non-designers initiate the speculative design process. In our survey we discovered only one such project: 'Africatown Activation' [58]. The project addressed questions of gentrification. In a series of workshops, community members came together with members of the development firm that purchased the land in order to re-imagine the historically Black Central Area neighborhood of Seattle (Washington, USA). Like in other PSD projects, non-designers were involved in ideation and generative reflection, but what distinguishes this project is the fact that it was initiated and led by a grassroots community group called Africatown, a group focused "on securing space for Black-owned businesses, majority-Black and/or low-income housing, and Black-centered public spaces" [58, p.4]. Interestingly, although a community group initiated the speculative design project and was involved in all of its stages, it was ultimately the development firm that had the final word on how, and if at all, the project would actually influence the neighbourhood's development. The implications are quite clear: initiating a speculative design project does not necessarily translate into control over its outcomes – certainly not if those outcomes are intended as forms of political or economic interventions and include stakeholders with conflicting motivations. This leaves us to imagine what a PSD project would look like if non-designers not only initiated and shaped the design process but were able to maintain ownership over the process by shaping goals, procedures, outcomes, and dissemination. Unfortunately, none of the projects we surveyed featured this kind of deep participation. In all the projects we surveyed the framing and context in which the PSD project took place were pre-defined by designers. This inherently limits the kind of voice and agency non-designers have during the design process [20, 55], and reduces opportunities to pursue deeper, potentially transformative forms of participation.

4 CONCLUSION

The expansion of speculative design into more diverse geographic, disciplinary and institutional settings, alongside the increased inclusion of non-designers in the speculative design process, raise important questions about the future of speculative design as a platform for "social dreaming" [21, p.189] *together*. While some see this expansion in reach and popularity as a sign that speculative design has value beyond the worlds of art and academe – that speculative design is finally "shifting to an emphasis on giving more value to collective and collaborative experiences rather than individual desires" [5, p.209] – others, echoing similar concerns about participatory design [8, 10], believe these changes hollow out speculative design's capacity as a critical practice. If one believes that a project's setting over-determines the process and its outcome, speculative design may very well be dead, as Francisco Laranjo quips [cited in 5, p. 203].

While both positions may find some support in the research presented in this paper, the benefits of opening up speculative design to non-designers seem undeniable. As Mitrović, Hanna & Helgason [39, p.81] point out:

> The active participation of ordinary people in the design process results in overcoming the situation where they are just a passive audience expected to engage and get involved only after the perception of a completed design project. The participatory approach opens up possibilities for people to think about, imagine but also to act in creating their preferable futures.

This line of reasoning will sound familiar to those practicing participatory design. What remains less clear, however, is what exactly is meant by "active participation", and what makes such forms of participation specific to speculative design.

We addressed these questions by surveying 66 PSD projects and deriving from them 8 categories of participation. From the shallower to the deeper, they are spectatorship, reflection, inspiration, generative reflection, shared creativity, shared authorship, initiative, and ownership. Although there is certainly room for interpretation in regards to how different PSD projects fit the different categories, we believe the taxonomy suggested here provides speculative designers and design theorists with a useful point of departure for more nuanced analyses that look beyond the intentions and descriptions of projects to the actual participatory dynamics they feature. Such future analyses may ask about the character and outcomes of the design process and the role played by designers: how do the micropolitics of PSD processes play out? How are the aesthetic qualities of speculative design impacted when artefacts are no longer produced exclusively by designers? How can designers capture and measure the potentially transformative outcomes of participation? And how do designers perceive their own role when engaging in PSD – do they identify as facilitators, mediators, curators, midwives, seeders or agents of the public imagination?

While it is true that not all PSD projects articulate their goals in the language of transformative action, involving individuals and communities in speculative design may help address what some identify as the approach's need to move from speculation to intervention [4, 47, 61, 63]. In this vein, creating more inclusive PSD projects may also assuage what some see as insecurities about the role of speculative designers as future-makers, or as Matt Ward [61, p.181] asks, "are designers the best people to ask questions about our collective futures?" Increasing the number and diversity of actors that think imaginatively and act decisively on the future, and inviting non-designers to take ownership of speculative design projects, may constitute a significant step in the democratization of both design and the future.

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