JCOM

LIVING LABS UNDER CONSTRUCTION: PARADIGMS, PRACTICES, AND PERSPECTIVES OF PUBLIC SCIENCE COMMUNICATION AND PARTICIPATORY SCIENCE

Living labs as third places: low-threshold participation, empowering hospitality, and the social infrastructuring of continuous presence

Christian Pentzold, Ingmar Rothe and Andreas Bischof

Abstract

In this practice insight contribution, we reflect on our learnings from configuring and upholding a living lab as a third place in an urban and distinctively non-academic environment. Trying to make space for an empowering hospitality necessitated withholding our schemes and workshop plans so to facilitate grassroots endeavors on the side of the people dropping in and staying around though they might follow unexpected paths. This follows no blueprint but requires researchers and science communicators to be open to surprises, to be patient and persistent, and to be willing to swap positions and be the learners, not the instructors. While the physical and technical infrastructures were at one point installed, keeping the social infrastructuring of continuous presence running remains an open issue that requires us to rethink how to fund and support living labs and their mission in the long run.

Keywords

Community action; Public engagement with science and technology; Social inclusion

DOI

https://doi.org/10.22323/2.22030802

Submitted: 30th November 2022
Accepted: 6th March 2023
Published: 20th June 2023

Introduction

To construct a living lab is one thing, to maintain it another. Inviting people to visit a living lab is one thing, to make them stay another. To cherish diversity among participants is one thing, to move away from the usual suspects is another. Looking back at our long-time experience of building and maintaining a living lab, we discuss our low-threshold approach that demanded us to move away from university settings and do away with any designs and forms of communication that had an academic flavor.

Conceptually, we treat living labs as third places, that is, as locations which are neither home nor work and "only partially amenable to rational planning," as Oldenburg and Brissett [1982, p. 270] posit. This runs against the majority of living lab typologies and traditions that pivot on the instrumented character of such

environments despite ambitions to make them seem natural and authentic. For all efforts to empower participants and provide a space for creativity and open-ended engagement, living labs primarily redeem the goals of their initiators and sponsors who may hope to deploy them for a variety of endeavors [Greve, Vita, Leminen & Westerlund, 2021; Leminen & Westerlund, 2019]. Understanding living labs as third places, in turn, underscores their capacity to foster sociability beyond purposive activities. Hence, their results and outcomes must not only be assessed in terms of the targets of their operators but can reach beyond, as Oldenburg and Brissett [1982] note, any "special and immediate purposes" [1982, p. 270]. As such, living labs might harbor one of the "most purely democratic experiences life can offer," they add [1982, p. 271]. For sure, this puts on another layer of normative expectations to already value-laden conceptions of the living lab. Yet at the same time it takes seriously and spells out the inherent participatory impulse that animates much of the enthusiasm around the method and the kinds of venues it requires.

We structure our discussion along the normative expectations which thread through the work around living labs that are deemed to foster participation and public engagement with science, that should reach out to people with only feeble ties into academia, and that may allow these participants to become active and experience research and innovation firsthand. However, putting such well-intended purposes into practice is, we argue, a thorny affair. This kind of critical practice insight from the perspective of the facilitators and researchers of living labs remains rare despite the numerous self-testimonies and applications of living labs in the past 15 years.

Living labs between norms and pragmatism

Living labs are commonly taken to proffer a methodical, technological, and spatial framework that establishes some kind of real-life setting with a strong focus on user-centric research and design. People from outside of the professional arenas of those managing the living lab infrastructures shall take a more or less active role in creation and participatory research in a quest to democratize innovation and design [Alavi, Lalanne & Rogers, 2020; Harrington, Erete & Piper, 2019]. However, these normative ideals do oftentimes not neatly translate into practice. Rather, the construction and maintenance of living labs ask for pragmatic solutions, for adjustments and compromises.

Participation ideals and realities

To foster and promote the participation of those affected by innovations have become one of the core aims of research and design. It presumes that future users and those implicated in technology should have a voice in its ideation and formation, not only for moral reasons but also in order to enhance its use value and usability. "The term 'participation' is traditionally used to describe the involvement of users and stakeholders in design processes, with a pretext of distributing control to participants to shape their technological future," write Vines, Clarke, Wright, McCarthy and Olivier [2013, p. 429]. Participation, Kelty et al. [2015] likewise postulate, "connotes openness and transparency, inclusion and diversity, democracy and voice, equality and deliberation" [2015, p. 475].

Arguably, the turn toward participatory approaches has become more urgent with the advent of digital devices and A.I.-powered services that scale quickly and

widely thus exaggerating the effects of bias, narrow stereotypes, and insufficient sensibility toward diversity [Eubanks, 2018]. At worst, participation and the noble ideals of sharing control and expertise are "becoming meaningless and often poorly articulated and theorized," as Vines et al. [2013, p. 429] warn. Even when we try to suspend these fundamental issues for a moment, a number of practical questions arise such as who is to engage in a living lab and who is able to decide about who can participate, how much participation is enough and what kind of outcome is to be expected from a living lab [Bratteteig & Wagner, 2016; Whittle, 2014].

In response, there is an emphasis on reaching out to people whose contributions have traditionally been overlooked or excluded, be this for reasons of age, ability, race, gender, sexual orientation, class, culture or otherwise [Costanza-Chock, 2020]. In turn, it is assumed that people from all walks of life are resourceful and skillful and that there are ways to elicit, share, and communicate their knowledge and expertise in technological choices. Next to issues of justice and equality, this quest can also follow more utilitarian aims of including new and unattended aspects and addressing concrete problems in the lives of the participants [Bratteteig & Wagner, 2016]. Thus, the makers of the Helsinki Living Lab for example underscore that for its users "the main motivation to be active partners is a passion to develop the products and services they use" [cited in Dutilleul, Birrer & Mensink, 2010, p. 73].

Levels of engagement

Whereas living labs and living lab research are flourishing, there is still only limited reflection on the micro-dynamics happening on the ground, in the interactions between participants and the operators of living labs, be they from academia, industry, or other fields [Light, 2010]. This also pertains to the status of participants who can be invoked as users, partners, or collaborators of a more or less joint venture, and these different positions imply a variety of forms and degrees of engagement. Consequently, participation does not fall into binary options of in or out, it is nothing people either do or not do. Instead, Vines et al. [2013] remind us that "users can participate in ways that are witting, unwitting, spectator-like, as a reflexive commentator or as a creator that leads the participation of others" [2013, p. 433]. These diverse levels of engagement not only happen in living labs but need to be addressed by other sites of participation too, as Simon [2010] has for example shown in the context of museums.

Furthermore, expectations of participation and its tight coupling with the adequacy and acceptance of innovations and decisions assume a linear process with clear roles and procedures [Chilvers & Kearnes, 2020]. Here, participation can merely serve legitimatory functions when participants have no opportunity to articulate dissenting viewpoints. Moreover, although living labs encapsulate participatory ambitions and try to embed innovations in real-world contexts, there are nevertheless often marked distinctions between operators and sought participants, for example in terms of competences, predispositions, and objectives. Consequently, a number of comparative studies have stressed the gap between the ideals and the realities of user participation [Følstad, 2008; Mulvenna et al., 2011]. In particular user-driven approaches with a high level of involvement are rarely employed; and they are especially absent from the ideation phase [Vanmerbeek, Vigneron, Delvenne, Rosskamp & Antoine, 2015], with some exceptions such as the

Living Lab Skagen [Kanstrup, 2008]. This then is not only a matter of participant selection but challenges the living lab method as such. They constitute, as Harrington et al. [2019] argue, a peculiar type of activity whose preoccupation with imagination, tech-centered creativity, and novel insights can in itself be exclusionary to underserved communities.

Paradoxically, it is often such underserved communities that are implicated in living lab schemes, yet at the same time they are the most skeptical and reluctant to become involved and take up the allegedly low-threshold opportunities. These basic tensions between the stimulation of participatory commitment and empowering hospitality on the one hand and the need for control and outcome orientation on the other, between an integrative low-threshold ethos on the one hand and selective sampling on the other are hard to resolve and leave their mark on any living lab venture. Yet although they cannot be fully eliminated, they are seldomly addressed in field reports and analyses of living labs.

Case site

The living lab we draw on in this practice insight was initiated in order to reflexively study the conditions and processes of participatory science and technology development with a Internet of Things (IoT) applications [Bischof, Freiermuth, Storz, Kurze & Berger, 2020]. It is a collaboration between different projects funded by the German Ministry for Education and Science (BMBF) and the German Research Foundation (DFG). Following its twin aims of developing IoT alternatives and shedding light on the living lab process, the facility and the chosen methodical approach have both a practical mission and a reflective orientation with respect to the conditions, premises, and dynamics as well as the unfolding relationships between scientists and stakeholders. With this, the living lab builds on cognate work drawn out in Human-Computer Interaction (HCI) and participatory design [Ehn, Nilsson & Topgaard, 2014]. The questions guiding its installation and implementation are: How do co-design and collaboration unfold over the course of time and in the space of a living lab? What kind of methodical approach and principles facilitate the participatory capacity of living labs? How can participation be configured so to offer different outcomes for the diverse people involved?

The living lab we manage and study has been piloted in 2016 and permanently established in 2018 in the center of a big but shrinking city in the Eastern part of Germany with a heavy industrial past and deep demographical transformations that in turn gave rise to some initiatives for cultural and economic revitalization. Its location epitomizes these different factors as it is based in a former model pedestrian precinct whose socialists planning scheme sought to reconcile recreational activities and living quarters. Now, the once thriving and later largely abandoned street has become, thanks to substantial public expenditure, a mixed living area with working class and lower middle-class families, students, and seniors who share the space with pop-up boutiques and galleries, shops, an elementary school, and small businesses. Administratively, the living lab was hosted by the nearby local university that has a strong STEM focus.

The general aim is to reach this neighboring community with its multiplex social relations, a common physical environment of life and partly also work, and shared challenges and barriers [Harrington et al., 2019; Le Dantec & Fox, 2015]. People

living in this community are usually not part of science communication and remain distant to any academic contexts and environments. For a variety of reasons, they are rarely touched by science or addressed in technology development, for instance because they are migrants, old, without a higher education background, or of low income. Often, we find these aspects overlapping each other thus making science skepticism and reluctance the subject of intersecting factors of disadvantage.

According to the taxonomy devised by Alavi et al. [2020], the living lab resembles what they call a visited place, a visited third place in fact, to which participants are invited. It is housed in ground-floor rooms formerly occupied by a small retail store. In principle, this rented place was meant to offer a high level of control on access, the parameters of the workshops and co-design events, and the data collection. It was essentially planned as an experimental setting in close proximity to the sought participants. In terms of Veeckman et al.'s [2013] multi-dimensional framework, the living lab seeks to be of value for all stakeholders involved and inclusive regarding results and partnerships alike, that is, everybody should have access to the results and everyone is welcome. It is a long-term project running for more than four years and rather small scale (<100 users). Overall, the setting and approach allows us to consider co-design situations through a number of methods including co-creation workshops, interviews, participant observation, questionnaires, and focus groups. More concrete, we base our practice insight on documentation of four dozen workshops and meetings including videos, photos, written protocols in addition to interviews and extensive field notes that have been produced over the entire course of the living lab including the grant application and preparation phases.

However, the material base of the insights presented below is not limited to methodologically-generated data. Conducting a living lab provides at least as much data through serendipitous encounters and conversations as through the recordings of workshops, interviews, and group discussions. For documentation and evaluation, we continuously produced memos as proposed by Grounded Theory (GT) [Strauss & Corbin, 1997], based on diaries, notes, and reflections following all of our events in the living lab. We used collaborative online documents that all team members could access simultaneously so to complement each other's observations. The following practice insights are the result of the collaborative creation and interpretation of these memos according to GT.

Practice insights: configuring participation

The living lab settings within which participation is stimulated and organized have a profound impact on its form and set the course of who gets involved and who is benefitting from it. Commonly, this "work that occurs before the work," as Le Dantec and Fox [2015, p. 1349] name it, is favoring the objectives of those operating and funding living labs and risks to marginalize the personal gains of other stakeholders [Iversen, Halskov & Leong, 2010]. The configuration of participation, that is, the decisions made before and during user participation about who initiates, directs, and benefits from the living lab, is therefore critical, Vines et al. [2013] argue. At the same time, rightly because it happens either in advance or on the administrative backend of living labs, the configuration of participation often escapes scrutiny and participants are confronted with decisions made for, not with them. At the same time, the configuration of participation can also be used to afford a more self-directed and open-ended engagement that furthers people's

reflection about and ability to alter the conditions and orientations of the collaborative co-design setting they are invited to join and enliven [DiSalvo, 2016].

Thinking through our stake in the configuration of participation and the ensuing work of upkeeping the living lab and embracing stakeholder contributions, we formulate three learnings. First, trying to make space for an empowering hospitality necessitated withholding our schemes and workshop plans to facilitate grassroots endeavors on the side of the people dropping in and staying around though they might go into unexpected paths. It follows no blueprint but secondly requires researchers and science communicators to be open to surprises, to be patient and persistent, and to be willing to swap positions and be the learners, not the instructors. Finally, while the physical and technical infrastructures were at one point installed, keeping the social infrastructure of continuous presence running remains an open issue that requires us to rethink how to fund and support living labs and their mission in the long run. The insights we share are neither revolutionary nor unconscionable but point us to inevitable tensions supposedly every user-driven living lab has to navigate.

Empowering hospitality

A lot of living lab conceptions advise on the selection of participants which is deemed to be of cardinal significance and a key success factor. For instance, Ogonowski, Ley, Hess, Wan and Wulf [2013] urge us to choose "participants with social competences and well-marked self-reflecting skills" [2013, p. 1545]. Others who strive for more equitable living labs highlight the sampling of marginalized and often excluded or underserved populations [Dillahunt et al., 2017; Erete, Israni & Dillahunt, 2018; Fox et al., 2017].

However, despite these efforts that go into putting together the right kind of social collective delivers on some of living labs' democratic and inclusive promises, it is exactly their axioms of openness and self-efficacy that come to stand against the careful composition of participants. In light of this predicament, the SocialMedia Experience and Design Lab maintained by Ogonowski et al. [2013] followed a mix of recruiting avenues. Next to ads in local newspapers and radio, they also let participants invite friends and colleagues.

The shift of power to the side of stakeholders also implies that decisions on who is to recruit the 'right' users are themselves moments of agency that must, moreover, not be one-time determinations but can be dynamic and reversible. Hence, people may follow an invitation or not, others seek access without invitation, and still others may decide to be around sometimes. When Agid and Chin [2019] refer to the ethical creed of "holding ourselves accountable to values prioritized by our partners" [2019, p. 75] this also extends to elementary choices of who wants to enter the living lab, who wants to take part in offerings from the side of the operators, and who ventures to use the facilities and equipment for some other project. Taking seriously the underlying idea of user-centric living labs to let people go off and do their thing requires, as Agid and Chin [2019] posit, some reorganization of schemes.

This of course does not mean that participants are given *carte blanche* and there can be situations that make it difficult to reconcile divergent concerns or renegotiate all

terms of engagement. Thus, in our case the living lab is first of all a set of rooms in a shopping area with space for collaboration and recreation furnished with some machine instruments and media technology which is entertained by a couple of temporary research projects. Hence, the living lab does not have one purpose but is used for a variety of endeavors, mostly around social robots, A.I. and smart homes. Some of them have a clear topical focus and are either organized as workshops or events, others are less clearly demarcated but aimed at fostering dialogue and encounters between scientists and those frequenting the area. Both kinds of ventures come with goals – in the first as more narrowly defined objectives and outcomes, in the second as more broadly assumed expectations and hopes.

The balancing act between pre-set aims and forwardness requires us to adopt a stance of empowering hospitality, as we name it. It predicates on the respect for users' decisions even if we as facilitators and operators may feel that they exceed our purview and current topical preoccupations with automation and digitization. The notion of empowerment, in this regard, stresses the relocation of power, that is, the agency and capacity to shape action, to participants who are enabled to take decisions [Bratteteig & Wagner, 2016]. That way, they become co-designers and collaborators who are enabled to do their work also if this does not respond to some task or participatory event on schedule and whose contribution is recognized also if it changes the course of how the living lab is used [Harrington et al., 2019].

In our case, empowering hospitality means, for instance, that there is an ebb and flow of participants. The lab is frequented by a rather loosely defined group of people, some of whom are eager to follow one of our calls for participation, others dropping by out of curiosity, still others are mainly hoping to have a warm place or enjoy some of the amenities. Furthermore, it means that some stakeholders are claiming the place for their own endeavors and projects they found valuable. For example, for some time the living lab became the home base for the weekly meetings of a guerilla gardening group. Although not planned and not directed at non-scientists, the living lab has also turned into a place where associated researchers and colleagues like to have informal meetings. On the same note, reporting about their experiences in a pop-up science center, Habibi Doroh and Streicher [2021] stress the importance of facilitating opportunities to "find a topic which they associate with science and their lives" [2021, p. 5]. By allowing participants to choose the goals, methods, and processes on their own terms helped to involve more and more diverse people.

With respect to the inclusion of marginalized communities, the lab has had numerous sprints with diverging target groups. There have been programs for explicitly marginalized communities (such as older adults within technology design). As of now, we focus more on heterogeneous and intergenerational groups of participants so to foster approaches that embrace lived situations (e.g., people of different age living together or forming neighborly social relations).

Mutual learning

The empowering hospitality we adopted in the living lab is at odds with more instrumental or reductionist views toward user involvement [Bergvall-Kåreborn & Larsson, 2008]. At the same moment, it can help to keep participants motivated as

they are not only asked to spend their time and energy on pre-defined assignments and workshop plans. In addition, they are enabled to follow self-set goals and muster collaboration. The approach furthermore can facilitate trust since it allows to meet communities on their own terms and encourage a two-way process of prompt and also critical feedback. "All these aspects seem to be trivial, but our findings indicate that they are rather important for long-term collaborations in Living Labs," as Ogonowski et al. [2013, p. 1547] determine.

In essence, this underscores the mutual nature of an ongoing learning process which involves living lab facilitators and participants alike. Seeing living labs through such a "learning lens," as advocated by DiSalvo [2016, p. 4460], makes clear that all stakeholders involved are in different capacities and to various degrees partners in a learning process which can generate new knowledge and insights for all of them. For instance, speaking about their collaboration with people aged over 80 regarding alternative payment technologies and the hurdles they met when banking made Vines et al. [2013] rethink their own financial habits.

Again, what seems in some way banal, contradicts indeed much of the current practice in participatory design methods [Bødker & Kyng, 2018]. "In most approaches, users are involved in order to tap into their ideas and knowledge," as Bossen, Dindler and Iversen [2016, p. 31] complain. Configuration then not only encompasses issues of technological usability and functionality and not only the participatorily scaffolding and workshop methods. It too stretches to "configuring the user," as Woolgar [1990, p. 58] called it, a process through which people are made into users who know and obey the prescribed forms of proper usage.

In turn, endowing participants with the possibility to reconfigure the living lab itself demands to let them also intervene in its methods, tools, and goals. That makes us aware of the potential multiplicity of viable outcomes. Indeed, when it comes to the results and achievements of participatory design, user gains often remain marginal to the research and design objectives of facilitators, operators, and sponsors. A user-centric perspective, however, accentuates a range of alternative outcomes, some more indirect such as the experience of being able to raise concern and having one's voice heard, others more direct like the acquisition of new skills or technological improvements [Bratteteig & Wagner, 2016]. Besides products, the living lab as third place is also about social connections and the civic virtues of collaboration, communication, and participation.

Nevertheless, even though the organizers of living labs might want to share power and are mutual learners themselves, there are imbalances and inequalities. In our lab, we as researchers have a specific expertise and agenda, we make judgments, and we are, in our reports and documentation, the interpreters of the material generated and collected in the living lab. And despite the low-threshold approach to let people do their thing, we employ the living lab also for workshops and events which are, next to our ongoing participant observation, again recorded, assessed, archived, and fed back into its design, methods, and facilities. So empowering hospitality in our case often involves participants not taking an action themselves but suggesting changes which we may decide to execute.

Enduring social infrastructuring

Mutual learning asks for long-term engagement, yet only few studies have, up to now, dealt with the continuation of living labs and in fact with the temporality of participatory design as such [Saad-Sulonen, Eriksson, Halskov, Karasti & Vines, 2018]. This negligence is striking because living labs, especially when they are installed as more permanent sites of visited places, lived-in places, or innovation spaces, predicate on continuous involvement [Ogonowski et al., 2013]. On the one hand, this sets expectations for the participants to keep showing up and staying around. On the other, it requires us to be present and approachable which in the long run proves to be a challenging task as it asks for the constant provision of social infrastructuring efforts.

Social Infrastructuring, or "infrastructural work" [Star & Bowker, 2002, p. 233], encompasses the integration and connection of resources, practices, and actors that make up a functional infrastructure. Whereas the notion of infrastructure denotes the more or less durable material, social, and organizational arrangements in support of human activities and technical operations [Bowker & Star, 1999], infrastructuring directs our attention to the ongoing work necessary to create, uphold, and steer these socio-technical setups. Given the funding structure of our living lab that stands exemplary for most project-based types of sponsoring, investments into the material infrastructure are quite unproblematic. Except for repair and some maintenance, these are mostly one-time investments of a manageable budget. On the contrary, the enduring social infrastructuring is more difficult to sustain as it needs a continuous commitment, financially and socially, that usually overstretches finite financial plans and challenges the logic of temporary funding schemes.

In particular a setup with paid staff, part-time or not, requires us to carry on supplying the necessary financial means. Otherwise, we are forced to explore alternative forms of maintaining the living lab based on volunteers. This then would ultimately alter the entire character of the framework as it reshuffles the positions of sponsors, operators, facilitators, and participants. Such fundamental reorganization of a living lab in order to ensure its operation has also far-reaching implications for its direction and power relations when the discretionary privileges of those paying the bills evaporate. That move would affect the authority of the operators initially setting up a living lab and it relocates the responsibility for upkeeping and organizing the social infrastructuring into the hands of the community. In effect, the user-centric living lab becomes an endogenously driven effort. As of now, this may only seem a very hypothetical option amongst others that would require an enduring institutional obligation, perhaps resting on multiple pillars. Yet similar structures of jointly run ventures are known for instance from media outlets that are realized by cooperatives and volunteer associations [Scholz & Schneider, 2016].

Conclusion

Arguably, most living lab enterprises, in particular location-based formats, seek to be third places to some extent that redistribute control and inspire people to become active participants. The underlying moral proposition is that "the people whose activity and experiences will ultimately be affected most directly by a design outcome ought to have a substantive say in what that outcome is" [Carroll &

Rosson, 2007, p. 244]. This also resonates with the fundamental beliefs baked into public engagement with science ventures [Weingart, Joubert & Connoway, 2021].

Starting from these assumptions, our practice insight is skeptical of all approaches geared toward harnessing participant contributions, boosting innovativeness, or streamlining engagement. Instead, it starts from the inherent messiness of realizing living lab schemes in an emerging process ripe with unexpected developments. With this, the practice insight contributes to appreciating and scrutinizing what Le Dantec and Fox [2015] have dubbed "A Productive Mess" [2015, p. 1357]. In doing so, it takes issue with a pertinent shortcoming of the burgeoning literature on living labs that is still quite ignorant of the practicalities of making living labs work. There are no straightforward procedures or toolkits; instead, the practice insight we offer takes us to the predicaments that accrue from the ambition to meet citizens on equal ground and consider their involvement in research and design. This endeavor is ripe with friction, yet this friction affords productive encounters and can propel meaningful and lasting participation. Moreover, this friction seems inescapable as the normative axioms of openness and freedom must necessarily be at odds with the structure of goals and plans that usually motivates a living lab and justifies its installation and funding. This is not easily resolved since the method can hardly relinquish its participatory stance whilst it also seems difficult to keep such third place clear of preconceptions.

Acknowledgments

Funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) — Project-ID 4162288727 — SFB 1410).

References

Agid, S. & Chin, E. (2019). Making and negotiating value: design and collaboration with community led groups. *CoDesign 15* (1), 75–89. doi:10.1080/15710882.2018.1563191

Alavi, H. S., Lalanne, D. & Rogers, Y. (2020). The five strands of living lab. *ACM Transactions on Computer-Human Interaction 27* (2), 1–26. doi:10.1145/3380958

Bergvall-Kåreborn, B. & Larsson, S. (2008). A case study of real-world testing. In *Proceedings of the 7th International Conference on Mobile and Ubiquitous Multimedia* (pp. 113–116). doi:10.1145/1543137.1543161

Bischof, A., Freiermuth, M. M., Storz, M., Kurze, A. & Berger, A. (2020). "Living Labs" als Beispiel für die konzeptionellen Herausforderungen der Integration von Menschen in Technikentwicklung. In B. Gransche & A. Manzeschke (Eds.), *Das geteilte Ganze: Horizonte Integrierter Forschung für künftige Mensch-Technik-Verhältnisse* (pp. 285–304). doi:10.1007/978-3-658-26342-3_14

Bødker, S. & Kyng, M. (2018). Participatory design that matters: facing the big issues. *ACM Transactions on Computer-Human Interaction 25* (1), 1–31. doi:10.1145/3152421

Bossen, C., Dindler, C. & Iversen, O. S. (2016). Evaluation in participatory design: a literature survey. In *Proceedings of the 14th Participatory Design Conference: full papers — volume 1* (pp. 151–160). doi:10.1145/2940299.2940303

Bowker, G. C. & Star, S. L. (1999). *Sorting things out: classification and its consequences*. Cambridge, MA, U.S.A.: MIT Press.

Bratteteig, T. & Wagner, I. (2016). Unpacking the notion of participation in participatory design. *Computer Supported Cooperative Work (CSCW) 25* (6), 425–475. doi:10.1007/s10606-016-9259-4

Carroll, J. M. & Rosson, M. B. (2007). Participatory design in community informatics. *Design Studies 28* (3), 243–261. doi:10.1016/j.destud.2007.02.007
Chilvers, J. & Kearnes, M. (2020). Remaking participation in science and democracy. *Science, Technology, & Human Values 45* (3), 347–380. doi:10.1177/0162243919850885
Costanza-Chock, S. (2020). *Design justice: community-led practices to build the worlds we need*. doi:10.7551/mitpress/12255.001.0001
Dillahunt, T. R., Erete, S., Galusca, R., Israni, A., Nacu, D. & Sengers, P. (2017). Reflections on design methods for underserved communities. In *Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing* (pp. 409–413). doi:10.1145/3022198.3022664
DiSalvo, B. (2016). Participatory design through a learning science lens. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 4459–4463). doi:10.1145/2858036.2858405
Dutilleul, B., Birrer, F. & Mensink, W. (2010). Unpacking European living labs: analysing innovation's social dimensions. *Central European Journal of Public Policy 4* (1), 60–85.
Ehn, P., Nilsson, E. & Topgaard, R. (2014). *Making futures*. Cambridge, MA, U.S.A.: MIT Press.
Erete, S., Israni, A. & Dillahunt, T. (2018). An intersectional approach to designing in the margins. *Interactions 25* (3), 66–69. doi:10.1145/3194349
Eubanks, V. (2018). *Automating inequality: how high-tech tools profile, police and punish the poor*. New York, NY, U.S.A.: St. Martin's.
Følstad, A. (2008). *Living labs for innovation and development of information and communication technology: a literature review*. Retrieved from http://hdl.handle.net/11250/2440026
Fox, S., Dimond, J., Irani, L., Hirsch, T., Muller, M. & Bardzell, S. (2017). Social justice and design. In *Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing* (pp. 117–122). doi:10.1145/3022198.3022201
Greve, K., Vita, R. D., Leminen, S. & Westerlund, M. (2021). Living labs: from niche to mainstream innovation management. *Sustainability 13* (2), 791. doi:10.3390/su13020791
Habibi Doroh, H. & Streicher, B. (2021). Knowledge○Room exploring social justice by going beyond 'traditional' spaces and activities of science centres. *JCOM 20* (01), C03. doi:10.22323/2.20010303
Harrington, C., Erete, S. & Piper, A. M. (2019). Deconstructing community-based collaborative design: towards more equitable participatory design engagements. *Proceedings of the ACM on Human-Computer Interaction 3* (CSCW), 216. doi:10.1145/3359318
Iversen, O. S., Halskov, K. & Leong, T. W. (2010). Rekindling values in participatory design. In *Proceedings of the 11th Biennial Participatory Design Conference* (pp. 91–100). doi:10.1145/1900441.1900455
Kanstrup, A. M. (2008). Living lab Skagen 2008. In *Proceedings of the Danish HCI research symposium* (pp. 59–62). Retrieved from http://www.hum.aau.dk/~nyvang/dhrs2008/ElectronicProceedingsDHRS2008.pdf
Kelty, C., Panofsky, A., Currie, M., Crooks, R., Erickson, S., Garcia, P., … Wood, S. (2015). Seven dimensions of contemporary participation disentangled. *Journal of the Association for Information Science and Technology 66* (3), 474–488. doi:10.1002/asi.23202

Le Dantec, C. A. & Fox, S. (2015). Strangers at the gate: gaining access, building rapport and co-constructing community-based research. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing* (pp. 1348–1358). doi:10.1145/2675133.2675147

Leminen, S. & Westerlund, M. (2019). Living labs: from scattered initiatives to a global movement. *Creativity and Innovation Management 28* (2), 250–264. doi:10.1111/caim.12310

Light, A. (2010). The unit of analysis in understanding the politics of participatory practice. In *Proceedings of the 11th Biennial Participatory Design Conference* (pp. 183–186). doi:10.1145/1900441.1900473

Mulvenna, M., Martin, S., McDade, D., Beamish, E., Oliveira, A. D. & Kivilehto, A. (2011). *TRAIL living labs survey: a survey of the ENOLL living labs*. Ulster, U.K.: University of Ulster. Retrieved from https://pure.ulster.ac.uk/en/publications/trail-living-labs-survey-2011-a-survey-of-the-enoll-living-labs-3

Ogonowski, C., Ley, B., Hess, J., Wan, L. & Wulf, V. (2013). Designing for the living room. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 1539–1548). doi:10.1145/2470654.2466205

Oldenburg, R. & Brissett, D. (1982). The third place. *Qualitative Sociology 5* (4), 265–284. doi:10.1007/bf00986754

Saad-Sulonen, J., Eriksson, E., Halskov, K., Karasti, H. & Vines, J. (2018). Unfolding participation over time: temporal lenses in participatory design. *CoDesign 14* (1), 4–16. doi:10.1080/15710882.2018.1426773

Scholz, T. & Schneider, N. (Eds.) (2016). *Ours to hack and to own: the rise of platform cooperativism*. doi:10.2307/j.ctv62hfq7

Simon, N. (2010). *The participatory museum*. Santa Cruz, CA, U.S.A.: Museum 2.0. Retrieved from http://www.participatorymuseum.org

Star, S. L. & Bowker, G. C. (2002). How to infrastructure. In L. A. Lievrouw & S. Livingstone (Eds.), *Handbook of new media: social shaping and consequences of ICTs* (pp. 230–245). doi:10.4135/9781848608245

Strauss, A. & Corbin, J. M. (1997). *Grounded theory in practice*. London, U.K.: Sage.

Vanmerbeek, P., Vigneron, L., Delvenne, P., Rosskamp, B. & Antoine, M. (2015). Involvement of end-users in innovation processes: toward a user-driven approach of innovation. A qualitative analysis of 20 livings labs. In *OpenLivingLab Days*. Retrieved from https://hdl.handle.net/2268/183928

Veeckman, C., Schuurman, D., Leminen, S. & Westerlund, M. (2013). Linking living lab characteristics and their outcomes. Retrieved November 25, 2022, from http://www.theseus.fi/handle/10024/141102

Vines, J., Clarke, R., Wright, P., McCarthy, J. & Olivier, P. (2013). Configuring participation. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 429–438). doi:10.1145/2470654.2470716

Weingart, P., Joubert, M. & Connoway, K. (2021). Public engagement with science—Origins, motives and impact in academic literature and science policy. *PLOS ONE 16* (7), e0254201. doi:10.1371/journal.pone.0254201

Whittle, J. (2014). How much participation is enough? A comparison of six participatory design projects in terms of outcomes. In *Proceedings of the 13th Participatory Design Conference on Research Papers — PDC '14* (pp. 121–130). doi:10.1145/2661435.2661445

Woolgar, S. (1990). Configuring the user: the case of usability trials. *The Sociological Review 38* (1S), 58–99. doi:10.1111/j.1467-954x.1990.tb03349.x

Authors

Christian Pentzold is Chair and Professor of Media and Communication in the Department for Media and Communication Studies at Leipzig University. He is interested in the construction and appropriation of digital media and the roles information and communication technologies play in modern society. He is Co-Principal Investigator in the CRC #1410 Hybrid Societies, based at Chemnitz University of Technology.

christian.pentzold@uni-leipzig.de.

Ingmar Rothe is a Post-Doc researcher at the Chair for Media and Communication Studies at Leipzig University. He is working in the CRC #1410 Hybrid Societies, based at Chemnitz University of Technology.

ingmar.rothe@uni-leipzig.de.

Andreas Bischof has a background in sociology, media communication and cultural anthropology. He studies how technology, science and society interact with each other. Currently, he is a Juniorprofessor at Chemnitz University of Technology and principal investigator in several research projects.

andreas.bischof@hws.tu-chemnitz.de.

How to cite

Pentzold, C. Rothe, I. and Bischof, A. (2023). 'Living labs as third places: low-threshold participation, empowering hospitality, and the social infrastructuring of continuous presence'. *JCOM* 22 (03), N02. https://doi.org/10.22323/2.22030802.

ISSN 1824-2049. Published by SISSA Medialab. jcom.sissa.it