Co-creation in Context: The User as Co-creator Approach

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Abstract. By providing a platform for systemic innovation and co-creative partnerships, Living Labs open opportunities to get users involved early into the creative process of new ICT, product and services development. The concept leaves, however, much room on how to get users actually involved, and does not explain how to keep users engaged during the entire design process. The current work elaborates upon the user as co-creator approach and illustrates how current methods stressing participation and co-creation can be deployed to strengthen Living Lab practices. We present examples from the ProFit-lab Delft that demonstrate co-creation in context as well as the user as co-creator approach. We conclude with a discussion on the results and challenges to actively co-creating in context.

Keywords: Children · Co-creation · Context · Design methods · Empowerment · Living Labs · Systemic innovation

1 Introduction

Living Labs are welcomed as a way forward to stimulate new ICT product and services development by providing a platform for involving users in the various stages of innovation; these are amongst others, bringing the users early into the creative process in order to discover new and emerging behaviours and user patterns, bridging the innovation gap between technology development and the uptake of new products and services involving all relevant players, and allowing for early assessment of the socio-economic implications of new technological solutions by demonstrating the validity of innovative services [4, 19]. Living Labs have grown in popularity in the past years; Next to the increased interest and the growing numbers of self-defined Living Labs, there is also a palimpsest of perspectives of Living Labs and methods used. The variety and evolution of concepts, methodologies, tools as well as infrastructures challenge the scoping of the Living Lab phenomenon, and have resulted in a strong rise in publications aiming to position the Living Lab phenomenon much sharper by presenting landscapes, frameworks and acknowledged definitions [see for example 3, 5, 14].

However, Living Labs are inherently complex by their systemic nature: the innovation process addressing societal challenges (*why*), the real-life environment (*where*), and the various multi-helix partners involved who are usually differently motivated and might benefit differently from the Living Lab concept (*who*), as well as the co-creation along the entire production cycle, from ideation to market deployment (*what*). Interestingly, the European Network of Living Labs has – since its inception – searched for ways to ensure the use of common methodologies and tools across Europe that support, stimulate, and accelerate the innovation process. See for example the Living Labs harmonization cube that addresses the systemic nature of Living Labs and contributed to the network's foundation [12, 13].

On top of that, the majority of Living lab experiences does not address this holistic perspective, but rather focuses on a particular perspective; making it harder to position Living Lab practices. Without doubt these discussions clearly facilitate common ground for sharing Living Labs practices, but might not necessarily contribute to a better understanding of the dynamics of innovation, the living part of the lab [12]. Living Labs are also a network of real people with everyday practices and experiences, a living network allowing partners to co-create in context [11, 12]. Living Labs employ specific methods and tools to interact with their users and stakeholders across the entire product and service development process, however, as concluded in our earlier work traditional methods for laboratory testing are emphasized over the use of co-creation techniques and participatory methods [11].

Differently put, the bigger part of user involvement remains merely reactive. Living Labs do, however, embrace the user as co-creator approach. The current work, therefore, addresses more intensive ways of engaging users, in more active roles, such as informing the design, or generating ideas and solutions themselves, and aim to contribute to a more elaborate user as co-creator approach.

2   User as Co-creator Approach

Over the past decades, the distance between designers and users has reduced. The by now traditional way is dominated by an 'expert' perspective in which trained researchers observe and/or interview largely passive users. The contribution of the users is to perform instructed tasks and/or to give their opinions about product concepts that were generated earlier by others without any input from them. Figure 1 shows this in the bottom-left corner. Increasingly, users appear in roles where they provide expertise and are given room for initiative, by participating in the informing, ideating, and conceptualizing activities in the early design phases. The participatory approach (i.e., 'user as partner', on the right in the diagram) has been led by Northern Europeans, originated in Scandinavia. A second dimension of development has been in the type of research that is conducted. The last two decades have shown a growth in research techniques, which have not only evaluative power (prove/disprove a hypothesis or idea), but also generative value (provide insights not yet known to the researchers). These latter developments are often supported by the inclusion of explorative actions using tools and techniques from design, such as making collages, diagrams, models,

and other visualizations as a means to support self-observation and reflection. The two approaches are now beginning to influence one another.

Within this landscape, in the area of participatory design, the notions of co-creation and co-design have been growing. As can seen from the human centred design landscape illustrated in Fig. 1, the challenge to keep Living Labs living is to involve active users by making use of generative techniques, and so, practicing a 'user as co-creator' approach.
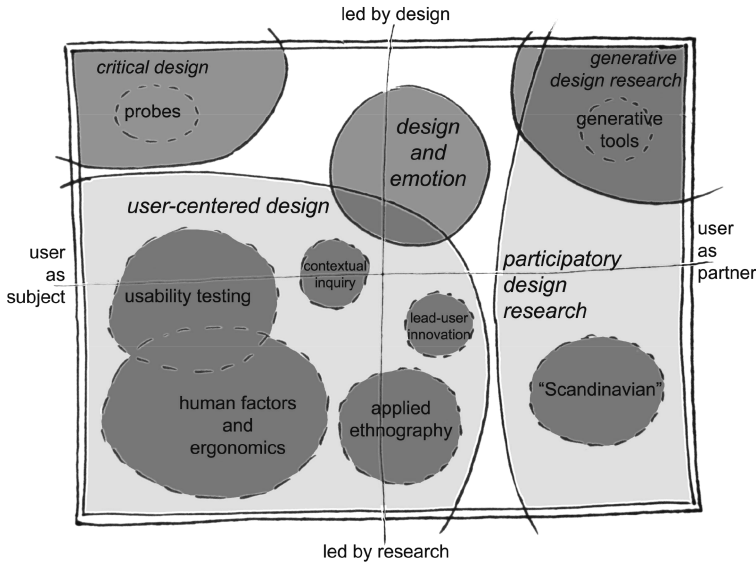

Fig. 1. The current landscape of human-centered design research as practiced in the design and development of products and services [from 17]

Living Labs do not use any of the Š, we see that the potential of the user as co-creator approach goes well beyond current practice of demonstration-and-reaction; both in the amount of time as well as in the commitment that is invested from all parties as well as in the depth and breadth of results that can be harvested from that.

2.1 Co-creation is About Participation and Context

Main forms of user participation in both industry and academia are after-the-fact testing. Users can react to a concept prototype in a demonstration, a focus group, or a usability test. The earlier phases in the process are mostly conducted within the lab or company, often based on literature study and market and segmentation studies. This is reflected in the emphasis put on 'demonstrators' as deliverables of projects. Involving

users in earlier phases is important to ensure that the concepts of products and services that are developed fit into the lives of the target groups.

For that, the development team, including researchers, designers, engineers, and others involved, must build an understanding of the context of product use, i.e., the full ramifications of who, where, what, when, how, and why which surrounds the product. This fuller understanding of the context is the more necessary as current ICT product and service design increasingly address complex interactions between users, products, services, and infrastructure, with increasing opportunities for mistakes due to 'blind spots' in the development team.

Sleeswijk Visser and colleagues [20] describe how such information can be gathered from users in a structured way, and point to two important factors: (1) generative activity (having people create artefacts as a way to stimulate observation, reflection, and discussion), and (2) sensitizing (letting participants go through a process of reflection over several days or weeks, in order to deepen their knowledge. Both tools of expression, and time for reflection are needed to work the participating user into the 'expert of their experience' to contribute with own initiative and input based on their experiences in Living Labs practices.

3   Context – ProFit-lab Delft

ProFit Delft is a Living Lab environment where companies in the area of sports and exercise can install product prototypes or production models to have them tested by citizens. The context is an actual playground, a real-life environment, where interactions take place during everyday use by the local community. This makes the lab very relevant for companies as well as knowledge institutes. Researchers use the ProFit-lab to collect data on the end-user interaction with the installed products in a real-life setting. However, the upcoming users were already involved before the first constructions of the Living Lab environment have been started. Their needs are investigated and form the basis for creating inviting concepts and environments.

Next, an observation system and different sensors are placed throughout the Living Lab environment to measure intensity of use, the user activity levels, as well as other use parameters. This provides relevant scientific feedback on the effects of the prototypes/products that are placed in the ProFit-lab; facilitating accelerated product development in this way. One of the first steps in the creation of the ProFit-lab was the organisation of an innovation competition, in which companies were challenged to develop new products that would fit within the lab. Submitted concepts are evaluated by a small representation of the user group and their advice was given to the jury who decided on predetermined criteria which concept wins. The winning team received an award voucher and support to develop their design into a prototype that can be placed in the ProFit-lab.

3.1   Contextmapping

In order to place innovative concepts in the ProFit-lab that support the specific target group and focus, user needs are explored through a "contextmapping" approach [20]. Contextmapping is a procedure for conducting contextual research with users, aiming to inform and inspire designers in the fuzzy front end of the design process. In these contextmapping sessions, participants receive creative assignments in which they make something that is related to their experiences and then discuss it. Through this procedure they are provided with the means to access deep levels of knowledge. By actively involving users, a fit between the design and use of a product is ensured. The insights from contextmapping-research are given to contestants in the innovation competition, as input for their submissions.

As an example, the ProFit-lab in Delft is further discussed. A traditional playground in Delft, located next to an elderly home and near to schools and family houses, is transformed into the new ProFit-lab. This ProFit-lab is targeted at children and elderly, with a focus on "being active together". In order to reveal the needs and wishes of the two specific target groups and their interaction with each other, a contextmapping study was conducted [see [24] for details]. Both children and elderly started with a sensitizing booklet, in which they observed their own activities and reflected on themselves over a period of time. After the sensitizing the participants came together in a group session. There were three different kinds of sessions: children only, elderly only, and a mixed session. All the data from the booklets and sessions (such as the creative outings and recorded discussions) were analysed, clustered and transformed into "Insight Cards" describing behavioural patterns, wishes, needs and experiences as voiced by the

Fig. 2. Example of an Insight Card

participants (see Fig. 2). These cards are presented to the contestants in the innovation competition.

Next to future users, many other stakeholders actively participated in the ProFit-lab. For example sports associations, a school for sports-management, several elderly associations, and a housing cooperative. They all are eager to work together within the ProFit-lab once it is realised. Their contribution could be for example to bond future users and organise activities and programmes related to the innovations tested in the ProFit-lab. Through their early contribution, the ProFit-lab that is currently under construction can also be designed and organised to reflect the concerns of these stakeholders.

3.2   Children as Researchers

In order to enhance the expert role of the users, a second case was conducted in which twenty children, aged 9 to 12, from a primary school in Delft took on the role of researcher themselves, doing interviews with peers and grandparents. Getting this responsible role motivated the children and listening to peers made them developing a more grounded opinion of their own [25]. The overall assignment for the children was to generate ideas for a new playground in which children and elderly can be active together. In order to create these ideas they had to research their target group by interviewing peers and grandparents. This project consisted of 3 meetings with small groups of children (4–5) and a researcher, the individual conduction of 2 interviews by each child and a final creative session. An overview of the activities per meeting:

Meeting 1. All children sketched ideas for new playground equipment, to be used by children and elderly together, and found out that it is hard to think of other people's needs and wishes. Subsequently, they thought of questions to ask their target group as input for a research booklet. This booklet was further developed by the researcher to help children conduct their interviews.

Fig. 3. Children practicing interviewing on each other

Meeting 2. During the second meeting with the researcher, each small group of children was briefly trained in interviewing skills and practiced the use of the research booklet by interviewing each other (see Fig. 3).

Conduction of Interviews. Individually the children interviewed either their peers or grandparents. The interviews were audio-recorded and notes were written down in the research booklet. They had two weeks to perform this task.

Meeting 3. The groups of children came together with the researcher for a feedback session in which their results were discussed. They explained and compared their research booklets and shared their experiences. After this discussion the children filled in templates of personas as a summary of different kinds of participants they had encountered.

Creative Session. The whole class participated in this session at the same time and new groups were formed to generate ideas together, each group included children with knowledge from the two different target groups. In their new groups, the children thought again of ideas to place in the new playground, but now with the use of their personas and their gained knowledge about the target group.

This case study showed that children are able to work as collaborators in contextual user research. The design of playground equipment is a motivating and understandable goal for them. The training was a necessary step to improve their interview skills and to get to know the children and their points of view. The most important aspect of this collaboration process was the way the children adopted the role of researcher. They felt ownership and developed a serious and focused attitude. In their role of researcher, the children discovered similarities and differences between themselves and others. Besides gaining valuable insights from their participants, they accessed and shared their own experiences, resulting into personal insights in the target group to be used by designers. See van [25] for more details.

Concept Evaluation. Next to user needs research, the Profit-Lab Delft also involved users as co-researchers to evaluate the submitted concepts in the innovation competition [23]. Two elderly and two children interviewed peers about their opinions on the five competition entries. After that, they reported their findings in a feedback session to the lead researcher. They explained the answers they gained with their research booklets and expressed their own opinion as well. Subsequently, they ranked the competition entries in order of attractiveness and discussed in what way the original user insights from the contextmapping research were traceable in these new designs. There was not much time for this evaluative research with users, so by recruiting four co-researchers, we included the opinion of twelve people.

3.3   Meaningful Relationship with Users

Until now, the input from users in the Profit-Lab was on demand; when a research question popped up users were involved. In the future we strive for a more meaningful and beneficial relationship for all parties. Getting a more sustainable relationship with users and binding them to the Profit-Lab is important. It turned out that giving users the

role of co-researcher is motivating, it gives them ownership and responsibility. Binding a group of co-researchers to a Living Lab and giving them the role of ambassadors might be an important step in the development of a sustainable relationship with users.

4 Discussion and Conclusions

Different types of stakeholders involved in user-driven innovation benefit differently from the Living Lab concept. Users are empowered to influencing the development of ICT services and products. For industry innovation processes can be more effective by partnering with other companies as well as end-users. Even for Small and Medium Enterprises (SMEs), the development, validation, and integration of new ideas and rapidly scaling-up their local ICT services and products to other markets becomes an opportunity by joining a Living Lab consortium. Participating in a Living Lab is a way to deal with the complexity of product development, which is growing rapidly on many fronts: new technologies, global competition, merging of products, services, and infrastructure, sustainability issues, and speeding up the innovation process.

4.1   Smart Industry Goes Community-Driven Innovation

Especially at large US industries such as Microsoft, new methods have found their way into industrial organizations. Moreover, co-creation techniques are rapidly finding their way into education, and – through the new generation of designers – into practice. But actual long-term or deep involvement of users in product development is limited. In industry, product- and concept-testing (after these have been finalized and implemented) are commonplace. However, techniques to involve users in the idea generation, information, and strategy-defining phases are not often applied in practice. In part this is because of the enduring technology push, in part because existing methods such as (design) ethnography are expensive and require changes in the way product development processes are conducted in the company. On the other hand, in Europe a range of (mainly academic) projects have shown the viability and value of user-inspired approaches, and have delivered new, appropriate methods.

Theories of innovation commonly distinguish two forces: technology push and market pull [18]. If product development relies exclusively on the former, this leads to 'technological tricks in boxes, with a button added to start their use'. The latter, taken alone, caters only to the needs of which people are explicitly aware. The competition on user qualities has created a third force, which has been called the 'contextual push' or the 'people insights' [21]. By this way, new products addressing tacit and latent needs come about, not through a new technical possibility or a visible demand from buyers, but through increased insight in the needs and dreams of possible future users. The most telling outcomes of these approaches are new products for which no buyers existed yet, however, these approaches can also be applied to existing products and markets. Key lesson in this area is that everyday people, if involved in an appropriate way [see 20], are a rich source of experiential knowledge, and are eager to participate in a design project if their expertise receives appropriate recognition. The participation not

only of everyday people as potential customers, but also of all other stakeholders along the value-chain can be seen as the foremost required element for the successful operation of a Living Lab.

Co-creation requires an open mindset towards sharing and collaboration. This is not trivial. Although, board members preach open innovation in pre-competitive collaboration with all possible stakeholders, including users, companies seem not eager to share with their competitors. Even within companies, employees are not always keen in sharing ideas. Involving users and incorporating the user's context helps companies to get deeper insights in the end-users' needs and values.

Although participatory design has its roots in the Scandinavian democratic movements, viewing participants as equal, as partners, current participatory practices are not always addressing these equal grounds. Arnstein [1] already criticized many participatory practices as not really giving the users a substantial influence in the process. Living Labs can provide such a space for co-creative partnerships [10].

4.2 Living Methodologies

The true value of getting deeper insights in user values and needs as well as discovering product or services ideas might be in the fuzzy front end, the early stages of strategy and alliance formation, and concept development. Whereas the Living Lab approach has been introduced as a methodology for experimentation and co-creation in real-life environments, where users together with other stakeholders such as researchers, industry partners, and designers look for new ideas, solutions, new products and services, current Living Labs practices, however, demonstrate too often reactive users rather than users as active co-creators. These practices show insights that are for the most part based on the usage of traditional methods, and are consequently, not exemplary in demonstrating the added value of a Living Lab over other user-centric methodologies. In order to have the Living Lab – and its methodology – growing to maturity, it is crucial to awaken the living part by making use of its infrastructure, and by continuously evaluating in all phases, thus before, during and after use and in-situ.

In addition, the use of living methodologies [9, 12] to come close to the user and his rich experiences as well as giving attention to the fuzzy front end as a phase advancing the product/service idea is a first step to embrace Living Labs' potential. For this, generative techniques and contextmapping [20] proved to be successful. In addition, by capturing rich experiences and social dynamics of everyday life, Living Labs make far better use of the promised ecological validity of the presented systemic innovation approach.

4.3 Empowerment Though Co-creation

In keeping with an increasing number of researchers, for example in the platform 'Researching Children International', children should be enabled to participate in research and design concerning their lives and surroundings. They are supported and driven by article 12 of the UN convention of the rights of the child [22], which states

that children have the right to form and express their views in all matters affecting them. Also amongst design researchers [for example 6, 16], there is also a growing believe that it is important to include children in the development of technology that influences their lives and they want to empower children to have a say about the environment in which they live.

Next to that, there are indications that active participation in research contributes to cognitive, social and identity development of children [7] and of young adults [15]. According to Dedding and colleagues [2] participation strengthens the involvement in society and understanding of democracy, which leads to a healthy and strong community, and especially in case of children it adds to their personal development as well. As nicely put forward by Kellett [8]: 'the concept of children as active researchers is rapidly gaining credence in response to changing perspectives on children's status in society'.

References

1. Arnstein, S.R.: A ladder of citizen participation. JAIP **35**(4), 216–224 (1969)
2. Dedding, C., Jurrius, K., Moonen, X., Rutjes, L.: Kinderen en jongeren actief in wetenschappelijk onderzoek: ethiek, methoden en resultaten van onderzoek met en door jeugd [Children and Youngster actively engaged in scientific research: ethics, methods, and results on research with and by youth]. LannooCampus (2013)
3. Dell'Era, C., Landoni, P.: Living lab: a methodology between user-centred design and participatory design. Creativity Innov. Manage. **23**, 137–154 (2014)
4. European Commission: Living Labs for user-driven open innovation, an overview of the living labs methodology, activities and achievements, January 2009
5. Følstad, A.: Living Labs for innovation and development of communication technology: a literature review. EJOV Electron. J. Virtual Organ. Netw. **10**, 99–131 (2008)
6. Guha, M.L., Druin, A., Chipman, G., Fails, J.A., Simms, S., Farber, A.: Working with young children as technology design partners. Commun. ACM **48**(1), 39–42 (2005)
7. Hart, R.A.: Stepping Back from 'The Ladder': Reflections on a Model of Participatory Work with Children. Springer, dordrecht (2008)
8. Kellett, M.: Children as active researchers: a new research paradigm for the 21st century? ESRC, UK (2005)
9. Mulder, I.: Living labbing the rotterdam way: co-creation as an enabler for urban innovation. Technol. Innov. Manage. Rev. **2**(9), 39–43 (2012)

10. Mulder, I.: Sociable smart cities: rethinking our future through co-creative partnerships. In: Streitz, N., Markopoulos, P. (eds.) DAPI 2014. LNCS, vol. 8530, pp. 566–574. Springer, Heidelberg (2014)
11. Mulder, I., Stappers, P.J.: Co-creating in practice: results and challenges. In: Thoben, K.D., Pawar, K.S., Katzy, B., Bierwolf, R. (eds.) Collaborative Innovation: Emerging Technologies. Environments and Communities. Centre for Concurrent Enterprise, Nottingham (2009)
12. Mulder, I., Velthausz, D., Kriens, M.: Living methodologies: understanding the dynamics of innovation. In: Schumacher, J., Niitano, V.-P. (eds.) European Living Labs – A New Approach for Human Centric Regional Innovation, pp. 31–38. Wissenschaftlicher Verlag Berlin, Berlin (2008)
13. Mulder, I., Velthausz, D., Kriens, M.: The Living Labs harmonization cube: communicating living lab's essentials. EJOV, Electron. J. Virtual Organ. Netw. **10**, 1–14 (2008)
14. Pallot, M., Trousse, B., Senach, B., Scapin, D.: Living Lab research landscape: from user centred design and user experience towards user cocreation. In: Proceedings of the Living Lab Summer School, Paris August 2010
15. Pucci, E.L., Mulder, I.: Star(t) to shine: unlocking hidden talents through sharing and making. In: Streitz N., Markopoulos, P. (eds.) DAPI 2015. LNCS, vol. 9189, pp. 85–96. Springer, Heidelberg (2015)
16. Read, J.C.: Validating the fun toolkit: an instrument for measuring children opinions of technology. Cogn. Technol. Work **10**(2), 119–128 (2008)
17. Sanders, E.B.-N., Stappers, P.J.: Co-creation and the new landscapes of design. CoDesign **4**(1), 5–18 (2008)
18. Scherer, F.M.: Demand-pull and technological opportunity: scmookler revisited. J. Ind. Econ. **30**, 225–237 (1982)
19. Schumacher, J., Niitano, V.-P. (eds.): European Living Labs – A New Approach for Human Centric Regional Innovation. Wissenschaftlicher Verlag Berlin, Berlin (2008)
20. Sleeswijk Visser, F., Stappers, P.J., van der Lugt, R., Sanders, E.B.-N.: Contextmapping: experiences from practice. Codesign **1**(2), 119–149 (2005)
21. Stappers, P.J., van Rijn, H., Kistemaker, S., Hennink, A., Sleeswijk Visser, F.: Designing for other people's strengths and motivations. Adv. Eng. Inform. **23**, 174–183 (2008)
22. UN convention on the rights of the child, (1990)
23. van Doorn, F., Gielen, M., Stappers, P.J.: Friends sharing opinions: users become co-researchers to evaluate design concepts. In: Proceedings of IASDR 2013 (2013)
24. van Doorn, F., Gielen, M., Stappers, P.J.: Involving children and elderly in the development of new design concepts to become active together. Interact. Des. Archit. **20**, 86–100 (2014)
25. van Doorn, F., Stappers, P.J., Gielen, M.A.: Design research by proxy: using children as researchers to gain contextual knowledge about user experience. In: Proceedings. of the ACM Conference on Human Factors in Computing Systems (CHI 2013), Paris, France, 27 Apr–2 May 2013