A collaborative learning infrastructure to build capacity for urban transformations

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Abstract. An increasing number of social innovators are leveraging cities as urban learning ecosystems in order to experiment with design approaches to tackle societal challenges at a local level. However, the scale and complexity of these challenges force them to constantly acquire new capabilities to advance the local experimentation towards systemic change. We introduce co-design as a transformative community-driven design method to facilitate innovators to continuously identify, connect, co-define, and share with other peers their learning journeys to build capacity over time for addressing societal challenges. The current article elaborates upon a capacity-building framework that not only resulted in elaborate training activities for urban transformations, but also fostered a community of practice that was instrumental to self-sustain a learning network. Results highlight the importance of developing a collaborative learning infrastructure capable of expanding the pool of societal actors contributing to the further diffusion and co-creation of knowledge for urban transformations.

Keywords: Capacity building, Co-design, Collaborative learning, Learning ecosystem, Reflection, Self-development, Urban innovators, Urban transformations.

1 Introduction

Societal challenges ask for systemic changes in urban infrastructures and governmental structures, but also demands doing things differently in our personal lifestyles and daily lives. What's more, the United Nation's Sustainable Development Goals [1] even call for new approaches to address complex societal challenges. Existing solutions to climate change, mobility, or urban inequalities are not powerful enough to trigger the needed structural and systemic change for sustainability transitions. The urgency is clear, as shows the emergence of a growing number of local initiatives using their (diffuse) design capability to contribute to the societal challenges at a local scale. Such mature urban pilots generally show a diverse mix of backgrounds within their team and closer collaborators; think of designers, local authorities, academia, and private and public organisations that share an interest in proposing positive change. Interestingly, these pilots use the urban environments as urban learning ecosystems as they are leveraging the resourceful and interconnected nature of cities and use the local context to engage in and experiment with innovative and creative ways to generate urban

transformations. In other words, design skills and approaches seem to be a promising resource in such urban experimentation, even though new capabilities are needed (e.g., community building, business acumen, and strategic leadership, to name a few).

In the current work, we refer to these new 'urban transformation' capabilities which are needed by urban innovators to address societal challenges. These experiments are usually successful in demonstrating the value of their creative practices and evidencing change across levels and scales though at a hyper-local level, however, they often struggle in further scaling their urban transformations beyond the boundaries of their own niche communities. Niches can be seen as a safe space for experimentation, more protected innovation ecosystems, free of the limitations of existing norms and rules and therefore more receptive to innovative proposals, where new ideas are oftentimes more easily generated [2]. When crossing the boundaries of such favourable breeding grounds to implement radically innovative solutions at a more systemic scale, urban innovators find themselves operating in a much more complex, multilevel ecosystem; the urban context and society at large. Such a complex system is regulated by a complex and diverse set of existing norms, rules, and infrastructures that together help to maintain the current societal context unchanged. This is what Grin and colleagues [2] refer to as the established 'regime'. To successfully influence a regime and enable systemic change to occur, different types of innovation processes need to simultaneously take place [3]. Differently put, a variety of actors across different levels of society, from citizens to private and public organisations while including local authorities, need to adopt innovative proposals to favour the establishment of new ways of doing in place of existing norms and rules, ultimately resulting in systemic societal transformations.

Imagining, creating, and developing these innovations requires therefore the simultaneous consideration of different perspectives [4] as well as the ability to develop value propositions that can successfully address the needs and desires of multiple actors at different levels. Addressing such a variety of perspectives demands innovators the ability to constantly innovate and adapt also their own ways of doing and conducting innovation processes. More precisely, innovators must be capable of continuously learning from and with different dynamics, actors, resources, and competencies that characterise the urban and social ecosystem, to identify and develop the most appropriate strategies and capabilities that can help them advance in embedding innovation in cities [5].

Without going into detail, these insights suggest that to successfully scale their impact, innovators must be increasingly (and continuously) aware of the capabilities they need to embed innovation in cities, as well as the steps to acquire these competencies, to fully exploit cities as learning ecosystems. In other words, they must be able to continuously identify, self-direct, and sustain their self-development journeys. With these premises, the present study aims to understand how to best support urban innovators in framing and sustaining their needed self-development journeys throughout their practice.

The context of study is DESIGNSCAPES, a European research project investigating how to ignite the transformative power of design for sustainable and responsible innovation in European cities. The project supports a hundred mission-driven urban innovation pilots, tackling complex societal and environmental issues in keeping with the United Nations sustainable development goals. These pilots are selected along three

different stages of their innovation processes with three corresponding open calls. The first call is for projects carrying out their initial feasibility studies, the second for pilots prototyping and embedding their solutions in an urban context, and finally, the third call selects pilots at the stage of scaling their innovation to another context. Next to funding, the capacity building program identified capabilities to foster social innovation and urban development [6] and provided appropriate training to infrastructure a community of innovators that can continue learning and developing in a self-sustaining way, beyond the program itself. Differently put, the awarded pilots are prepared to leverage cities as learning ecosystems. The program enabled the articulation of multilevel participatory design processes and identified ways of engagement with citizens, local institutions as well as private sector representatives, and stimulated the diffusion of key competencies such as design literacy among these urban stakeholders. In keeping with earlier work addressing smarter citizens [7] and sociable smart cities [8] the pilots further build capacity in the public domain and contribute to and accelerate local transformations in the urban context.

The current work elaborates upon the development of a capacity-building program aiming to leverage the knowledge gained by innovators in their urban pilots and facilitate them to further connect, co-create, and share new knowledge on urban innovation across local contexts as a way to accelerate their growth and facilitate the scaling of impactful innovation. In particular, the capacity-building program utilised co-design as a transformative community-driven design method to infrastructure a collaborative learning platform that again facilitates the diffusion of the necessary capabilities to conduct social innovation processes within cities as well as the activation of a learning community of urban innovators across Europe. In other words, aiming to develop learning networks [9]. Urban innovators from the awarded pilots are involved in the co-development of the capacity-building program and stimulated to act as active co-creators of knowledge with their peers. Through evaluating these co-creative activities, the current article investigates how to facilitate the continuous growth and self-development of such urban innovation pilots. The next section motivates our reflective approach enabling urban innovators to better frame the challenges ahead in their pilots and to identify the necessary professional learning needs. Afterwards, we introduce the capacity-building framework and the setup of learning space to evaluate the developed touchpoints with several urban innovators. We report on the resulting capacity-building program and training modules, and then discuss the value of the collaborative learning platform in fostering connections and collaborative learning among innovators facilitating their continuous growth.

2 Urban Innovators' Reflective Practice

Reflective processes have been investigated in the domain of professional self-development [10-12]. Especially, when approached as an "active and purposeful process of exploration and discovery" [11, p.496], reflection can become a promising tool for professionals' continuous growth as it helps them to "become receptive to alternative ways of reasoning and behaving". Consequently, this opens up learning opportunities for practitioners' self-development [12, p.16]. Next to increasing

professionals' awareness of alternatives for their practice, engaging in a reflective process also supports professionals in better using the information and knowledge that they are gaining from experience [12, p.16]. In this way, they are stimulating their ability to learn from past events and actions for the ongoing betterment of their designs.

Schon's distinction between reflection *on* action and reflection *in* action [10] is often referred to in the context of innovation practitioners' ongoing learning and reflection to ensure continuous improvement of their design practices. Through his studies with innovation practitioners such as architects, designers and engineers, Schon [10] describes reflection as the ability of such professionals to learn from experiences in order to frame how to better act on the unknown challenges that are presented to them in their projects. In this, Schon specifies innovators' reflective process as a "reflective conversation with the situation" at stake, through which innovators are able to explore a given problem situation by relating it to past experiences that could help them approach it. In this way, innovators can "name the things to which [they] will attend and frame the context in which [they] will attend to them", and by doing so they can more easily define the initial problem, and together with it also "the decisions to be made, the ends to be achieved, the means which may be chosen" [10, p.40].

Similarly, Dorst and Cross [13] argue that through a process of exploration of problem and solution spaces designers identify what are more specific, unresolved problems to focus on, on which they can focus their creative effort in elaborating new approaches. In a similar way, the current work refers to a problem setting process that helps designers identify novel perspectives from which the same challenging situation can be seen, and therefore tackled. According to Dorst and Cross [13] designers explore so-called problem and solution spaces, by analysing first what are the elements of a given problem situation, and then relating these with elements of previous situations they have encountered before as well as solutions proposed by others to tackle a similar problem situation. This can be a helpful way to identify initial solutions to approach the current situation. Although such solutions will likely solve the problem at stake only partially, such approaches can be instrumental for designers to isolate and frame what is new, unresolved, and more specific challenges from the initial problem situation that they initially could not identify. In other words, upcoming challenges without a solution perspective or ability to solve yet, but presented in a different way enabling designers to focus on, identify, experiment and learn new creative approaches and solutions for their design practices.

2.1 Reflective steps for urban innovators' self-development

Elaborating upon Schon [8] as well as Dorst and Cross [13], reflection *on* action has been used as a tool to support urban innovators' self-development trajectories, helping them to identify challenges ahead in their pilots and the capabilities they need to acquire to achieve them [14]. In particular, we facilitate reflection on action, facilitating urban innovators to look back at their past experiences and supporting the articulation of future steps to advance their projects. In earlier work, we engaged urban innovation practitioners from the awarded pilots in the second open call for prototypes in the European project described above [14]. By conducting a series of online reflective sessions with innovation practitioners, we investigated how to scaffold a reflective

process enabling urban innovators to identify latent requirements and challenges in their design projects, as well as the new corresponding capabilities they needed to acquire to address the upcoming challenges. The study contributed positively to urban innovators' self-development journeys by facilitating them to identify what are new capabilities relevant to learning for the advancement of their practice. Fig. 1 shows the resulting scaffolding process consisting of five main steps for reflection and supporting reflective questions.

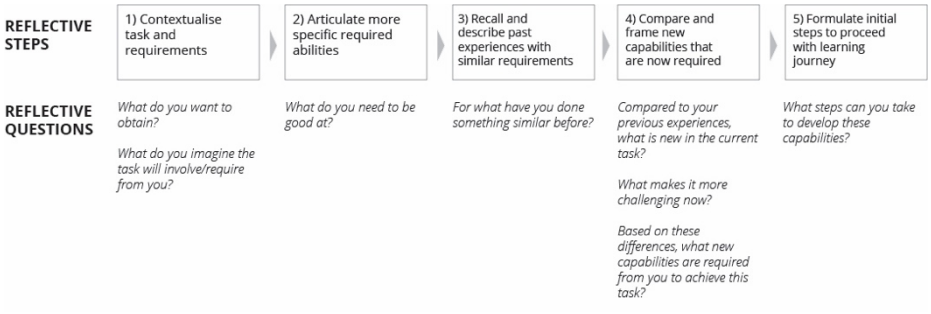

Fig. 1. Five reflective steps facilitating innovators to identify what are new capabilities relevant to learn for the advancement of their practice.

The first step entails elaboration on a given task in the project. This step enables practitioners to articulate more specifically what they want to obtain, and what they would imagine the task will involve, to then uncover and highlight what will be required of them. Articulating the requirements of the task as a first step ensures that the participants' reflection revolves around the relevant aspects that will determine the success of the task. As a second step, participants are asked what they think they need to be good at to achieve the task at hand. Posing such an open question showed to encourage more spontaneous and nuanced answers that helped practitioners think in concrete terms about the task to be achieved. Thirdly, participants were asked to recall past experiences, where they had to utilise similar abilities to the ones currently required, and to describe those past situations, the approach taken, the circumstances in which they acted, and the results obtained. Such descriptive analysis was instrumental for participants to reflect on what they are already capable of doing and prepared them for the fourth step in the process, which focused on comparing past and present situations with the aim of identifying what are now key differences that may force them to choose new approaches and capabilities to achieve the new task at hand. These new required actions finally enable practitioners to identify new capabilities that they need to acquire and guide them to the fifth and last step which entails formulating the initial steps to sustain their learning process.

The previous study demonstrated that the proposed scaffolding process enabled the participating urban innovators to better anticipate future steps in their projects, compare them with their previous experiences in practice, and identify new challenging aspects in their ongoing projects that demand the continuous development of new capabilities and skills. In other words, the developed reflective process, articulated in the five steps previously described, proved valuable to urban innovators to co-construct new insights

during discursive and reflective dialogues, and identify new learning needs for their projects that could inform and orient their self-development learning journeys throughout their urban innovation challenge. Interestingly, the study also revealed other crucial elements that complement or improve reflection that is necessary to enable innovators in sustaining a continuous and self-directed capacity building process throughout their projects. For example, the study showed how it might be best to position a given task in relation to multiple examples of related previous experiences and their respective aspects or situations, which helped to more precisely frame the requirements and learning needs to approach it. To do so, a collaborative reflective process considering multiple perspectives to frame the given problem situation showed more beneficial to innovators. Furthermore, the study highlighted that next to understanding their own learning needs, innovators also need to be able to plan actionable steps towards acquiring the new needed capabilities that they identified through reflection, in order to successfully sustain their self-development trajectories. Interestingly, the study showed that this may not be a straightforward step for innovators and that further scaffolding is needed to turn the unveiled learning needs into concrete learning steps and corresponding action repertoire. In the current work, we, therefore, elaborate on the scaffolding process for more collaborative learning and reflection and facilitate the community building of actors with and from whom they can learn the new needed competencies as well as can take actionable steps in practice.

3 Study

In keeping with Mulder [15], we use co-design as a transformative community-driven method, to search for ways to facilitate urban innovators to connect, co-create, and share their learnings with peers and other urban stakeholders, within or outside their known context, in order to establish a learning network that can be used as an infrastructure to self-sustain their learning journeys over time. In this way, we develop a capacity building program that, on the one hand, can be seen as a collaborative space for learning and reflection, and on the other hand, a community of learners.

3.1 Building capacity through collaborative reflection

The capacity building program has been framed as a space where pilots can identify and connect with peers, share experiences from practice, contextualise key capabilities, and foster collaborative reflections, with the aim of co-developing new knowledge on challenges, strategies, and capabilities necessary in their projects. To infrastructure such a space, we articulated two parallel threads of co-design activities to understand how to facilitate urban innovators to connect, co-create, and share their learnings with others in the programs. One thread of co-designing is supported through a series of touchpoints for engagement designed to spark the engagement of and among pilots into a learning network. The second set of co-design activities refers to infrastructuring the program and includes a series of dialogic workshops that help innovators to co-develop with expert pilots' new knowledge, methods, and tools to train for their practice.

Through co-designing these interventions, we co-define challenges and facilitate co-reflection, with the aim to co-develop with the participating urban innovators, new knowledge on challenges, strategies and capabilities necessary to address societal challenges. At the same time, we collect insights on how to enable community building and collaborative learning among social and urban innovation pilots. Fig. 2 shows the setup of the capacity-building framework and highlights the developed touchpoints for engagement.

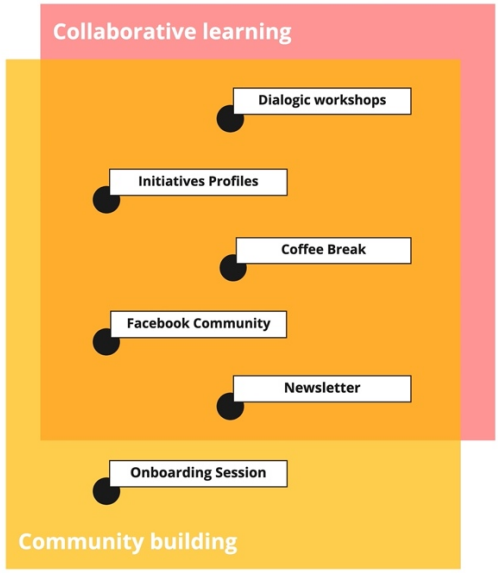

Fig. 2. Framework of the Capacity Building Program, highlighting the series of touchpoints as well as dialogic workshops.

3.2 Participants

Participants in the current study are the urban innovators taking part in the 50 pilots awarded in the second and third call of the DESIGNSCAPES project; 40 pilots are referring to prototyping innovation in cities, and ten pilots are scaling their projects from one city to another. Together, these pilots addressed a wide range of complex societal challenges in approximately 40 European cities, and across 20 European countries. The challenges included among others, the revitalisation of communities and urban spaces through active participation in co-design processes, the co-design of green infrastructures more resilient to climate change, the reduction of overconsumption towards a more circular economy, the use of technology to facilitate sustainable and safer mobility, the activation of local talents among youngsters in face of increased youth disengagement, the increase in assistance and public awareness on noise pollution in cities, and many others. Each pilot is characterised by their diversity of backgrounds and experience among practitioners. In fact, most of the pilots included

multi-disciplinary coalitions of practitioners; amongst them were designers, engineers, but also academics, policymakers, and social entrepreneurs.

3.3 Setup and procedure

Representative members of each pilot project have been contacted via email and invited to join the mentioned co-design activities, which were presented to them as activities part of the capacity building program offered by the European project. For each of these activities, specific materials were purposefully designed, that range from online canvases for facilitating collaborative workshop activities, to digital communication artefacts like posters as well as slideshow presentations. To communicate with participants during online activities, we have utilised the online tool Zoom. To host spaces for sharing resources and where innovators could autonomously interact throughout the program, we made use of the online platform Facebook. When the online activities included interactive exercises with the need for canvases or templates, e.g., to engage participants in reflective conversations, the online collaborative tool Miro has been utilised in combination with Zoom, to structure and facilitate the sessions with participants. The zoom recordings were used for data collection.

By having urban innovators taking part in online activities and engaging with other peers in the program, we were able to observe participants' reactions and collect insights on how to best infrastructure their capacity building and learning process. These online activities have the aim to create contact and interaction with and among pilots during the capacity building program, and further, facilitate community building and collaborative learning. In particular, the 'moments' are meant to work as spaces that can facilitate innovators to engage in collaborative reflections that would allow us to collect insights on their process of capacity building. Therefore, the developed touchpoint and dialogical workshops also served as moments for data collection. The next sections provide details on data collection through these different activities of engagement and interaction.

3.4 Touchpoints for engagement

Following Figure 2, the current section describes the different touchpoints that have infrastructured the program, detailing each goal and setup used to foster innovators' connection and engagement.

Onboarding session. An onboarding session has been designed to welcome new pilots entering the capacity building program, and facilitate some initial interactions among them. The session also aimed at introducing pilots to the program's activities, as well as researchers that would be in contact throughout their participation in the project, in this case, the authors. The onboarding session has been set up as an informal online meeting of approximately 45 minutes and was hosted twice, at the start of both the second and the third open call in the project. During the meeting, participants were asked to introduce themselves to others and to share their expectations of the program. This with the aim of unveiling first connections among pilots, and eventually gathering

knowledge on their needs and aspirations regarding their projects. During the gathering, data were collected through observations and note-taking, additionally, screenshots were taken with the permission of participants.

Online community page. To facilitate a direct channel of communication with and among pilots throughout the entire duration of the capacity building program, a dedicated online community page was also set up utilising the online platform Facebook. The page was set up to facilitate the interaction with and among the pilots in a more autonomous and self-directed way, provide an accessible and open space for participants to post and share any materials, updates, and other resources generated throughout their projects, as well as to pose questions to other members on the page. Furthermore, the online page has been utilised to keep selected pilots updated with the latest program activities. To keep innovators engaged in the program activities, the authors periodically posted on the page invitations to the upcoming activities and events going on within the program (e.g., online workshops) as well as external events parallelly taking place during the European project (e.g., online conferences). The online page has been set up at the beginning of the second open call and was open throughout the entire duration of the second and third open calls (approximately 15 months) and beyond. All participating pilots were invited to join and use it. To collect insights on the activities of innovators on the page, the online community page was kept under observation throughout the entire duration of the two calls.

Periodical newsletter. Additionally, a periodical newsletter was sent via email to pilots in the program to make sure the whole community would stay updated with the development of the capacity building program and would have easy access to the knowledge and learning sparked throughout the program activities. Through these periodical emails, innovators received additional information on the upcoming training activities in the program, stressing how it could be relevant for scaling their initiative. The newsletter also included a summary of the highlights (e.g., topics discussed, main insights shared, specific comments from other pilots) of the recent online meetups. The newsletter was introduced as a touchpoint in the program in correspondence with the third open call of the program, therefore it involved as recipients only the ten pilots that were selected to scale their projects to another city. The digital newsletter was used for data collection.

Community coffee breaks. A series of online gatherings have also been designed as the main spaces for interaction and exchange for the community. Short informal online gatherings, denominated ‘community coffee breaks’, have been set up to lower the threshold for participation in community activities and facilitate casual exchange and relationship building among innovators. These community coffee breaks consisted of 45 minutes of online meetings hosted by the researchers. The meetings were deliberately kept unstructured, and space was given to innovators to suggest topics for discussion that would be most relevant to their own needs and interests. The community coffee breaks were held on a biweekly basis for a period of three months during the third open call of the program. All ten selected pilots were invited to participate. In total five of the ten invited pilots participated in the online gatherings. Data were collected during the gatherings through observations and note-taking.

Profile interviews. The final touchpoint introduced in the program is a series of interviews allowing for one-on-one conversations with innovators, to collect material to develop a series of profiles showcasing the pilots taking part in the capacity building program. Such profiles would then be shared among (and beyond) the community of pilots through the online channels provided by the project, namely the project's Facebook page, LinkedIn page, and the official website. A series of informal, semi-structured interviews of approximately 30-60 minutes was set up by the authors in correspondence to the third open call of the program.

The ten pilots selected in the third open call were invited to take part in the interviews, with one or more members of the project. In the interviews, innovators were asked to describe the current status of their projects and the main challenges faced in the recent months (with particular attention to the Covid-19 pandemic). Afterwards, questions were made about the composition and expertise of their teams, and about the lessons that their teams had learned until that point while scaling their projects. Finally, the interview would close by asking participants about their aspirations for their projects in the upcoming months. In the end, nine out of ten of the invited pilots took part in the activity, with one up to three members of each team. Interviews were conducted with pilots utilising the online platform Zoom and video recorded for data collection. Subsequently, interviews were transcribed and analysed by the authors to elaborate on pilots' profiles. The resulting profiles of each pilot were described in nine short blog posts and subsequently published online on the European project's official website and posted on social media (e.g., LinkedIn and Facebook).

3.5 Dialogic workshops

A series of online dialogic workshops have been designed to facilitate reflection on action among pilots to stimulate collaborative learning among the different pilots, articulating a step-by-step process to identify, connect, co-define and share. The workshops aimed at stimulating pilots to identify relevant topics and learning needs for their projects, connect with other innovators to discuss these, and from those discussions ultimately co-develop new knowledge that could be shared with the rest of the community of pilots. Firstly, a relevant topic was co-defined to guide the workshops based on the insights collected during the earlier interaction moments (e.g., touchpoints). Depending on the broadness and complexity of the topic at hand, the online workshops were then structured as one or two session modules. In the latter case, the sessions took place once per week but for two consecutive weeks. The first part of the module aimed to introduce the selected topic relevant to urban innovation practice and contextualise it in pilots' projects. For this activity, a brief introduction of the topic was usually made by experts (in our case, the authors or other experts involved from the European project consortium) at the beginning of each module. The introduction was followed by an interactive activity purposefully aimed at eliciting and reflecting on the prior experiences of participants. In this activity, pilots were facilitated to share their experiences with the topic in their current and past projects. In particular, pilots were asked to contextualise the topic at hand, answering prompting questions that can elicit concrete examples helping to picture nuances and obstacles prom practice,

relevant to the discussion. Furthermore, questions such as “Have you engaged before with “topic” in your practice?” have been used to prompt innovators. Through this discussion, which can be seen as a collaborative problem framing/setting exercise, challenges and specific aspects to focus on were identified that served as a base for the following part of the workshop. In the second part, a ‘roundtable’ discussion was set up and facilitated for pilots, as well as invited external experts, to share and compare strategies to be applied in regards to the challenges unveiled in the first part of the module, in this way moving towards the phase of problem-solving where a benchmark of possible approaches could be explored and actions to be taken could be evaluated and discussed among pilots. This roundtable discussion aimed in particular at co-constructing the collective knowledge of participants and experts involved, building on the knowledge previously unveiled, and now converging towards the identification of new strategies that could be applied in the innovators’ practice, as well as new open questions and challenges to be further addressed on the topic, or related aspects. The insights emerging through these interactions were finally used: on the one hand, to inform the content to be addressed through following training activities in the program and help distil a series of in-depth co-created training modules for urban innovation that could be further shared outside the program; on the other hand, provide useful lessons and learnings for pilots to apply in their projects. To set up each session, different sets of templates and slide presentations were purposefully designed that helped to structure and guide the conversations with and among innovators. Each workshop was video recorded for data collection, and answers of participants were also gathered by collecting their completed canvases at the end of each session.

3.6 Data analysis

The overall engagement in the program was assessed in the first place, by registering all voluntary attendance to the activities in the program, counting the number of innovators taking part in each of the activities, and specifying who attended multiple times within each call and across the two calls in the program. To gain insights into the collaborative learning and new connections and relationships sparked among innovators in the program, we referred to the recordings and transcripts of the sessions that were collected via Zoom and subsequently search for utterances that indicate connections and collaborative learning among innovators during the activities [16].

4 Co-developed learning platform

Our elaborate reflective co-design approach resulted in a learning platform consisting of a set of touchpoints for engagement. These touchpoints were iteratively improved throughout the program activities, facilitating the engagement of innovators in the program. Through the interaction with pilots facilitated by the touchpoints, we could collect pilots’ needs and inform the development of online dialogic workshops on key topics for urban transformations (n=13). In these workshops, innovators could reflect on their practice, ultimately generating new insights and knowledge on their practice, which was finally consolidated into a set of ten in-depth Training Modules [17]. Table

1 shows the dialogic workshops (n=13) informed by the data collected through the interaction with pilots in the program, as well as the final set of Training Modules (n=10).

Table 1. Co-developed dialogic workshops and resulting Training Modules.

Open call	Dialogic workshops during second and third open calls	Informed by	Resulting Training Module (TM)
Second open call Prototypes	1. Theory of Change methodology	Data collected during first open call Feasibility studies	TM 1. Theory of Change
	2. Service design tools for urban innovation	Data collected during first open call Feasibility studies	TM 2. Tools & Methods for urban innovation
	3. User research methodologies in Covid-19 times	Data collected in the various interaction moments with participants from the second open call	TM 3. User research (in Covid-19 times)
	4. Participatory evaluation	Data collected during first open call Feasibility studies	TM 4. Participatory Evaluation
Third open call Scaling	5. Reflection as a tool for urban innovation	Data collected in the various interaction moments with participants from the second open call	TM 5. Using reflection to approach your future steps
	6. Stakeholder engagement	Data collected in the interaction with participants from the second open call during the session "Reflection as a tool for urban innovation" and community coffee break.	TM 6. Communication and Engagement with Stakeholders
	7. Urban dimensions for innovation	Data collected during first open call Feasibility studies	TM 7. The urban dimension and its relation to innovation processes
	8. Examples of scaling processes (scaling up, scaling out, scaling deep) in relation to transition processes.		
	9. Session on challenges throughout replication processes	Data collected during first open call Feasibility studies, and in the interaction with participants from the second open call	TM 8. Developing a blueprint for scaling
	10. Strategies for financial sustainability of mission-driven ventures (session 1)	Data collected during the *Profile interviews* with pilots during third open call	TM 9. Funding for mission driven ventures

	11. Strategies for financial sustainability of mission-driven ventures (session 2)		
	12. Measuring the social impact of mission-driven ventures (session 1)	Data collected during the *Profile interviews* with pilots during third open call and during the second session on Strategies for financial sustainability	TM 10. Measuring impact of social ventures
	13. Measuring the social impact of mission-driven ventures (session 2)		

Five dialogic workshops have been informed by the learning journeys that were identified in the first call. Another eight dialogic workshops have been co-defined with participating pilots of the second and/or third open call. The topics addressed in the eight co-defined sessions were based on the insights gained from innovators either through the interactions with them facilitated by the touchpoint activities, or during the reflective conversations among innovators sparked during the online workshops. The resulting ten Training Modules were elaborated as a result of the reflective conversations held during the online sessions. The modules vary from emphasizing specific operational support for design practice to more explorative and practice-oriented modules aimed at collaboratively identifying broader aspects and topics within urban innovation practice. While the first type of trainings introduced concrete tools to implement in practice, the second type facilitates the collective reflection on broader concepts and challenges emerging in urban innovation practices. Also, the format varied from more prescriptive traditional lecture-like webinars, to more horizontal and discursive sessions. The next section elaborates on the impact of the reflective co-design approach used to develop the capacity building program, and resulting learning community.

5 Connecting pilots towards a learning community

The developed program and co-designed activities successfully sparked the engagement of innovators in the program as co-creators of knowledge and did support the continuous self-development journey of urban innovators throughout reflecting on their practices. To further elaborate, we, first, illustrate how the program successfully sparked the engagement of innovators, connected innovators and stimulated the activation of an initial community of practice across Europe. Secondly, we elaborate on how the program facilitated innovators to develop new learning trajectories for their practices. By helping them to unveil new insights useful for their projects through collaborative discussions with peers, and then sustaining them in the exploration of newly discovered topics throughout the program and beyond; in what can be seen as promising learning networks that could sustain innovators self-development journey also in the future. Thirdly, we reflect on how, by collaboratively reflecting with each other and learning about their practice, innovators also contributed to co-definition of

relevant topics to train for urban innovation practice, which could be generalised in a set of Training Modules addressing methods, tools and practices to the benefit of other urban innovators within and beyond the program itself. We conclude our discussion reflecting on the value of our co-design approach in supporting innovators' capacity building. In particular, we address the key role of participation and reflect on the need to further explore the involvement of larger communities of actors as co-creators and trainers of new knowledge.

5.1 Building a community of practice

The innovators showed enthusiasm towards joining others across Europe already at the start of the program. During the onboarding session welcoming the awarded pilots at the start of each call, innovators were encouraged by the informal and friendly atmosphere generated by the event to get to know each other and share their expectations for the program; among others, to learn from other people's experiences, share learnings, build connections with other organisations, and discover new tools and new methodologies to apply in participatory projects (Fig. 3).

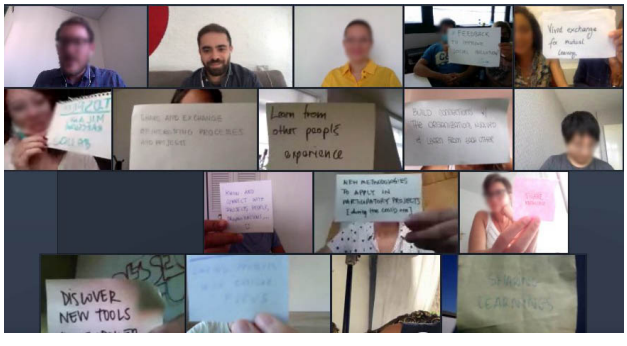

Fig. 3. Screenshot from the onboarding session showing pilots expressing and sharing their expectations on the program.

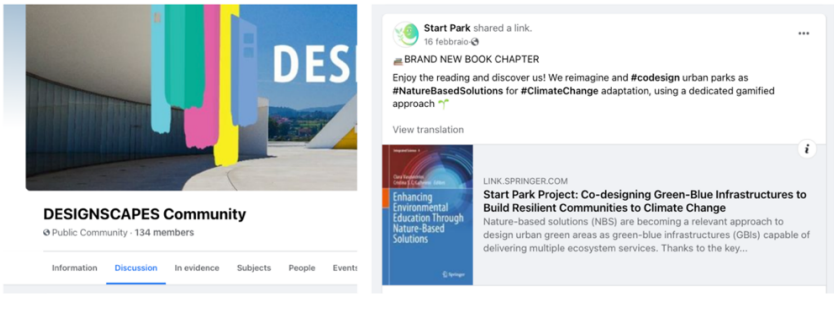

Fig. 4. Screenshots of the Facebook page denominated DESIGNSCAPES Community, taken April 30th, 2022. The left screenshot shows the current number of members registered for the online community, while the screenshot on the right shows one of the latest posts from one of the selected pilots in the program.

The engagement sparked early on, and also motivated them to actively join the online community page, contributing to the gradual creation of a wide online community throughout the second and third open calls. As a result, the online community of pilots gathered more than 130 members throughout the period of our study (Fig. 4), showed to utilise the online page as a fruitful communication space to post updates on their projects, share invitations to relevant events on urban and social innovation across Europe. Interestingly, this successfully kept pilots engaged and connected to the larger community even beyond the scope of their pilot's call. As a demonstration, various innovators from the second call continued to post updates on their projects throughout the third open call until today.

Similarly, the elaborated pilots' profiles facilitated connection and communication among innovators also beyond the program gatherings. By providing a way for innovators to know each other upfront, the blog posts and social media posts helped to lower thresholds for communication among each other, helping them to feel more comfortable engaging in conversations with them inside and outside the program. Furthermore, facilitating pilots to start knowing each other and feeling part of the group also 'from a distance' had an overall positive effect of keeping innovators more connected to the rest of the group also during periods of inactivity in the program (e.g., when they were unable to attend online gatherings due to other pressing duties). The following quote from one of the participants illustrates the value of receiving the list of profiles of other pilots in the program.

"I found really helpful the other day one of the last email that you sent with them, with all the initiatives (profiles)", "that helps a lot, it was like a very first overview… and if we don't have the time to attend some of the meetings, with that at least we can know a little bit more (who they are)."

Interestingly, of the 50 pilots participating in the online learning program, more than a dozen actively contributed to the co-development of the training modules. In the third call, ten out of ten pilots showed outstanding engagement in the reflective activities. The active innovator teams volunteered to reflect on their experiences, providing on-topic examples from practice during the training and articulating new insights, tools and methods, which were valuable in co-creating the Training Modules.

Next to that, the strengthening of connections and relationships among innovators beyond initial introductions was facilitated by the social interactions and exchanges during informal activities such as the community coffee break sessions and the dialogic workshops. In these social moments, innovators could open up and engage in more spontaneous and in-depth conversations about their current projects and overall experiences in their practice, opening up possibilities to create bonds and connections. The following quote from one of the participants exemplifies how the workshops helped to establish a friendly, peer-to-peer atmosphere for community building:

It is true that you can get in contact with anyone. But then when you are in a workshop together and we meet each other, we are discussing something, then I feel more comfortable to ask you the next question. […] in that case with the workshop that you were organising you were putting me, a sort of classmate with them and then it's easier to start that conversation so that part I think, it was very valuable.

5.2 Collaborative reflection

Next to facilitating connection among pilots, the program successfully enabled them in unveiling and developing valuable learning trajectories. Throughout the current program, we observed how the reflective conversations facilitated in the dialogic workshops helped innovators to reach a better understanding of urban innovation practice, articulating and analysing multiple, interconnected aspects of their complex projects (e.g., engagement of multi-stakeholder communities, strategies for sustainability of innovation in the long run). Such collaborative analysis, helped innovators realise previously unconsidered learning needs for their practice, as well as appreciating the value of new specific competencies and expertise as key for the success of their projects. The following quote from a participant of the dialogic workshop on communication and engagement with stakeholders shows how the conversations during the session enabled the innovator to discover and appreciate the value of anthropological research expertise for a better understanding and engagement of diverse communities, and ultimately consider it as a key capability to implement in her team.

"I really think that design when it goes hand in hand with other disciplines, in this case, anthropology, because that's what I was discovering today, can actually take out the best of it. Because it's not just about experimentation is also about research [...] so I would say, my takeaway for today was actually to include in a project (that) previously I was thinking it would involve only the private sector, also the field of research, university and people that are working on these issues…from a different perspective… That may be immediately I wouldn't see the connection, but exploring bit by bit can actually add value to the project per se."

On another occasion, innovators reached more collectively a better understanding of more strategic tasks to address in their projects, as happened during the first session on funding for social ventures, where innovators evaluated collaboratively several strategic factors that played a role in maintaining or challenging their financial sustainability over time (e.g., costs, partners, organisational set up). On that occasion, the group ultimately identified the aspect of governance as one common crucial element that was directly linked to their ability to attract funding and therefore, to sustain their projects. Learning how to address this aspect, as the following quote shows, was therefore recognised by many as one of the crucial learnings to be addressed in the upcoming months.

"It was interesting to see that we are sharing a bit the same struggle connected with the next steps, not because necessarily we have the same type of obstacles, but just because understanding what is the governance that our project will have after the incubation [...] is something that we are all somehow concerned. And it's directly connected also with the funds that we will potentially attract. So, in perspective, something that can be interesting, for me I'd say, is to learn how these different models of governance can actually impact your project and the access to certain funds."

5.3 Collaborative learning trajectories

Interestingly, lessons on participation showed that the more active participants, who actively engaged in multiple sessions, generally fostered highly insightful conversations with other pilots, they continued participating in the following activities and ultimately articulated their self-development journeys. In particular, exploration of particular topics for their practices was sustained throughout the variety of program activities and continued even beyond. In fact, more active pilots successfully contributed to the establishment of a peer-learning network that could further support their ongoing self-development. Fig. 5 shows an exemplary learning journey of one of the innovators in the program articulating the broadness of her challenge to engage with a new community of stakeholders.

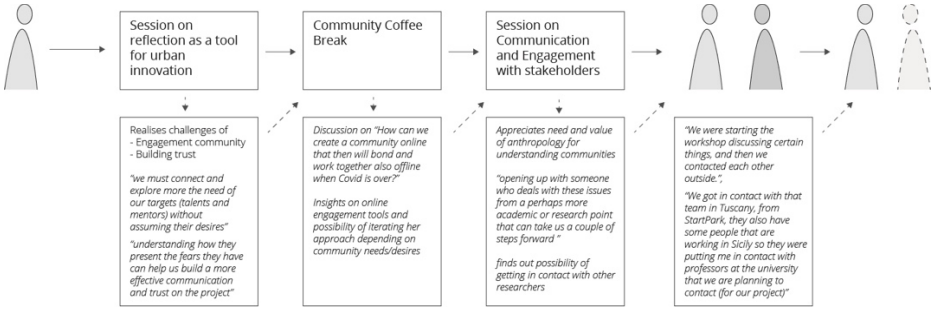

Fig. 5. The steps of a participants' learning journey highlighting the topic of engaging with new communities of stakeholders, through three different activities in the program, and finally in an external interaction moment with another pilot taking part in the program.

Fig. 5 shows how the participant was first enabled to identify the topic as relevant to her own project by participating in the online workshop on using reflection to approach urban innovation projects. During the workshop, she realised the need to figure out how to better know the community of stakeholders she is working with in order to communicate effectively her goals and build their trust in the project. Inspired by these insights, she decided to dive deeper into the topic by joining the following coffee break session, where she initiated a discussion in regard to online engagement and community building among youngsters involved in her project. Afterwards, to further dive deeper into the topic, she joined the session on communication and engagement with stakeholders, where she had the chance to engage in a one-on-one in-depth conversation with another peer, with whom she realised the possibility of involving research professionals in her project to better know the community of actors she is working with. Interestingly, her learning journey on the topic did not stop there, instead continued beyond the program activities. In fact, as the following quote shows, she later contacted the same innovator that she met during the session also after the workshop, who facilitated her further connection with another researcher with whom she is now planning to establish further collaboration for her projects.

"We were starting the workshop discussing certain things, and then we contacted each other outside [...] we got in contact with that team in Tuscany, from Start Park, they also have some people that are working in Sicily so they were putting me in contact with professors at the university that we are planning to contact (for our project)"

The learning path of this innovator demonstrates the value of the program in enabling the continuous learning process of participants, accompanying pilots from the initial step of identifying learning needs, to connect with others, learn with them, and further repeat this learning cycle. At the same time, it also highlights how the fruitful conversations facilitated during the program also helped innovators to gradually increase their learning networks, even beyond the program community, as promising infrastructures to support continuous growth, also in the future.

5.4 Co-defined learning needs consolidated in training modules

The elaborate co-design process of a collaborative learning environment not only enabled innovators to build new knowledge for their projects, but also proved valuable to facilitate a continuous co-definition of needed resources for the capacity building program. In fact, through their in-depth conversations and reflections, innovators did not only unveil valuable insights on methods, tools, and strategies for their projects, but also highlighted what were previously unknown challenges and needed capabilities for urban innovation practice. By doing so, their discussions successfully informed the (co)development of new topics to be addressed with upcoming training sessions in the program. As mentioned before, a total of ten Training Modules were elaborated as a result of the reflective conversations held during the online sessions. Fig. 6 illustrates the reflective process and co-definition of new topics.

Fig. 6. The co-definition of a new topic to train in the remainder of the capacity building program. Through the dialogic workshop on reflection as a tool for urban innovation, the challenging topic of communication and engagement with stakeholders was unveiled, informing the upcoming homonym workshop.

More specifically, the figure illustrates how the dialogues during the dialogic workshop on reflection enabled the innovators participating to define the more pressing challenges in their projects' next steps, among which the engagement and communication with communities. These challenges served then to design a next dialogic workshop aimed to address, together with innovators, more specific obstacles and strategies needed when engaging and communicating with various stakeholders in their urban innovation projects. Another activity that proved instrumental in the identification of new latent needs in pilots' projects, and therefore in the co-definition of new relevant topics to be addressed, was the one-on-one conversations held during the profile interviews. Such informal discussions with pilots really enabled us to get to know more closely the teams behind these projects, and with that also some of the biggest fears and needs that they were facing. As the following quotes show, two main challenges unveiled through the interviews were for example the urgency to identify strategies for the longer-term financial sustainability of their projects beyond the program itself, as well as the difficulty in assessing the social impact of their projects.

"Maybe from a business point of view, (to) see how our service can evolve and can have different ways of sustaining itself in different contexts… I mean like an advice of how to behave from a business point of view. [...] So not only what model shall we design in order to sustain ourselves, but also how to get investment… because we are very inspired into moving to be a start-up, but we are kind of missing some things in order to make it happen."

"For example, with what do we say the impact (we are having), and another way of measuring the impact and all that… I would like to have some indications of that… don't really know what to say"

Informed by the interviews, four online sessions (respectively two on strategies for financial sustainability of mission-driven ventures and two on measuring the impact of social ventures) were organised in the program. During the interviews for profiles, some of the pilots also highlighted the desire to interact with practitioners from a more entrepreneurial background. This insight informed an important iteration of the upcoming dialogic workshop, that in fact involved the participation of practitioners beyond the network of the project consortium, namely social entrepreneurs and consultants, as well as one of the pilots in the program, as trainers in the sessions.

6 Discussion and conclusions

Overall, the outcomes of our co-developed capacity building program showed that our co-design approach was valuable in facilitating connection and collaborative learning among pilots, and shows promise in sustaining innovators in their self-development journeys for their projects. Furthermore, taking a co-design approach showed value in gradually unveiling the nuanced and specific learning needs of pilots, and iteratively adapting our learning infrastructure with relevant resources and training that could sustain their growth over time.

Results also highlighted, however, that the impact and effectiveness of such a capacity-building approach are highly dependent on participation and active engagement. Pilots, who were more active throughout the program and eager to learn with other peers, were also the ones who best contributed to the co-creation of learning activities, and benefited the most from the provided learning environment. While some were easily engaged in this process, for others the value of collaboratively learning and exploring with their peers how they could improve their projects may have not always been necessarily self-evident. On the contrary, for these pilots the potential contact points with peers and the relevance of training activities, had to be made more explicit to motivate them to take part in the program activities. Iterating on the touchpoints, we understood that closer interaction with pilots is what enabled us to best understand what were their needs, as well as their obstacles for participation in the program activities. Among other things, we realised that one-on-one interactions with participants were crucial to unveiling these important insights affecting engagement and participation. This finding was supported by interviews conducted for the pilots' profiles. Through those conversations, we collected important insights that informed the detailing of the upcoming program activities, making these even more relevant, and enabling more active participation from pilots. Understanding the key for their engagement in the program activities, consequently opened the possibility of more in-depth and interesting discussions during the online workshops, with the effect of ultimately increasing the benefit for all innovators involved and better informing the development of the program itself. For future work, it would be beneficial to increase our efforts in establishing informal one-on-one moments of closer interactions with pilots from the very beginning and with the whole group, as now this happened only with the ten pilots, halfway through the third open call for scaling. In this way, gaining deeper knowledge of the entire community more systematically would enable us to infrastructure an increased amount of punctual and relevant events, as shown from the sessions on communication and engagement, strategies for funding and impact measurement.

In fact, the designed mechanism that helped to co-define and unveil with pilots new unconsidered topics to be trained throughout the program also ended up stretching the expertise required to offer training activities capable of addressing these multiple unveiled needs. In other words, the more we unveiled new and specific pilots' needs, the more we realised the need of reaching out to different experts outside the initial network provided by the project consortium, to be capable of developing appropriate training activities. Although this may raise the challenge of continuously changing a learning infrastructure over time, it also stresses the relevance of the premise from which the current study originated. Namely, the need of exploring collaborative approaches for the development of large-scale capacity building programs in order to sustain the continuous development of urban innovation pilots over time. The continuous revelation of new learning needs stresses the importance of further exploring how to collaboratively infrastructure learning environments for urban transformations that are capable of involving larger numbers of participants as co-creators and trainers of those emerging topics. In this way triggering a mechanism that could continuously expand the pool of societal actors that can contribute to the creation and diffusion of knowledge. To develop these mechanisms, further experiments of larger-scale co-design approaches need to be continued in the future. The results of the current study confirm that co-creation can be a valuable approach to provide a

supporting infrastructure for the continuous growth of urban innovation pilots. However, it also stresses the need to further investigate the value of collaborative capacity building approaches as a means to activate a larger pool of facilitators and trainers that can contribute to the continuous development of learning infrastructures for urban innovators.

The present study investigated the use of co-design for the collaborative development of a large-scale capacity-building program within the context of a European-funded project. The aim was to investigate how to facilitate the continuous self-development journeys of urban innovation pilots throughout their projects. For this, a set of touchpoints have been iteratively designed to actively connect with the participating pilots in the program, and engage them in a collaborative reflection through a series of online training activities, purposefully designed to elicit innovators' lessons and challenges from their practice. Connecting pilots through the touchpoints was instrumental to engage them in further connecting with other peers, collaboratively learning with each other, and ultimately diffusing the new knowledge generated in the program. It can be concluded that our collaborative approach not only resulted in the elaboration of multiple training activities and the creation of a set of Training Modules on urban transformation, but also fostered community participation and peer-to-peer learning networks capable of supporting pilots to sustain their self-development journeys even beyond the program. Our promising results highlight the importance of exploring the enabling role of design in supporting collaborative processes to develop learning infrastructures capable of continuously expanding the pool of societal actors contributing to the creation and diffusion of knowledge for urban transformations.

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