Towards a framework for urban landscape co-design

Linking the participation ladder and the design cycle

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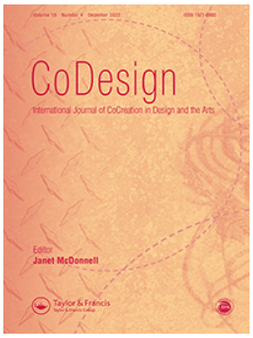

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Towards a framework for urban landscape co-design: Linking the participation ladder and the design cycle

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ABSTRACT

With the increasing social and ecological pressures on urban settlements, re-thinking how we produce them becomes a growing concern. Due to the diversity of actors across sectors and backgrounds involved in such design processes, collaboration is of utmost importance. Co-design can thus play a crucial role in integrating aims and knowledge as an evolving institutional process toward feasible, suitable and legitimate projects. While many studies on co-design focus on one-time activities, little attention is paid to conceptualising how such processes occur, involving several actors in dynamic participatory ways. We propose a Co-Design Framework and suggest that collaboration is achieved at many levels within different design steps in the process. Analysing three Chilean public space co-design processes through the lens of our framework, we highlight the intrinsic diversity of such an approach. This study posits that three co-design arenas interact (strategic, transdisciplinary, and socio-cultural) according to their main aims to enable, inform, and legitimise the projects accordingly. Our framework contributes to conceptualising and analyzing co-design and may also be useful to plan and develop such processes in academia and practice.

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Co-design; public space; design process; urban landscape; collaborative design; Chile

1. Towards a framework for urban co-design

1.1. Co-design: more than just collaboration in design

Co-design refers to the collaboration of multiple actors in the design process aiming to improve the outcomes (Sanders and Stappers 2008). It follows the participatory design tradition, emphasising collaboration in design processes (Manzini 2015; Mattelmäki and Sleeswijk Visser 2011; Sanders and Stappers 2008). In recent years, it has been said to contribute to solving complex problems (Manzini 2015) while improving the outcomes' legitimacy, context-specificity, innovativeness, feasibility, and, ultimately, their sustainability and resilience (Baibarac and Petrescu 2019; Gaete Cruz et al. 2021; Hansen et al. 2019; Lang et al. 2012; Manzini 2015; Mulder 2015; Munthe-Kaas 2015; Palmås and von Busch 2015). Specifically in urban design, actors come from multiple sectors (public,

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private, academia, non-profit, community) and knowledge backgrounds (strategic, transdisciplinary, socio-cultural) (Webb et al. 2018). Such collaborative and democratic processes (Huybrechts and Teli 2020) deal with the diverging aims and knowledge of the involved actors (Baibarac and Petrescu 2019; Huybrechts, Benesch, and Geib 2017; Ostrom 1996, 2007; Sanders and Stappers 2014) and may require deliberation, negotiation or other problem-solving forms (Castro 2021). Collaboration, thus, occurs in dynamic multi-sectorial ways and in transdisciplinary teams, integrating formal and informal knowledge, values, and skills (Baibarac and Petrescu 2019). Such complexity of co-design is not always approached and much less conceptualised both in academia and practice. With this article, we contribute toward conceptualising and evaluating urban landscape co-design processes (Szebeko and Tan 2010).

Many studies have focused on co-design moments (McDonnell 2018; Saad-Sulonen et al. 2018) and the use of tools and methods to facilitate horizontal interactions and shared understandings amongst diverse participants (Sanders and Stappers 2014; Sanders 2014, 2008). Some have attempted to map tools and methods (Gaete Cruz et al. 2022; Sanders and Stappers 2008; Sanders 2008). Others have conceptualised the levels of collaboration or the factors influencing it (Drain and Sanders 2019). However, little attention has been paid to conceptualising how co-design processes take place, particularly how actors collaborate in design steps to pursue diverse aims.

Recent studies have suggested that more process-oriented conceptualisations of co-design have yet to be developed (Gaete Cruz et al. 2021; Halskov and Hansen 2015; Huybrechts, Benesch, and Geib 2017; Koskela-Huotari, Friedrich, and Isomursu 2013; Manzini 2015; Manzini and Rizzo 2011). Some suggest that collaboration and design are open and dynamic processes that evolve through multiple timeframes and episodes (Andersen et al. 2015; Huybrechts, Benesch, and Geib 2017; Poderi et al. 2018). At the same time, others have developed process-oriented approaches to conceptualise how co-design unfolds over time (Saad-Sulonen et al. 2018). The question remains, how can we conceptualise the complex dynamic processes of collaboration in the design process? Moreover, how do urban landscape co-design processes take place while integrating diverse actors and aims? Furthermore, how can we analyse such dynamic, collaborative design processes?

To help answer these questions, we developed a twofold framework for urban landscape co-design and applied it to the study of three Chilean public space co-design processes. In our framework, we reinterpret Arnstein's participation ladder (Arnstein 1969) and link it with the design cycle steps (Jonas 2007; Roozenburg and Eekels 1995). Bridging these two bodies of literature is novel and allowed us to envision three coexisting co-design arenas. The latter and the framework may be the main contributions of this study.

1.2. When the ladder of participation meets collaboration

Arnstein's ladder (Arnstein 1969) is often used to assess citizen participation in design (Andersen et al. 2015). Although, the metaphor of the ladder is relatively static, limiting and represents a continuum that does not fully apply to processes that change through time while diverse actors are involved in different ways (Andersen et al. 2015; Bowen et al. 2013; Collins and Ison 2009; Greenhalgh et al. 2019). The duality between a leading actor

Table 1. Proposed ladder of collaboration.

Collaboration Recurrent shared decision-making that builds long-lasting partnerships.	High participation (Brysch, et al., 2021), Institutioning (Huybrechts, Benesch, and Geib 2017), social innovation and intense collaboration (Manzini 2015), infrastructuring (Björgvinsson, Ehn, and Hillgren 2012), social learning (Reed et al. 2010), partnership (Arnstein 1969).
Participation Involvement in the decision-making of some elements or partial issues of the project.	Mutual learning (Björgvinsson, Ehn, and Hillgren 2010), horizontal collaboration (Manzini 2015), Functional participation (Pretty 1995), placation (Arnstein 1969).
Consultation Contribution of information (knowledge, values) to the process. An advisory level without shared decision-making.	Information feedback (Connor 1988), participation by consultation (Pretty 1995), consultation (Arnstein 1969).
Information Communication about the process and the project. One-way flow of information to report or raise awareness.	No collaboration (Manzini 2015), Passive participation (Pretty 1995), Education (Connor 1988), Informing (Arnstein 1969).

and users' participation is somewhat restrictive if we aim to analyse network configurations within the urban. Following the Scandinavian and Dutch participatory design traditions, this has been a significant shift in participatory and collaborative design literature (Mattelmäki and Sleeswijk Visser 2011). The opportunities to address design from a more horizontal perspective, with multiple actors collaborating and experimenting, may be considered an additional step on the ladder. Such design traditions have highlighted the challenges and opportunities of pursuing more balanced power dynamics amongst diverse actors that are not only users or citizens (Lee 2008). Their involvement cannot merely be considered from a top-down or bottom-up perspective but as a collective social learning process (Collins and Ison 2009). In doing so, collaborative dynamics can be understood simultaneously as bottom-up, top-down, and peer-to-peer across conventional design boundaries (Koskela-Huotari, Friedrich, and Isomursu 2013; Manzini 2015).

In this study, we adhere to the evolution of the ladder and reinterpret it to conceptualise co-design. We define four levels of collaboration, disregarding the extremes in Arnstein's ladder. We propose four steps of the ladder to assess the level of collaboration in co-design: information, consultation, participation, and collaboration (Table 1). The lower levels of 'information' and 'consultation' stimulate the involvement of actors with an expert orientation, but they are understood as building blocks for collaboration. The higher levels of 'participation' and 'collaboration' allow the genuine involvement of the actors in decision-making. The first establishes temporary involvements while the latter permanent ones. The higher level of collaboration promotes partnership building that can only be achieved long-term. This way, the lower levels, 'manipulation' and 'therapy', were not considered forms of genuine collaboration and are understood to respond to the provocativeness of the publication of the ladder (Connor 1988). Similarly, the higher levels of 'citizen control' and 'delegated power' are not considered forms of collaboration (Gofen 2015; Pretty 1995) and may even not be feasible (or desirable) when designing urban public spaces.

Our ladder then specifies collaboration but does not explain its effects on the design processes. We then analyse how collaboration relates to the concept of design by understanding the design cycle in the following section.

Table 2. Proposed design steps.

Research Gathering of relevant knowledge and values to inform the project.	Research (Van de Ven et al. 2016), investigating, informing, and communication design (Manzini 2015), research (Jonas 2007), data gathering (Preece, Sharp, and Rogers 2001).
Analysis and Synthesis Analysis and synthesis of information, main criteria or requirements for the project.	Analysis (Jonas 2007; Roozenburg and Eekels 1995; Van de Ven et al. 2016), exploration (Van de Ven et al. 2016), triggering and enhancing (Manzini 2015), analysis and establishing requirements (Preece, Sharp, and Rogers 2001), synthesis (criteria) (Roozenburg and Eekels 1995).
Projection, Ideation Designing the project or ideating possible solutions or particular aspects of it.	Simulation (Roozenburg and Eekels 1995), designing alternatives (Preece, Sharp, and Rogers 2001), variation and projection (Jonas 2007), visioning, scenario and strategic design (Manzini 2015), testing (Van de Ven et al. 2016).
Selection, Decision-making Evaluation and decision-making of the most convenient option. This step often leads to a new design cycle.	Evaluation and decision (Roozenburg and Eekels 1995; Van de Ven et al. 2016), Selection and synthesis (Jonas 2007), evaluating (Preece, Sharp, and Rogers 2001).

1.3. When collaboration meets the design cycle

Co-design is not only about the collaboration between actors but about how diverse knowledge, values, aims, and skills are integrated to influence the design outcomes (Ostrom 1996; Sanders and Stappers 2008; Vargo and Lusch 2004, 2008). Design has been defined as 'a trial-and-error process that consists of a sequence of empirical cycles, in which the knowledge of the problem and the solution increases spirally' (Roozenburg and Eekels 1995, 88). The dynamics in design processes have often been conceptualised as design cycles that establish the processes' repeated design steps and phases (Hansen et al. 2019; Jonas 2007; Roozenburg and Eekels 1995). The basic design cycle distinguishes five steps (Roozenburg and Eekels 1995) that match the success criteria for design (Sanders 2006) and the evolution pattern and microcycle of design (Jonas 2007). We combined such cyclical approaches to define four design steps: research, analysis, projection, and selection (Table 2).

In urban co-design processes, the search and analysis of relevant information and requirements may be as important as the design of possible solutions and the definition of the most appropriate one. In this sense, a collaborative approach to the design steps may foster different co-design dynamics that clarify the co-design approach. Collaboration in research and analysis may foster more context-specific projects while promoting shared understandings and, ultimately, social learning (Gaete Cruz et al. 2021). Collaborative approaches to projection and selection may ensure consensus-building legitimising the outcomes (Gaete Cruz et al. 2021).

1.4. Linking the ladder and the cycle

To better understand how the different levels of collaboration occur in the different design steps of co-design processes, we developed a Co-Design Framework that linked the proposed collaborative ladder with a cyclical approach to design as shown in Figure 1. In such a way, various co-design moments can be mapped and analysed in the co-design landscape. For instance, while some co-design processes may foster higher levels of collaboration in the initial steps, others may promote them in the latter ones. However, both may be considered co-design processes within the co-design landscape.

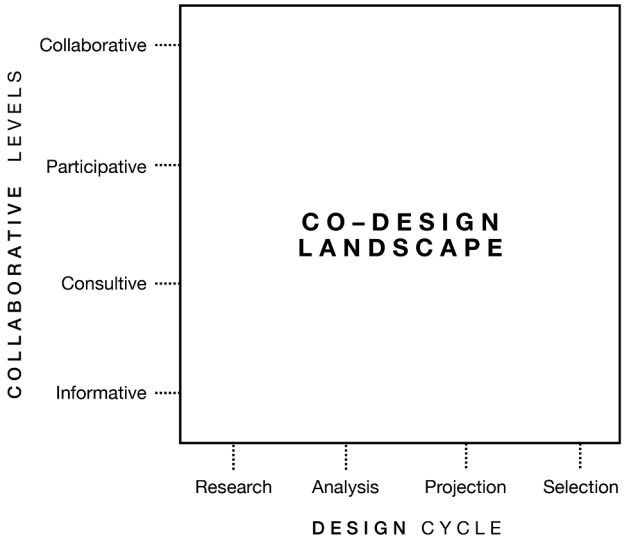

Figure 1. Co-design framework: collaborative levels and design steps.

Integrating diverse knowledge and skills during the 'research' and 'analysis' steps promotes shared understandings and learning that may contribute to more context-specific designs. Similarly, collaboration on the 'analysis' and 'projection' steps allows prioritising criteria and the generation of solutions to be consensual and legitimate. This prepares the ground for shared selection and decision-making that involves a higher institutional willingness and commitment. In this sense, on the lower levels of collaboration, an expert mindset prevails from the leading actors that aim to design while engaging with others. Moreover, higher collaboration levels aim for genuine negotiations and shared decision-making towards reciprocally designing with others. In sum, we understand co-design as a process in which diverse actors may interact at several collaborative levels within specific steps of the design cycle. A wide variety of co-design moments may occur in such processes to foster more context-specific, legitimate, and feasible urban design projects (Gaete Cruz et al. 2021). This study uses the twofold Co-Design Framework to map and analyse the activities of three public space co-design processes in the Atacama Desert.

2. Methods and cases

2.1. Method

This study aims to contribute an in-depth understanding of complex and contemporary phenomena such as the co-design of public space. We undertook a comparative case study building on primary and secondary data obtained through fieldwork conducted in December 2019 and January 2020. The primary data consisted of thirty-three semi-structured in-depth interviews of key participants. Their selection considered the inclusion of different sectors and backgrounds to make the sampling

comprehensive (Ridder 2017). Secondary data included public reports, media publications, and design plans. We triangulated data from the interviews, documents and observations on site.

The interviewees were asked to describe the co-design processes identifying the involved actors and relevant activities. We aimed to gain in-depth insights into their perceptions. The data analysis consisted of four main steps (Bryman 2016). First, we organised and transcribed the data. Then, we designed a coding based on the interview questions. Next, we coded the data in-depth with Atlas Ti software. Finally, we undertook a thematic analysis. The explanatory results helped us answer the research question and classify data into our proposed framework.

The first author of this study was partially involved in the process of the three cases. We acknowledge that such involvement might bring legitimacy issues to the study but has enabled access to data and interviews that would have been difficult to obtain otherwise. Similarly, the familiarity developed with the cities, actors, and territories enabled valuable insights for this study (Labaree 2002).

2.2. Cases: three public space co-design processes

We analysed three public space co-design processes in depth (Table 3). The cases were selected as innovative co-design processes in the last decade in the Chilean institutional context. In Chile, organisations tend to operate in silos (Barton 2013; Krellenberg et al. 2014; Orellana et al. 2016), citizen participation is relatively shallow (Barton, Krellenberg, and Harris 2015; Lecannelier 2015), and interdisciplinary design is an emerging phenomenon (Aldunce et al. 2016; Gaete Cruz et al. 2021; Krellenberg and Barth 2014). In this context, the institutional settings of the cases involved inter-sectorial partnerships, multidisciplinary teams, and active community associations. The cases are currently receiving considerable local attention due to their collaborative and resilient design approaches (Consejo Nacional de Desarrollo Urbano Chile 2018; Moreno 2018).

The three cases consist of adaptation measures on public spaces aiming for context-specific solutions to connect, foster social interactions, and deal with water scarcity, droughts, island effect, and water-related risks in the Atacama Desert in Chile. Two of them are city-sized longitudinal urban parks on the riverbed in Copiapó city and the seaside in Antofagasta city. The third case is a multi-neighbourhoods pedestrian connection from the hills to the seaside within the city, integrating the vulnerable upper neighbourhoods and informal settlements with the lower areas where most of the services are located.

The three selected cases were designed involving different actors. Case 1 is an example of collaboration among two ministries, a transdisciplinary team integrating landscape and hydraulic designers, and some citizen participation endeavours. Cases 2 and 3 are led by Creo Antofagasta, a public-private-people-academia living lab partnership (Steen and van Bueren 2018), and active citizen involvement in interdisciplinarity and intersectorial approaches to the design processes. While the involvement of a diversity of actors in each of the three cases demonstrates their collaborative approach to design, the relative level of their involvement varies widely depending on their respective contributions and influence on the projects designed.

Table 3. Description of the cases and the actors involved.

Case	Case 1 Kaukari Urban Park (c1)	Case 2 Antofagasta Seaside Park (c2)	Case 3 Antofagasta Sea-hill Pathways (c3)
Location	Copiapó city, Chile.	Antofagasta city, Chile.	Antofagasta city, Chile.
Size	60 ha. 3,5 km.	35 km long.	4 ha. 3,5–2 km.
Project type	Urban Park in a naturalised riverbank.	Urban Park along the seaside.	Pedestrian pathways connecting the hill to the seaside.
Design consultancy	2011–2013. Teodoro Fernández Architecture Studio and Bonifacio Fernández.	2017–2020. Teodoro Fernández Architecture Studio, Urbana ED, GSI Engineers.	2017–2018. Nicole Rochette and Associate Architects, Creo Antofagasta.
The main funding sources for implementation	Housing and Urbanism Ministry and Public Infrastructure Ministry.	Public Infrastructure Ministry and BHP Billiton company.	Housing and Urbanism Ministry and BHP Billiton company.
Actors involved	Housing and Urbanism Ministry, Public Infrastructure Ministry, Municipality of Copiapó, Regional Government of Atacama, National Assets Ministry, Social Development Ministry, Teodoro Fernández Associate Architects, Habiterra Consultancy, Community Organisations.	Public Infrastructure Ministry (Port Infrastructure Office, Road Infrastructure Office), Housing and Urbanism Ministry, Municipality of Antofagasta, Regional Government of Antofagasta, Social Development Ministry, Chilean Army, Teodoro Fernández Associate Architects, BHP Billiton, Creo Antofagasta NGO, Urbanismo Social NGO, University of Antofagasta, Catholic University of the North, Citizen Council, Community Organizations	Housing and Urbanism Ministry, Social Development Ministry, Municipality of Antofagasta, Regional Government of Antofagasta, BHP Billiton, Econsa Water Company, Adasa Water Company, Boa Mistura, Creo Antofagasta NGO, Mi Parque NGO, Ciudad Emergente NGO, University of Antofagasta, Catholic University of the North, Citizen Council, Community Organizations

The public sector led Kaukari Urban Park (c1), and the design teams took a prominent role in strategic and transdisciplinary design decision-making. This allowed for innovative transdisciplinary design solutions, which is unusual in the Latin American context (Barton, Krellenberg, and Harris 2015). This twofold leadership also allowed the park's construction soon after its design in 2015 and 2018. However, the community actors had an early involvement, which generated a rather conventional approach to social uses and spaces as an urban park for the city.

For cases 2 and 3, Creo Antofagasta NGO leads the strategic, transdisciplinary, and socio-cultural interactions throughout the process. This resulted in both opportunities and difficulties in legitimising the process through the years. Both the Citizen Council (representing citizens) and the Regional Industries Association (representing the private sector) had a positive impression of the initial leading role but reported a lack of communication and missed opportunities for collaboration leading to distrust in some of the later phases.

The Seaside Urban Park (c2) had several multi-actor meetings in the early phase that promoted shared understandings and empowerment, resulting in a context-specific seaside park. However, various citizen (citizen council), private (Regional Industries

Association), public (municipality), and the third sector (*Urbanismo Social* NGO) actors reported that the lack of communication in some of the design phases discredited the process.

The Sea hill Pathways (c3) design process lasted much longer than the previous case. The initial socio-cultural interactions with the neighbourhoods addressed a wider variety of problems than the project could solve, so other projects and activation initiatives emerged within the neighbourhoods, such as participative paintings, green recycling waste disposals, and cleaning of illegal dumpsites. This resulted in a much less consistent and coherent co-design process with the side-effect that the final design ended up being somewhat disconnected from the local aims and interactions in the urban neighbourhoods. In this case, the local public sector that should have played a strategic role at a local level failed to deal with the regulatory limitations and opted to remain a technical actor.

In the three cases, citizens provided formal and informal knowledge and values that conditioned the public space designs. In case 1, some neighbourhood associations, school representatives, and students were informed and consulted in rather traditional meetings. While on the other two cases, local actors, citizen organisations, neighbourhood associations, and the 'citizen council' were involved in strategic and technical co-design activities.

The private sector and academia had no participation in case 1. However, they played an essential strategic role in cases 2 and 3 as the Executive Committee members approved budgets and reviewed the progress of the consultancy stages. They also provided valuable socio-cultural knowledge that influenced the designs. An example of this was acknowledging botanical and animal areas that were to be protected in the seaside park project.

3. Results: the three processes in the Co-Design Framework

The Co-Design framework was used to classify and map the co-design activities reported by the interviewees for the three urban co-design processes (Figure 2). First, we positioned the activities according to the level of collaboration of the actors in specific design steps of the cycle. Activities that aimed to gather information were classified as 'consulting research' (lower-left). Meetings to share the development of the projects were mapped as 'informative decision-making' (lower-right). Likewise, meetings aiming to develop the projects were mapped as 'collaborative projection and decision-making' (upper-right) because they were roundtables in which the actors regularly contributed (the design or the technical teams). Recurring meetings to gather information to condition the projects were classified as 'collaborative research activities' (upper-left). Some activities were placed in one position, while others comprehended more than one.

The diverse activities suggest that not purely design-oriented acts, decisions and interactions were made, but also ones aiming to enable cutting edge projects, increasing their feasibility, strengthening their local suitability and legitimacy (Table 4). The diverse activities were grouped according to their primary aims: feasibility, context-suitability, and legitimacy of the projects. This allowed the identification of three coexisting co-design arenas: the strategic, the transdisciplinary, and the socio-cultural design arenas. This suggested that co-design could consider not merely technical design acts but also strategic, transdisciplinary, and socio-cultural ones.

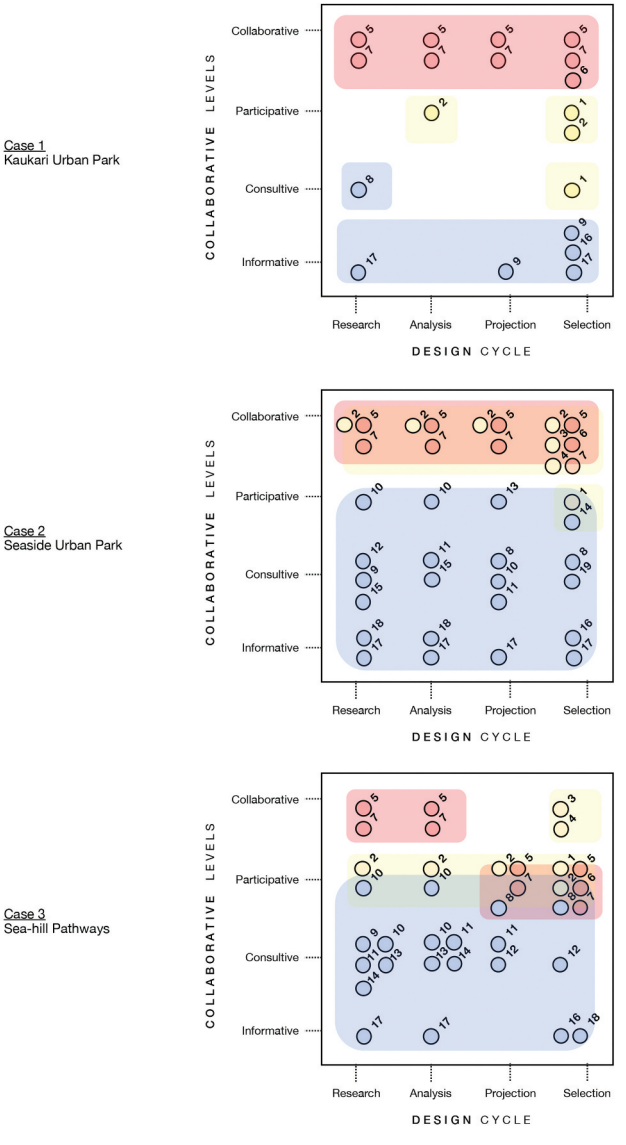

Figure 2. Co-Design framework and cases 1, 2, and 3 accordingly. Activities (numbers) and arenas: strategic (yellow), transdisciplinary (red), and socio-cultural (blue).

In the following sections, we focus on the results of each of the cases analysing the co-design activities and arenas we observed to have interacted in such process.

3.1. Kaukari Urban Park

Kaukari Urban Park is an interesting integrated project regarding transdisciplinary design solutions and an inter-sectorial implementation. The public space project integrated social and ecological elements in the riverbed along the city, addressing flooding

Table 4. Activities reported by the interviewees organised according to the main pursued aim.

	Case 1 Kaukari Urban Park (c1)	Case 2 Antofagasta Seaside Park (c2)	Case 3 Antofagasta Sea-hill Pathways (c3)
	Strategic activities		
1	Strategic national level meetings	Strategic national level meetings	Strategic national level meetings
2	Strategic local government meetings	Strategic local government meetings	Strategic local government meetings
3		Executive council	Executive council
4		Operative Comitee finance meetings	Operative Comitee finance meetings
	Transdisciplinary activities		
5	Technical meetings	Technical meetings	Technical meetings
6	Technical aproval meetings	Technical aproval meetings	Technical aproval meetings
7	Design meetings	Design meetings	Design meetings
	Cultural activities		
8	Citizen participatory meetings	Design workshops (2017)	Design workshops of partial project (square) (2015)
9	Public participatory hearings	Citizen participatory meetings (2013)	Citizen participatory meetings
10		Seaside multi-actor roundtables (2013, 2017).	Multiple-neighbourhood meetings (2014 – 2019)
11		Tactical urbanism initiatives on site (Gran malón La Chimba, Vive tu borde costero) (2017)	Neighbourhood meetings (2014 – 2019)
12		Activation initiatives on site (Juegos del Mar, Beach cleaning, Vive tu borde costero) (2016–2019)	Tactical urbanism initiatives on site (Participative facade paintings, participative tree planting)
13		Seaside pavement design contest (2016)	Activation initiatives on site (Gran Malón)
14		Seaside pavement contest – general public voting (2016)	Citizen Foums – Sustainability and neigborhoods
15		Citizen Foums	
	General public activities		
16	Project expositions on public spaces and buildings	Project expositions on public spaces and buildings	Project expositions on public spaces and buildings
17	Media publications	Media publications	Media publications
18		Seminario Concurso de borde costero (publico general)	Inauguraciones de proyectos parciales (Plaza Antonio Rendic, Plaza La Cantera)
19		Opening of partial projects (La Chimba Beach)	

and fluctuating river flows. The design process was transdisciplinary, and such an integrated approach was also adopted by the public organisms that committed to finance and implement the project together. Both collaborative approaches were relatively rare in the Chilean context.

We recognised strategic activities in which participative analysis and decision-making were achieved through the process. This was the case of inter-sectorial public interactions. Even the design team was involved to ensure that the ambitious and rather cutting-edge project was feasible, both budget and regulatory wise.

Conversely, trans-discipline was accomplished within the design teams in permanent collaboration with the main involved public parties. A great diversity of formal pieces of knowledge and professional practitioners were involved in the project regarding the design of the project's social, technical and ecological elements. At the same time, the inputs from the community were rather generic. The project seems to have resulted from knowledge co-production and multiple discipline interactions towards defining both the

problems and solutions. The close work of the urban landscape design team with the hydraulic engineers towards a riverbed urban park design is of great relevance.

Regarding the involvement of citizens and the community, this process was rather conventionally approached. Activities opened for non-conventional actors only achieved informing and consulting levels of collaboration in research and analysis. This was the norm within the rather conventional top-down institutional setting. This may explain that although transdisciplinary and collaborative, the design solution failed to capture existing specific local social requirements such as specific sports or cultural activities. Despite this, the project designed considers defined spaces and undefined ones, so it is somewhat adaptable to emergent social and ecological conditions (Gaete Cruz et al. 2021).

All interviewees expressed that the project was context-specific and valued by the community because the project was implemented in recent years, and two crucial floodings have already occurred since then. However, this sense of local suitability was developed over the years after.

The many involved disciplines and professionals, especially urban landscape and hydraulic designers prove the design's transdisciplinary approach. The joint funding and implementation amongst public parties result from strategic collaboration, and Kaukari Urban Park's co-design process illustrates a transdisciplinary and strategic collaborative approach.

3.2. Antofagasta Seaside Park

Antofagasta Seaside Park was promoted by a living-lab NGO (Creo Antofagasta) that partnered with actors from diverse sectors and backgrounds such as the public, private, citizen, third sector and academia. Such a collaborative approach blurred the boundaries of design within a wide variety of stakeholder decision-making settings. We recognise an innovative, collaborative approach to strategic, transdisciplinary, and socio-cultural design-decision multi-actor activities.

Much public inter-sectorial dialogue was fostered in this process, and the implementation was planned with public and private funding sources. These resulted from a long-term strategic relationship-building process with other relevant public and private actors led by the NGO.

On the other hand, the project was developed by a design consortium of architects, urban landscape designers, engineers, and process managers. The leading urban designer might have taken the lead in fostering and facilitating collaboration throughout the design process. Also, before the formal design consultancy started, the consortium received vast amounts of formal and non-formal knowledge and analysis collected and synthesised in the previous phase. This significantly influenced the project and complementary activities on site (tactic urbanism, activation initiatives, seminars, pavement contests, sea sports festivals).

The previous may have also promoted the socio-cultural legitimacy of the ambitious city-sized proposal. Early activities allowed community organisations and academics to participate in design. Multi-actor round tables achieved a participative research and analysis level in which the involved interviewees valued as genuine, eye-opening, and trust-building. Nevertheless, some community members reported that effective

communication with the transdisciplinary arena was lost in the later stages of the process, leading to confusion and mistrust. Anyhow, the pavement contest activities allowed the community to design and vote for an iconic pavement pattern for the main pathways of the project. This allowed participative design variation and selection, even though only for one element of the general urban park design. The design was then technically adapted into a feasible pavement design. This initiative achieved a participative design analysis, projection, and selection, but only for one area of the general project.

We acknowledge that extensive collaborative activities were promoted throughout the design process of case 3, which may have made everyone uncomfortable or out of their comfort zone. Nevertheless, this may have prepared the ground for genuine collaborative accomplishments, raising awareness and willingness throughout the process. Some private and citizen interviewees reported a lack of fluent communication from the strategic and transdisciplinary arenas, which raised trust issues within the socio-cultural arena. This highlights that co-design is a long-term building process that should be taken care of regularly.

3.3. Seahill pathways

The Seahill Pathways project aimed to ensure pedestrian mobility connections from the hill to the sea in Antofagasta. The project has its origin in an intense local community collaboration promoted and facilitated by Creo Antofagasta NGO. However, the lack of involvement of strategic actors towards the end resulted in its non-feasibility.

The project emerged from a local community collaboration endeavour which was both intensive and extensive. The initial focus was somewhat open and helped identify connectivity, safety, and local hygiene problems. At a certain point, citizen collaborative interactions took their journey fostering other neighbourhood needs (waste collection days, on-site activation initiatives) and initiatives (water treatment plants, sports square re-design, participative façade paintings). Activities like the design workshops for a small square and the participatory façade painting allowed for high community involvement. These two initiatives achieved a participative design projection and selection, but only for an area of the general pathway. Due to the deprived character of the neighbourhoods and the lack of public investment in the area, these moments were highly valued by the local communities. They acted as trust-building milestones fostering their willingness to participate in the long-lasting process.

The project mainly proposed the implementation of pavements, accessible crossings, urban forestry, vegetation, and urban furniture. The focus on connection was mainly addressed within the urban landscape design team of the leading NGO. As such, there was no extensive co-production of knowledge or transdisciplinary approaches. Surprisingly, the design team even expressed that they did not see how interacting with the community would contribute to the development of the process. So the project's development proceeded rather conventionally but incorporated some ecological aspects such as water treatment and urban forestry that can be highlighted due to their innovativeness within the context.

It is important to note that despite the intense local collaboration and some of the projects already designed, they were unfeasible. Such unfeasibility responded to their high costs per square metre, the lack of political will to prioritise them, and the lack of

willingness from the local government to mandate the unemployment of informal occupations on the sidewalk. The previous forced the project to be revised again to lower costs, raise awareness, and adapt to everyone's expectations.

Despite the extensive community collaboration, the designed project was reported to be unfeasible due to the lack of involvement of relevant strategic public parties. This case highlights the importance of collaborative interactions to ensure permanent communication and feedback through long-term processes.

4. Discussion

A collaborative approach to several design steps was taken throughout the studied processes. Nevertheless, their trajectories were different and not always aimed for or achieved long-lasting partnerships within the institutional systems. Case 1 shows high collaboration within the transdisciplinary design team, promoting more strategic collaborations from the public parties to financing and implementing the project. Case 2 has early transversal collaborative activities with actors of all sectors and backgrounds that contributed to aligning the visions for the city and generated shared understandings of the seaside area. Such an approach prepared the way for such an ambitious design project and set the collaborative tone for the following phases, even with some miscommunication reported at some point. Case 3 had a conventional design process, but the early community relationship was built through diverse innovative activities that allowed the emergence of other complementary initiatives and projects. All three cases can be considered co-design processes, and their activities were worth analysing with the framework.

The activities reported for each case pursued different aims that suggest the co-existence of three co-design arenas. An arena is a helpful analytical unit for understanding sequential or simultaneous institutional arrangements (Ostrom 2007) as social spaces where participants interact, exchange, and make decisions (Björgvinsson, Ehn, and Hillgren 2010). This study suggests that three arenas interact in co-design processes according to their main activities, actors, interactions, and aims as the strategic, transdisciplinary, and socio-cultural co-design. The strategic arena aims for the feasibility of the project and the transdisciplinary one for its context-specificity and integration. Moreover, the socio-cultural arena aims for the legitimacy of the designs. Integrating a wide diversity of actors during the design process may contribute to public space feasibility, context-specificity, and legitimacy. Accordingly, activities in which higher levels of collaboration are fostered in the later steps of the design cycle may promote the aims of the design arenas (Figure 3). Identifying the co-design arenas unravels the complexity that lies within such processes.

The strategic co-design arena aims for the feasibility of the projects and their implementation. It may have a less direct influence on the contents of the design decisions and strategies. The feasibility of a project is mainly related to budget availability, regulatory viability, and political aims. This arena may have a say in prioritising, promoting and approving the project at several stages. In many cases, such feasibility actions will be influenced highly by socio-cultural and ecological values that may become legitimate. In this sense, the strategic arena may be linked to the socio-cultural one: the first may benefit or exploit the emerging values of the second. In

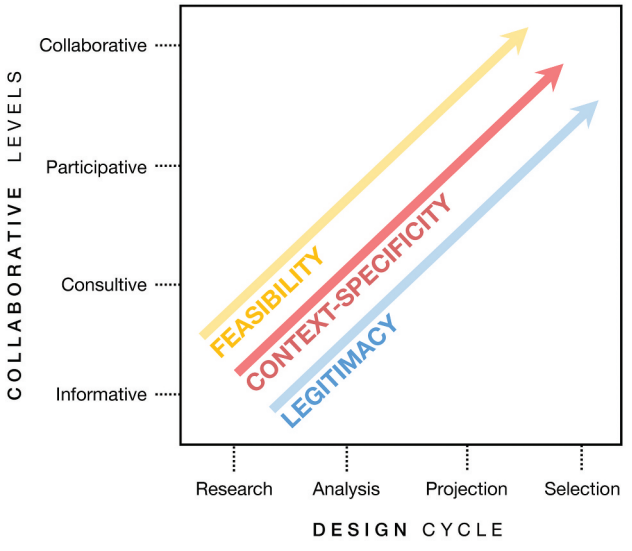

Figure 3. Aims pursued by the design arenas.

some other cases, acknowledging this arena may even allow the emergence of new complementary initiatives. This is the case of the pavement contest, some activation initiatives in case 2, and the early design of a sports square in case 3. The strategic character often positions this arena in the consultation and participation levels of the framework throughout the design steps. When this is not the case, projects may not be feasible, and delays may occur.

The transdisciplinary co-design arena integrates the actors' knowledge, values, and aims into the design processes and seeks context-specific integrated solutions. In the three cases studied, this arena achieved high levels of collaboration among the leading organisations and the design teams influencing design decision-making. This arena is relevant because it influences both problem definition and solution provision. An essential aim of the arena is to generate shared understandings and knowledge co-production. In this sense, the broad themes or aspects regarded as relevant will highly influence the elements designed. For example, if the sea level rise had been explicitly considered a relevant risk in case 2, the ecological focus would not only have been on conservation and safeguarding public investment. Similarly, if case 1 had acknowledged existing cultural and sports community organisations, the project could have specialised functional spaces. It should be noticed that transdisciplinary interactions often integrate formal and informal knowledge and sometimes diverging values to match the requirements of the projects. Efforts should be made to widen the social and ecological scopes of the initial analysis if seeking context-specificity, local-suitability, and integrated solutions that are open for change.

The socio-cultural co-design arena promotes the involvement and empowerment of non-conventional actors towards legitimising the designs. In the cases studied, the socio-cultural activities involved end-users and the community in providing values and shared understandings that influenced the projects and empowered them. This arena achieved

informing and consulting levels of collaboration in the research and analysis design steps in some activities (public hearings, citizen forums, and conventional citizen meetings). Other activities achieved higher collaborative interactions (design workshops, placemaking activities on-site). Efforts should be made to identify socio-cultural and ecological values to legitimise the projects and empower new initiatives and the co-operation of the designed public spaces. Case 1 and 2, as city-sized projects, aimed to capture a wide variety of existing values and provide responses to existing needs. The mismatch of values, needs and solutions were detrimental in case 3. The socio-cultural arena plays a role in providing values to the transdisciplinary arena, and in doing so, it may legitimise the designs. A legitimate urban landscape design (and design process) may allow the empowerment of non-conventional actors and all the benefits that may arise.

The three arenas are interwoven in co-design processes. Their distinction is conceptual, and efforts should be made to ensure integration. In this sense, we identify them to highlight the importance of fostering cross-feedbacks. We emphasise that isolating them may be harmful to co-design processes. Case 3 illustrates how the lack of involvement in the strategic arena may undermine the overall feasibility of a project. Case 1 illustrates how not addressing the socio-cultural arena might result in a lack of acceptance from the wider community. We stress that overlaps should be promoted for actors to feel part of, and be willing to contribute to, co-design processes. The actors in leading positions (public parties, design teams, NGOs, or even citizens) can foster linkages amongst the arenas by acting as facilitators. In many co-design processes, the transdisciplinary arena may take the leading role, so its willingness, awareness, and availability to collaborate with others will largely condition the achievement of the main co-design aims (feasibility, context-specificity, legitimacy).

We believe that actors are not fixed to specific arenas, and they can collaborate in more than one arena or may shift throughout the process. Participants might also interact in different arenas (pursuing different aims) in different co-design processes. This was the case of some local sports organisations playing a strategic role within case 2 and a socio-cultural one in case 3. In the first case, they pushed for the implementation and appropriateness of the project. At the same time, they mainly contributed with social values and technical concerns to the early conceptual designs in the latter. Actors are not fixed to specific arenas, and their evolving roles within different arenas might be somewhat desirable in long-term approaches. A flexible and evolutionary approach to design may be essential in such collaborative settings (Gaete Cruz et al. 2021).

We found that the three cases achieved collaboration within several design steps of the process. However, such a collaborative approach to design sometimes failed to build or sustain long-lasting partnerships within their institutional systems. The transdisciplinary arenas achieved higher collaborative levels on the several design steps due to the compromises made by the design teams to collaborate and provide integrated solutions. The strategic and socio-cultural arenas were often involved in consulting and informing levels during early research and analysis steps. Cases 2 and 3 reveal some creative and innovative activities to involve various actors early in the process: forums, tactical urbanism, placemaking, contests, and workshops, amongst others. Despite these co-design activities, the three processes show a critical gap between the transdisciplinary and socio-cultural arenas that may have prevented genuine, long-lasting legitimacy and empowerment towards the

joint operation of the public spaces. We conclude that the three cases can be considered urban co-design processes, even though their trajectories differed.

The Co-Design Framework is helpful to visualise the activities and arenas intervening in complex dynamic urban landscape processes. In this study, it enabled us to illustrate the three co-design processes, highlighting their differences and similarities. While co-design is often seen as a horizontal collaborative process, this study demonstrates that interacting arenas and dynamic forms of collaboration in design may coexist and evolve. Rather than a ladder or a cycle, the Co-Design Framework defines a landscape in which co-design unfolds. Co-design processes might want to move up the staircase of co-design towards pursuing higher degrees of feasibility, context-specificity and legitimacy.

5. Conclusions

In this study, we developed a twofold Co-Design Framework to understand how urban landscape co-design processes occur. We took the ladder of participation as a starting point and proposed four collaboration levels. We then combined the ladder of collaboration with the design cycle steps. This allowed us to conceptualise diverse possible interactions within the landscape of co-designthat may contribute to clarifying and measuring it (Szebeko and Tan 2010). We tested the Co-Design framework by analysing three urban landscape processes in Chile.

The study suggests that co-design processes host transdisciplinary design activities and strategic and socio-cultural actions. Three arenas were found to have interacted in such co-design processes according to their actors, interactions, and aims: the strategic, transdisciplinary, and socio-cultural arenas.

The framework is a contribution to illustrating different kinds of co-design processes. We argue that unfolding co-design processes using the framework helps visualise the complex dynamics that occur and allows their comparison and evaluation. It should be noted, though, that identifying the three co-design arenas aims to explicit their interactive co-existence, and not their segregation. The interaction amongst the arenas should be fostered and ensured if a co-design approach is aimed to be taken.

This study contributed to conceptualising and analysing urban landscape co-design while giving insights to theory based on real-life practices. Although developed for the urban landscape, the Co-Design Framework contributes to conceptualising the general phenomena of co-design not as a mere horizontal process but rather as a dynamic and evolving one. In this sense, co-design processes may have different trajectories and may fail or succeed in developing long-lasting collaboration (Gaete Cruz et al. 2022). More process-oriented studies should aim for conceptual clarifications of co-design, embracing its non-linearity and blurry boundaries. The co-design framework may contribute in this direction, yet, further studies are necessary. The Co-Design framework is available for others to plan, undertake, or evaluate co-design processes.

Although framed in the Latin American context, the study may contribute to geographical diversity. The cases studied may be valuable examples for other cities to foster urban landscape co-design processes. The Co-Design Framework and the Co-Design Arenas, although conceptual contributions, may provide guidelines for the design of such processes in practice. In doing so, design leaders might be able to use the framework to define activities to involve diverse actors to pursue different aims. In such a way, the Co-Design

Framework may be helpful to plan and design further processes in practice, or even action research and research through design endeavours.

Conceptualising co-design as a phase of co-production may contribute to fostering collaboration within long-lasting processes. For instance, the Co-Design Framework could clarify how co-design occurs in the different consecutive phases of design (Gaete Cruz et al. 2022). It may also contribute to analysing how collaboration during the design phase contributes to collaboration in the operation phase. In doing so, issues of power, politics, and social justice may be addressed, contributing to understanding the social implications of fostering collaboration early in the process. Similarly, the influence of the context (cultural, geographical, political, spatial) in urban co-production processes may call for further research. In this sense, the barriers and enablers for genuine collaboration may open new purposes, activities, methods, and social endeavours.

This study clarified how various actors collaborate in specific design steps, yet more process-oriented studies are needed to understand how they contribute to and influence design outcomes. Further research should question how co-design improves urban design by integrating diverging knowledge, values, and aims, by analysing specific co-design tools and methods concerning the aims pursued and the achievements accomplished. The influence of the involved actors on context-specificity, defining design criteria, and providing solutions are yet to be understood.

In contested times of social, ecological, and political crises and uncertainties, co-design may provide answers that are feasible, consensual, adaptable, and transformable for inevitable change. Deepening the knowledge of co-design processes' complex and evolutionary dynamics may allow the shift from mere collaborative activities to genuine, long-lasting institutional change. However, this requires flexibility, willingness, awareness, and social commitment (Gaete Cruz et al. 2021, 2022). This study aimed to contribute conceptual clarity for both academia and practice.

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