

## Learning Cities as agentive educational ecosystems: Public value of connections, social justice and participatory methods

### Learning Cities come ecosistemi educativi agentivi: valore pubblico delle connessioni, giustizia sociale e metodi partecipativi

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#### Abstract

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The Learning Cities paradigm, consolidated within the framework of the Unesco Global Network of Learning Cities, presents the city as a civic infrastructure for lifelong learning, inclusion, and sustainability. However, a substantial part of the scientific and policy literature continues to measure urban learningness through the quantity of initiatives and partnerships. This thesis proposes a conceptual framework that takes the relational architecture of the ecosystem as its unit of analysis, interpreting the Learning City (LC) as an agentive educational ecosystem grounded in the quality of connections. The epistemological critique of learnification and critical pedagogy provide the foundation for an orientation toward attributing public value to ecosystemic connections, taking the Capability Approach as its theoretical direction, and considering re-territorialization arrangements. The thesis outlines a minimal relational architecture that makes explicit a dynamic set of “ecosystemic connections” to be considered in order to move from an accountability-based idea of the LC toward a generative option for social justice, accompanied by a list of twelve combined capabilities.

**Keywords:** educational agency ecosystem; agency; capability approach; connections; democracy.

#### Sintesi

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Il paradigma delle Learning Cities, consolidato nella cornice Unesco Global Network of Learning Cities, propone la città come infrastruttura civica per l'apprendimento lungo tutto l'arco della vita, l'inclusione e la sostenibilità. Tuttavia, una parte consistente della produzione scientifica e policy continua a misurare la *learningness* urbana mediante quantità di iniziative e partenariati. L'ipotesi propone di assumere, come unità di analisi, l'architettura relazionale dell'ecosistema, interpretando la Learning City (LC) come ecosistema educativo agentivo basato sulla qualità delle connessioni. La critica epistemologica alla learnification e la pedagogia critica fondano l'orientamento verso l'attribuzione di valore pubblico delle connessioni ecosistemiche, e assumono la cornice del Capability Approach e considerando i dispositivi di ri-territorializzazione. L'ipotesi delinea un'architettura relazionale minima che esplicita un insieme dinamico di “connessioni ecosistemiche” da considerare per evolvere da un'idea di LC rendicontativa verso una opzione generativa di giustizia sociale accompagnata da una lista di dodici capacità combinate.

**Parole chiave:** ecosistema educativo agentivo; agency; capability approach; connessioni; democrazia.

## 1. The evolution of the principles of the Learning City

Over the past fifteen years, the concept of the Learning City (LC) has assumed growing centrality, offering visions of lifelong learning and inclusion capable of moving through the transformations and transitions of a turbulent age. Within the Unesco framework, the LC is portrayed as able to mobilize resources and actors so as to foster inclusive learning and quality of life, while explicitly linking lifelong learning to the SDGs (Unesco Uil, 2013; 2015; 2017). This evolution, however, has not been linear: alongside significant progress and the many local experiences developed within the global network of learning cities, a persistent theoretical and methodological difficulty remains in representing and elaborating models capable of advancing the idea of the LC beyond its original horizon of comparability and generalization. This difficulty lies in the tendency to assess LCs chiefly through descriptors of initiatives, numbers of partnerships, or the volume of actions offered, as though the sum of activities could in itself express the emergent property of urban “learning.”

Beginning with the first definition sketching LCs (Unesco Uil, 2013) as an actor that “effectively mobilizes its resources in every sector” in order to implement a lifelong learning system and “foster a culture of learning throughout life,” thereby generating “individual empowerment and social cohesion, economic and cultural prosperity, and sustainable development” (Unesco Uil, 2015, p. 10), a set of structural Key Features was progressively delineated as the basis for data collection, more firmly anchored in an additive logic. With the momentum of the 2030 Agenda, the SDGs were adopted as guides for action: the concept of the learning city “encompasses other approaches such as Smart Cities,” expanding into “a people-centred and learning-focused approach” for addressing complex urban challenges (Unesco Uil, 2017, p. 6). In the GNLC Medium-Term Strategy 2025-2030 (Unesco Uil, 2024, p. 4), the need to “update and refine these metrics” is explicitly affirmed in order to establish “a new framework of Key Performance Indicators (KPIs)” and a “Global Monitoring Platform.”

And yet, it may be possible to develop a model in which the public value of the opportunities offered by the LC depends on the quality of the connections it activates and on the capacity of a territory to function as a combined context. Gasparin and colleagues (2024) reformulate public value for cities in the age of the Anthropocene: it is not produced only for communities by institutions, but emerges as a co-generated property of the urban system. This means that the LC, understood as an ecosystem, generates public value that is measurable not through the sum of outputs, but through the quality of co-generated processes (Walker, 2004). In this direction, Biesta (2011) understands civic learning as a non-linear process, tied to ongoing experience yet also acting back upon it, thus becoming recursive. By contrast, the accountability-driven impulse concentrates on the efficient production of a narrow set of learning outcomes, with the risk that contemporary society may not be ready to convert equal opportunities into equal outcomes (Biesta, 2020).

What is at stake in this process, is the meaning and purpose of educational discourse as a whole: in other words, the problem is *learnification*, namely the progressive replacement of the language of education with that of learning, increasingly shaped by an individualizing logic, optimized by systems, and rendered accountable in terms of standardized values (Biesta, 2006; 2010; 2014). Learnification produces at least three structural effects: the question of foundational knowledge and of the ends of education disappears; the relationship between educator and learner dissolves; and the idea of subjectification is marginalized, even though it is precisely this that would enable subjects to act in ways not wholly determined by the infrastructures in which they are embedded

(cultural implantations). As an alternative, at least three irreducible functions of education may be proposed: the acquisition of mastery (qualification), citizenship (full participation in civic life), and subjectification (subjects capable of critically interrogating and transforming infrastructures) (Biesta, 2014). An LC conceived as a democratic ecosystem should hold these dimensions together, in dynamic balance, and make them visible. In this direction, Longworth's work (2006) was oriented toward outlining a system of problems to which responses should be given in order to sketch the idea of the LC, rather than directing attention toward learning as an end in itself.

A consequent question, one that opens onto a new perspective, is therefore the following: when, within the city, does a network of actors and initiatives become an agentive ecosystem, capable of generating collective agency, public value, and substantial opportunities for participation? Furthermore, can the LC, as an ecosystem, realize social justice?

## **2. From learnification to agency**

The Unesco framework has defined a number of pillars on which to build LCs and position them within a global network, providing a vocabulary oriented toward governance, participation, and sustainability (Unesco Uil, 2013; 2015; 2017). In effect, both this vocabulary and the processes it has set in motion are essential for the implementation of cities and for the comparability of their activities. At the same time, however, they generate a side effect: they foreground a set of requirements or key features, treated as a checklist, which become accountable markers of a certain standardization of characteristics. This effect, which may distort the very meaning of LCs, finds an alternative proposal in Educating Cities, where the educating city is understood not as a list of initiatives but as a public, plural, and inevitably conflictual project, in which education is a diffuse function of urban life and of its substantive democracy (Messina & Valdés-Cotera, 2013).

One possible alternative proposal, if the LC is to be understood as an "ecosystem," requires the development and support of a relational theory, in which intangible and cultural heritage also becomes a fundamental dimension for nurturing and generating connections as value. Places, archives, cultural landscapes, practices, memories, and shared innovations can function as boundary objects that both enable and require cooperation among heterogeneous actors, within a perspective that is neither totalizing nor assimilative. Boundary objects, understood as entities "both plastic enough to adapt to local needs... yet robust enough to maintain a common identity across sites," also become "a means of translation" between different social worlds (Star & Griesemer, 1989, p. 393). Applied to Learning Cities, the extended heritage of the ecosystem - precisely because it carries plural meanings (educational, civic, cultural, economic, identity-related) - would represent the shared point of reference through which the connections necessary to co-design and define the LC as an educational ecosystem can be made visible.

Let us assume a first perspective: if the learnification described by Biesta is the problem - that is, the dissolution of education into the language of measurable individual learning - then the transition toward an LC understood as an ecosystem would require not only a normative critique, but also an epistemological foundation, capable of considering the mechanisms through which relationships produce forms of mastery and collective citizenship. Some insights developed in cognitive biology and second-order cybernetics offer, though always with caution, analogies that help make the idea of the LC as a living

ecosystem something more than a metaphor.

Maturana and Varela (1992) describe structural coupling as the process through which an organized system modifies itself recursively in response to environmental perturbations, incorporating them as transformations of its own internal structure without losing its organization. If extended to an LC, this concept may reveal some limits, since an LC is an open and intentionally transformative system, not a closed autopoietic one. Nevertheless, it describes a process that occurs within the subsystems of the LC ecosystem – a set of educational institutions, community networks, local governance systems, and “invisible” assemblages – which do not open themselves indiscriminately to the environment, but selectively incorporate those perturbations they recognize as meaningful for their own organization. Participation is the relevant device through which external perturbations – new actors, conflicts, heterogeneous knowledges, claims – enter subsystems and modify them structurally, rather than simply being suffered or rejected. In this sense, the subsystems of the LC ecosystem are structurally coupled through the perturbations that occur via participation: they neither merge nor become homogenized, but modify one another while maintaining their own identity (Capra, 2022; Maturana & Varela, 1992). The idea that knowing is effective action – that is, that knowing is inseparable from transformative action in context – helps explain why an LC that does not foster agency cannot, strictly speaking, foster collective mastery either (Maturana & Varela, 1992). By extension, this would also occur in the relationships between subsystems and system as a whole. Gregory Bateson (1972) expresses the same criterion: “What we mean by information – the elementary unit of information – is a difference which makes a difference” (p. 459).

To shift epistemology from the object to the relation means that what matters is not the quantity of resources available, but the difference a connection produces within the system. A cognitive ecosystem does not reduce differences to noise to be eliminated; rather, it selects and integrates them as conditions of generativity. They become shared knowledge when they enter a circuit of feedback that renders them meaningful for action. This principle has a direct implication for the critique of learnification, since standardizing LC metrics would mean neutralizing the differences that produce mastery, replacing relational quality with the quantity of outputs. “Break the pattern which connects the items of learning and you necessarily destroy all quality” (Bateson, 1979, p. 8). The quality of the ecosystem does not emerge from the addition of elements – institutions, programmes, certifications – but from the configuration of the relations that connect them and from the capacity of those relations to carry meaningful differences across subsystems. The feedback that generates collective intelligence is not a technical monitoring mechanism, but the capacity of a system to recognize and incorporate its own internal differences as a generative resource (Capra, 1996).

This capacity, which would aim to valorize the qualities of ecosystemic connections (see Section 3), is what would distinguish an adaptive LC from a transformative LC: the former manages differences by reducing them to standards; the latter keeps them in productive tension, nourishes expansive repertoires (Engeström, 1987; 2001), and develops the collective capacity to transform not only practices, but also the assumptions on which those practices are grounded.

In effect, the LC may be understood as a multilevel educational context, as described by the learning ecologies approach, in which learning (of knowledge, methods, languages) becomes the outcome of opportunities distributed across contexts and relationships grounded in the recognition and co-construction of networks (Barron, 2006), as well as in

continuous and progressive participation in social and community practices that are legitimated peripherally (Lave & Wenger, 1991; Wenger, 1998). These perspectives focus on the LC as an ecosystem with high connective value, in which the quality of forms of mastery depends on the quality of environments, ties, and configurations that make possible the recognition of plural alterities, citizenships, extended participatory practices, and co-construction.

Some lines of research already suggest, albeit in forms not yet fully consolidated, that LCs are not containers of services, but inclusive and sustainable urban contexts with the potential to generate economic value in a generative rather than extractive sense, and whose aims may be pursued through partnerships, governance, and a culture of co-design, all oriented toward learning that is extended and plural in its forms, places, and purposes (Osborne et al., 2013; Yang, 2012). If we take this aspect seriously, we must also assume, as a consequence, that LCs - without exception - may be identity-based, non-standardized expressions of their material and immaterial heritage as cities, as urban worlds, and as territories (Unesco, 2011). In this sense, the LC would come to be configured as a civic infrastructure of recognition and valorization (Collettivo per l'Economia Fondamentale, 2019), as a boundary field-object-idea capable of stabilizing networks of cooperation among heterogeneous actors and making visible the quality of the connections generated, also sustained through public investment. In this perspective, the LC/LR can be understood as an educational and formative ecosystem constituted around co-participated places, practices, memories, and knowledges, which become generative elements for co-design, translation between social worlds, and the creation of public value and common good. In this way, the substantial contribution of the already-mentioned Educating Cities (Messina & Valdés-Cotera, 2013) is taken up again and reconsidered, reminding us that education in cities and in the urban sphere is a political-cultural project, not merely the almost accounting-like implementation of programmes. The Educating City is a civic ecology that generates citizenship, recognition of alterity, and cohesion, rather than a context for reproducing inequalities and exclusions. In this light, Unesco's current effort (2024) to update the initial metrics of LCs acquires further significance, so that they may reflect present realities and address emerging challenges. Nevertheless, it remains evident that this perspective is not yet fully focused on making explicit the relational mechanisms capable of transforming a set of activities into a collective capacity to evolve and transform.

An emerging question, then, is whether it may be possible to introduce the principle of an "evident observation" of the relations that form an ecosystem and generate the ecosystemic and capability-enhancing city: is the LC as ecosystem distinguished by the quality of the governance of relations and connections, rather than by the numerical density of actions?

Let us adopt a second perspective: the Capability Approach (CA) (Sen, 1984) as a framework for understanding LCs/LRs as ecosystems, since, among the other aspects discussed below, it offers a criterion of social justice. This is a criterion of social justice that separates the availability of resources from the real opportunities people have to build a life worthy of being lived. The relevance of this perspective for the LC is further confirmed by Nussbaum's development of the CA (2011), in which she distinguishes between subjects' internal capabilities (formed through educational and training systems) and combined capabilities, treating the former as outcomes in relation to the latter: "internal capabilities combined with suitable external conditions for the exercise of the function" (Nussbaum, 2000, p. 85). The extension of this perspective to the educational context (Walker, 2006) would make it possible to propose a capability-based theory for the justice of educational policies oriented toward the public good and human flourishing. Within the

framework of the CA, an LC that takes agentive being and doing seriously transforms resources into combined capabilities, that is, into substantial possibilities for participation, citizenship, design, advocacy, and voice. Yet it is necessary to ask which public and whose good, since an ecosystem may also amplify inequalities if it does not incorporate arrangements of voice, access, and recognition (Emirbayer & Mische, 1998; Walker, 2006).

It is therefore agency that must be interpreted as the key characteristic through which the connections of LCs/LRs may generate an educational and formative ecosystem. Attention to agency concerns, overall, all the goals and values that a person has reason to pursue, “whether or not they are connected with his own well-being” (Sen, 1992, p. 56). Agency includes altruistic and common-good goals that may potentially conflict with personal interest, such as climate change mitigation, or the regulation of new urban development in a city when it significantly reduces public green space – both of which require drastic changes in current individual consumption patterns for the sake of future generations.

Agency is central to Sen’s conception of human beings “as agents who can think and act, rather than merely as patients whose needs demand fulfilment” (Sen, 2013, p. 8). It therefore includes not only the power to act, but also the freedom of self-determination, through which people can actively participate in shaping their own individual and collective destinies, expressing and making their values heard, rather than merely enduring their circumstances or the actions of others (Sen, 1999, p. 11).

In continuity with this, we find the construct of the capability to aspire particularly relevant for the hypothesis under consideration (Bonvin & Zimmermann, 2024; Zimmermann, 2024). This construct underlines that aspiring is not simply an individual desire, but a transversal capacity to act that nourishes other capabilities and makes it possible to configure “a feedback loop between agency and capability to aspire” (Bonvin & Zimmermann, 2024, p. 4). For an LC, this would mean that an ecosystem is truly agentive when it makes aspirations not only formally available, but thinkable, formulable, expressible, and realizable: it is not enough to offer opportunities; it is necessary to build conditions – along the lines of Biesta’s subjectification, recognition, accompaniment, and governance – that transform aspirations into trajectories of subjective achievement (that is, the freedoms to achieve the goals one has reason to value in life) and participation. Practices such as the shared care of material and immaterial heritage, civic storytelling, and forms of intergenerational territorial laboratories may function as configurations that support aspirational trajectories and make the emergence of collective agency within the LC ecosystem more likely (Ibrahim, 2006). This is a guiding idea of particular relevance, since aspiring means looking toward something that does not yet exist and must be shaped, either conservatively, by reproducing what already exists, or innovatively, by breaking existing patterns. The capability to aspire thus becomes the freedom and the power to conceive desirable future-oriented ends for oneself and for the collectivity (Zimmermann, 2024).

This would also extend activity theory (Engeström, 1987; 2001), already directed toward showing how systems evolve by transforming contradictions into reorganizations of the collective object and of the rules of the game, as well as the notion of transformative agency, which describes the collective capacity to overcome constraints and open new paths of action (Sannino et al., 2016). This evolution takes on the dimension of pedagogical-transformative agency (Fabbri, 2025). In an urban ecosystem, collective agency is the emergent property that signals when the city is not merely delivering activities (to be accounted for), but is actually able to transform, through co-participated action, the conditions and connections that hinder the full development of democratic citizenship.

It is, however, necessary to specify the quality of agency (Giroux, 1988; 2011; 2020), by distinguishing between adaptive agency - that is, the capacity to navigate existing structures effectively without substantial transformation - and transformative agency, which instead comes to question, redefine, and modify those very structures, asking why certain problems exist, who produces them, and what alternatives are possible, thus becoming an agent of change within the cultural implantation. Transformative agency requires the assumption of a critical literacy: the capacity to read the world as a socially constructed and therefore modifiable reality. An LC ecosystem may display high collective adaptive agency and low transformative agency, thereby producing systemic efficiency without producing democracy. Work on the connections of an ecosystemic LC would tend to create the conditions under which knowledges and cultures located at the margins of each network may bring their contribution to the centre of public deliberation.

### **3. LC as agentive educational ecosystems: relations as connections**

#### **3.1. The public value of ecosystemic connections**

The public value of the LC ecosystem is not the sum of the values produced by each node: it is an emergent property that depends on the quality of the connections among the nodes. Gasparin and colleagues (2024) show how public value in cities in the Anthropocene emerges as a co-construction and as the outcome of multilevel participatory processes, rather than as an “institutionalized” provision delivered through normative channels. This leads to an awareness: being in common in the world is practiced “by sharing places and action, by building spaces in which speech and action can construct a political dimension grounded in mutual recognition” (Micciarelli, 2018, p. 142). Without this kind of city, and with places of study and work increasingly deprived of any dimension of extra-work sharing, it would seem evident, as a consequence, that virtual squares are perceived as among the few remaining spaces of democracy.

Applied to LCs, this perspective would imply valuing and making explicit the ecosystem’s capacity to generate public value through connections, including weak or “invisible” ones. Network theory helps to specify this aspect: ties that connect different contexts, even at the micro level, together with functions of intermediation and participation, increase the circulation of information, access to opportunities, and the capacity for innovation, while reducing self-referential closure (Burt, 2005; Granovetter, 1973). Ehnert and colleagues’ research (2025) on learning ecosystems in urban transitions, identifies the category of socio-educational-cultural intermediaries, relational actors who operate within networks as connections among other actors, contributing through relationship-building to the advancement of transformative agency. This aspect recalls and reinforces a quality we recognize in the agentive ecosystem, namely the emergence of reciprocal, regular, and prolonged interactions “between” different microsystems: “human development takes place through processes of reciprocal interaction in its immediate external environment. [...] Such enduring forms of interaction are referred to as proximal processes” (Bronfenbrenner & Morris, 2006, p. 797). An agentive rather than accumulative LC “works” when it multiplies reciprocal interactions that become more complex.

#### **3.2. Connections as devices of re-territorialization**

The territorial laboratory takes on value as a methodological device that makes visible the

principle of “landing” (Latour, 2017; 2021). It represents a deliberative space in which different groups of citizens describe their material dependencies and build maps of interdependence, in order to describe what they depend on in order to live, with which human and non-human entities they are in relation, and in which territory they are effectively rooted. Applied to LCs, this device points toward a shift in perspective: citizens do not learn in the territory, but with the territory, through the territory, and for the territory. In this sense, three functions are fulfilled: participatory identification of capabilities; generation of inter-network connectivity; and measurement of emergent properties through the artefacts produced by territorial laboratories – maps, narratives, and protocols of collective care. The emergence of tensions, relations, and connections makes visible that structural coupling (Maturana & Varela, 1992) already highlighted between the city-system and the territory: the concept of “landing” becomes educational and political, since it concerns the capacity to recognize one’s material dependencies and to participate in the collective redefinition of what it means to inhabit a specific and public place well (Belligiano et al., 2024; De Rubertis et al., 2019). The idea of taking structural coupling and territory as educational and political, thus giving a certain coherence to the characterization of the LC/LR, would find support in Capra’s study (2022): “Mind and matter no longer appear as separate entities, as Descartes believed, but can be seen as two complementary aspects of the phenomenon of life - process and structure. At all levels of life, beginning with the simplest cell, mind and matter, process and structure, are inseparably connected. For the first time, we have a scientific theory that unifies mind, matter and life. In my view, this was Humberto Maturana’s greatest achievement” (p. 11).

At the same time, a process of structural coupling also outlines how the specificity of a local territory is not defined only by factors of path dependency or by the unique peculiarities of context. Also relevant is the role of contingency, a kind of accidental micro-agency that manifests itself in specific territories and consequently becomes a constitutive part of the territory’s actual character (Moulaert et al., 2005). For example, local leaders, charismatic figures, traditions of economic solidarity, and experience in public-private partnerships may determine the strength of local initiatives in defining their own sphere of influence within a broader institutional and economic territorial space (ecosystemic territorial milieus). Latour’s territorial laboratories represent spaces of conscientization through which material and immaterial, socio-cultural, and environmental heritage are recognized. This is a process of re-territorialization understood as an educational and liminal act, analogous to what is enacted through the configurations of ecomuseums (see following Section 4.4). Latour (2005) proposes reassembling the social, so that the connections between citizenship and heritage are woven into a process of transformation, reconstruction, and creation of heritage itself. Stories and community participation play a generative role for memory and for the future, bringing the intersectional dimension into value. It is not a matter of preserving “a” heritage, but of co-constructing and negotiating it with the community: this aspect once again underscores the difference between an additive LC and an agentic ecosystem-LC.

### **3.3. Toward a possible relational architecture of LCs as ecosystem**

The CA, as a grammar of conversion between resources and opportunities would, on the one hand, make it possible to render the justice of the ecosystem visible through the conditions that make possibilities exercisable; on the other hand, as we have noted, Nussbaum defines combined capabilities as “internal capabilities combined with suitable external conditions for the exercise of the function” (Nussbaum, 2000, p. 85). The hypothesis, therefore, is to identify a minimal relational architecture articulated in ten

essential relations that express the connections to be co-constructed and recognized in the LC as ecosystem (Figure 1):

| <i>Connection/Relation</i>                                   | <i>Connections among actors (examples)</i>                                                                                                                        | <i>Quality of the relationship</i>                                                                                   | <i>Justice dimension and public value</i>                                                                             | <i>Updated theoretical anchors</i>                                                                           |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <i>R1. Co-decision and co-responsibility (co-governance)</i> | Municipality/ Public sector ↔ universities ↔ schools ↔ third sector & civic companies ↔ benefit companies ↔ citizens in stable deliberative arenas                | Decision-making symmetry, transparency, accountability, continuity; coordinated polycentrism; inclusion              | Equality of participation; redistribution of decision-making power; countering the additive network model             | Ansell & Gash (2008); Boni & Frediani (2020); Emerson et al. (2012); Fraser (2010); Ostrom (2010)            |
| <i>R2. Co-design of the cultural offer (co-design)</i>       | Schools ↔ universities ↔ third sector ↔ cultural institutions ↔ ecomuseums ↔ agencies supporting hybrid pathways ↔ movements ↔ citizenships                       | Complementarity, integration between formal and non-formal contexts, accessibility, coherence with territorial needs | Distributive justice: provision understood as combined capability, not as mere delivery; spatial contracts            | Barron (2006); Biesta (2020); Lave & Wenger (1991); Schafran et al. (2020); Walker (2006)                    |
| <i>R3. Translation across languages and liminal worlds</i>   | Professional actors operating between public sector ↔ communities ↔ universities–citizens ↔ schools, neighbourhoods ↔ city centre, ecomuseums ↔ informal networks | Differentiation, interdependence, shared boundary objects                                                            | Justice of recognition: situated knowledges placed at the centre of deliberation; countering cultural standardization | Burt (2005); Granovetter (1973); Star & Griesemer (1989); Young (1990)                                       |
| <i>R4. Bidirectional circulation of knowledge</i>            | Universities ↔ communities; schools ↔ third sector; public administration ↔ citizens; ecomuseums ↔ educational networks; city ↔ city (peer education)             | Reciprocity, documentation, transferability, recontextualization; connecting devices; countering one-way flows       | Epistemic democracy: who produces knowledge in the ecosystem? Redistribution of cognitive power                       | Bateson (1979); Bronfenbrenner & Morris (2006); Brown & Duguid (2000); Capra (1996); Frediani & Boano (2012) |
| <i>R5. Recognition and</i>                                   | Universities / schools ↔ third sector & civic                                                                                                                     | Distributed recognition, visibility of the                                                                           | Justice of recognition; visibility of                                                                                 | Biesta (2020); Fraser (2010); Giroux (1988);                                                                 |

|                                                               |                                                                                                                                                                                   |                                                                                                                                           |                                                                                                                                                       |                                                                                                  |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <i>valorization of educational action</i>                     | companies ↔<br>benefit companies ↔<br>citizens ↔<br>activists ↔<br>movements across sectors                                                                                       | value created, intersectional analysis                                                                                                    | subjects at the margins; right to action                                                                                                              | Russell (2019); Thompson (2021); Walker (2006); Wenger et al. (2011)                             |
| <i>R6. Equitable access and conversion into opportunities</i> | Public sector ↔<br>services ↔<br>schools ↔ third sector ↔<br>collectives / communities to remove barriers                                                                         | Conversion into combined capabilities, substantive inclusion, territorial distribution; spatial contract; conversion factors              | Substantive distributive justice: not formal equality, but equity in conversion factors; education as subjectification across the lifespan as a right | Binet et al. (2025); Nussbaum (2011); Sen (1999); Schafran et al. (2020); Walker (2006)          |
| <i>R7. Partnerships oriented toward public value</i>          | Businesses ↔<br>public sector ↔<br>universities ↔<br>third sector & civic companies ↔<br>benefit companies ↔<br>social movements to co-produce goods and services as public goods | Shared public object, plural metrics (not only measurable outputs), conflict management; education as a common good                       | Co-produced public value; the ecosystem does not deliver value for the community, but produces value with the community                               | Gasparin et al. (2024); Micciarelli (2018); Moore (1995); Moulaert et al. (2013)                 |
| <i>R8. Trust and reciprocity</i>                              | Civic and institutional networks with multi-year commitments, shared norms, and protocols of mutual care                                                                          | Stability of ties, fairness in the distribution of risks and benefits, democratic conflict management; democratic agonism as mature trust | Procedural justice: trust not as consensus, but as a relation among adversaries who recognize one another                                             | Coleman (1988); Mouffe (2013); Ostrom (1990); Putnam (2000)                                      |
| <i>R9. Feedback loops and reflexivity</i>                     | Public sector ↔<br>communities ↔<br>schools / universities for participatory monitoring, iterative revision, and capability-based evaluation                                      | Adaptive capacity, course correction, transformation of contradictions; structural coupling; PAR as method                                | Transformative justice: feedback must be able to change the rules, not merely optimize them                                                           | Boni & Frediani (2020); Engeström (1987, 2001); Maturana & Varela (1992); Sannino et al. (2016); |
| <i>R10. Operational interdependence and co-production</i>     | Mixed teams, shared spaces, integrated budgets, joint protocols;                                                                                                                  | Real co-production (not mere consultation), shared artefacts,                                                                             | Structural justice: co-production as a real redistribution of power                                                                                   | Boni & Frediani (2020); Casebourne et al. (2024); Healey (1997); Latour                          |

|  |                             |                                                                                      |  |         |
|--|-----------------------------|--------------------------------------------------------------------------------------|--|---------|
|  | territorial<br>laboratories | scalability;<br>permanent<br>territorial<br>laboratories,<br>including<br>ecomuseums |  | (2017); |
|--|-----------------------------|--------------------------------------------------------------------------------------|--|---------|

Figure 1. Connections that form the relational architecture of an agentive Learning City.

The aim is to make visible that the LC is not the sum of the activities carried out by organizations, but rather the quality of the relationships among them, taking into account the dimension of social justice (Walker, 2004) and its valorization. It also seeks to reduce forms of activation that reproduce subalternity, while proposing participatory mechanisms as a criterion of quality. This is an attempt to highlight relationships that generate capabilities, bringing to the foreground the dimensions of recognition and resistance to cultural implantation, while also considering the ecosystem as one of distributive justice and co-constructed public value. The transformative threshold element is represented by feedback loops, including those arising from conflict, insofar as they make it possible to change the rules; not merely to optimize them within an adaptive perspective and to multiply the number of participants, but to generate connections aimed at redistributing power.

Alongside the relational architecture and the ecosystemic connections, a list of twelve combined capabilities specific to the domain of the LC (Appendix 1) completes the proposal. It is constructed by integrating Nussbaum's tripartition, Biesta's critique of learnification, and Latour's configurations of re-appropriating the inhabiting of the urban and territorial space. For each capability, an attempt has been made to identify a foundational core, the ecosystemic conditions necessary for its actual exercise, and the relational indicator linked to the connections within the architecture (Appendix 1).

In summary, the attempt has been to make explicit the capabilities of LCs/LRs. By way of example, "participating in the democratic project of the city" and "citizenship as practice" would correspond to Biesta's function of subjectification and, consequently, require, respectively, the ecosystemic connections (R1, R7, R9 and R1, R7, R10). The capability of "re-territorialization as an educational act" is the capability that translates the configurations of permanent laboratories, the participatory mapping of material dependencies in inhabiting "the Earth," and the integration of the ecological dimension into urban governance (R3, R9, R10). Practical reason and aspirational orientation integrate Bonvin and Zimmermann's capability to aspire, requiring non-directive and non-subaltern spaces of orientation that make aspirations thinkable, formulable, and achievable.

## 4. Imagined implications: LC as a site of justice

### 4.1. Reading imbalances within the ecosystem

Taking the quality of connections as a defining feature of ecosystemic LCs would make it possible to interpret recurring phenomena that would otherwise remain invisible if the focus were placed on the sheer number of initiatives. An ecosystem may thus appear rich while being weakly agentive if co-decision and co-responsibility (co-governance) are weak and decision-making power remains concentrated. In this case, partnership is reduced to mere consultation. Collaborative governance shows that the quality of outcomes depends

on the way asymmetries, incentives, and trust are managed throughout real deliberative processes (Ansell & Gash, 2008; Emerson et al., 2012). Similarly, network density may produce redundancy where the co-design of the educational and cultural offer is only formally present: in the absence of actual co-design connections, initiatives are duplicated, compete with one another, and fail to build ecologies of opportunity (Barron, 2006).

Adopting the CA perspective also makes it possible to read subtle forms of exclusion: cumulative provision may in fact grow without becoming combined capabilities where barriers to access and conditions that inhibit full citizenship remain in place, such as care responsibilities, mobility, language, inequalities, and the possibility of having voice in decision-making processes (Nussbaum, 2011; Walker, 2006). From this perspective, the quality of connections also includes the quality of conversion: the agentive LC strengthens the transformation of nominal opportunities into substantive freedoms to propose, participate, and transform, going beyond aggregated forms of participation produced by the quantity of initiatives to be accounted for.

Moreover, feminist and intersectional critique shows that practices of urban democracy are not structurally neutral and often reproduce the same asymmetries of gender, race, and class they claim to overcome (Russell, 2019; Thompson, 2021). Relational indicators should therefore include an explicit intersectional dimension: not only whether connections exist, but also who is connected, because the information of those who are connected normally circulates within the ecosystem, whereas those who systematically remain at the margins, despite the formal presence of inclusive mechanisms, do not in fact participate. Very dense networks may turn into forms of network capture, reinforcing the centrality of a few actors and reducing the possibility of access and voice for non-connected participants. The aspirational dimension also requires attention: aspirations may become adaptive or domesticated by contexts of scarcity that shift responsibility for the “lack” onto individuals, without taking into account the transformation of structural conditions. This is the distinction Giroux draws between adaptive agency and transformative agency, here brought into the LC ecosystem.

#### **4.2. Can the LC as ecosystem realize social justice?**

The question of social justice is, of course, the most demanding one to address. If we consider the distributive perspective within the CA (Nussbaum, 2011; Sen, 1999; Walker, 2006; 2004), justice is understood as the fair distribution of resources, opportunities, and capabilities. From this angle, a just LC should guarantee everyone real access to the resources of the educational and formative ecosystem: the twelve combined capabilities of the framework are mainly oriented toward this tradition. Yet, from the perspective of recognition and representation, parity of participation must be added (Fraser, 2010): an LC is not just if it guarantees access to education and training but does not redistribute the power to decide what counts as education, mastery, and citizenship, which knowledge is legitimate, and who has voice in the ecosystem. Parity of participation includes the economic, cultural, and political dimensions: treating them separately impoverishes the very definition of social justice (Fraser, 2010). The structural perspective on oppression (Freire, 1970; Young, 1990) identifies five faces of injustice—exploitation, marginalization, powerlessness, cultural implantation, and violence—as systemic structures that can also be reproduced unintentionally. An LC ecosystem may be designed with the best intentions and still reproduce marginalization, because these dynamics do not depend on intentions but on the cultural infrastructures that reproduce subalternity.

The theoretical proposal of the LC-as-ecosystem hypothesis, and of the framework that

follows from it, is therefore not to answer the question “Does the LC realize justice?” directly, but to propose a distinction that the LC literature has not yet fully explored: the LC as an ecosystem of adaptation to injustice versus the LC as a generative ecosystem of justice. The first representation activates an ecosystem that increases individual and collective resilience in relation to unjust structures. The second activates the ecosystem as a device of fundamental and substantive democracy: it redistributes the power to decide, builds collective capabilities for political participation, makes oppressive structures visible, and explicitly raises the question of which structural transformations are necessary beyond the ecosystem itself. The criterion for distinguishing between these two configurations is the presence or absence of a full system of connections, not as isolated practices, but as a systemic architecture. Similarly, an LC that activates flows of knowledge but does not connect them to forms of co-decision is an ecosystem of communicative diffusion, not of substantive democracy.

#### **4.3. The emergence of AI in the LC: beyond the logic of the Smart City**

The current spread of intelligent algorithms (artificial intelligence, AI) in cities tends to view AI as a tool of optimization – mobility, energy, security, personalized services – thus creating the perimeter within which the logic of the Smart City has long been concentrated. This framework is structurally aligned with learnification: just as learnification marginalizes subjectification from education, the Smart City marginalizes citizens from the production of urban choices, delegating them to algorithms that optimize parameters predefined by other techno-logical and techno-cratic experts. Policy-makers act on the basis of forecasts generated by non-human intelligences, in a process largely lacking in transparency and accountability (Cugurullo et al., 2025). By contrast, the perspective of the “human in the loop” should be supported (Benanti, 2022), so that human stakeholders do not surrender their decision-making capacities to non-human intelligences. We might take this as the techno-urban version of Biesta’s critique of learnification: the standardization and algorithmic logic of the city replaces citizens’ capacity to define what ought to be optimized.

There is, however, a radically different perspective: AI as an infrastructure for democratic collective learning (Casebourne et al., 2024). Generative AI could be used not to personalize individual pathways, thereby reinforcing the greater power of some at the expense of others and reproducing subalternity, but rather to support processes of collective learning, dialogue, and critical reflection among social groups, creating opportunities for advocacy and voice, and thus for transformative agency. The OECD (2024) shows that AI can amplify existing inequalities if implemented without participatory governance, thereby pointing toward the opposite vision, namely co-decision, which represents a cardinal point of the proposal (Figure 1). This perspective adopts the principle of AI4SG (AI for Social Good), or of a society for a good AI, as presented by Floridi (2022), whose realization requires an approach that takes all stakeholders into account, is multistakeholder in character, supports the rationale of an ambitious, inclusive, equitable, and sustainable programme of policymaking and innovation, and ensures benefits - and mitigates risks - for all and for the common good.

The city of Barcelona, for example, expresses and implements a normative counter-model by promoting technopolitical sovereignty through its digital strategy via Decidim Barcelona (2025), the Municipal Data Office, and policies of algorithmic transparency. The paradigm of Community-Based AI Development (CBAID), documented by the Accadia Winter School, provides early evidence of an AI designed with communities, not only for

them (Toto et al., 2025).

Opposed to AI as an optimization tool within the Smart City logic, which reinforces learnification, is an AI understood as an infrastructure of epistemic democracy, within a logic of the agentive LC that supports collective subjectification. The effort here is to consider AI as something that expands combined capabilities and distributes collective agency, rather than using it as an excluding tool of optimization and of maintaining subalternity.

#### **4.4. Rebel cities and ecomuseums as a logic for LCs**

The literature on rebel cities (Castells, 2012; Harvey, 2012; Mouffe, 2013) documents that the paradigm of the LC as a democratic ecosystem finds, at least in part, support in some contemporary urban experiences. The connection between the rebel city and the LC is made explicit through the right to the city. In Lefebvre's original formulation (1996), this is not an individual right of access to urban resources, but a collective right to transform the city and, with it, the social relations that create it. This connection therefore has an intrinsically educational dimension, in the broadest and most political sense of the term. The radical municipalism of recent years –understood as a project of democratic reappropriation at the local scale –constitutes the institutional form through which this collective right attempts to turn into practices of governance and, at the same time, into processes of forming collective political subjectivities (Russell, 2019; Thompson, 2021). From this perspective, experiences of rebel cities are not simply examples of good participatory practice: they are laboratories in which the transformation of the urban ecosystem into an agentive educational ecosystem is tested, albeit through contradictory outcomes.

Harvey (2012) argues that the right to the city is the collective right to transform it, because it requires the formation of collective political subjectivities capable of exercising it. This perspective would require an agonistic dimension in Mouffe's sense (2013; 2018): democracy is not a consensual process, but a relation among "adversaries" who recognize one another's legitimacy. This distinction is relevant for the LC framework: the presence of agonistic conflict is an indicator of democratic vitality, not of dysfunction, provided that conflict takes place among adversaries who recognize each other as such, and does not degenerate into destructive antagonism (Mouffe, 2005). For the LC-as-ecosystem, this means that an ecosystem capable of managing agonistic conflict – making power asymmetries visible and producing feedback that transforms them – is structurally more robust than one oriented only toward consensus or the maintenance of privileges, and of subalternities, which risks masking exclusion. Tryggvason (2023) and Kråkenes (2024) stress how the agonistic dimension is essential for an education for democracy that does not limit itself to rational deliberation, but forms the capacity for dissent as a civic competence. Moreover, in urban social movements as networks of accelerated collective learning, the experience of common action produces cognitive and identity transformations that educational institutions are unable to generate on their own (Castells, 2012). At the same time, the tension remains fragile and unresolved between the rhetoric of the "rebel city" and the difficulty of producing new forms of democratic subjectivity capable of going beyond the simplistic repertoire of standard participatory practices. The risk is that the structural underrepresentation of older people, persons with disabilities, and immigrant communities in participatory mechanisms does not allow for the expression of connections capable of perturbing the system(eco) (Calvo & Monterde, 2019; Triviño-Salazar et al., 2025), thereby confirming the need for attention to explicit intersectional connections within the relational architecture. The case of Grenoble since 2014, which combines

Unesco LC certification with governance oriented toward ecological transition, perhaps represents the example closest to the capability of re-territorialization, attempting to include the ecological dimension as an object of feedback and co-production at all possible levels (Dardot & Laval, 2019).

Alongside the experiences of rebel cities, ecomuseums offer a type of territorial laboratory with an international genealogy and a logic that the LC framework should explicitly take on.

The concept of the ecomuseum originated in France (de Varine, 1992), but its deeper roots lie in the Santiago de Chile Declaration (Unesco & Icom, 1972): the “integral museum” is defined as an institution that does not preserve objects from the past, but actively transforms the social context in which it operates, involving communities as subjects rather than as a public (Girault & Orellana, 2020). This Global South tradition - in which the museum is an instrument of liberation and community development, not of unilateral heritage transmission - constitutes the foundation that LCs as an agentive ecosystem should recognize as their own. At the international level, the Unesco Convention for the Safeguarding of the Intangible Cultural Heritage (2003) and the Council of Europe Faro Convention (2005) define the framework within which ecomuseums operate and legitimize their inclusion in the LC framework. The Unesco Convention (2003) assumes that the communities, groups, and individuals who “create, maintain and transmit” heritage must be actively involved in its management (Art. 15): intangible heritage is not a datum to be archived, but a living practice to be collectively re-produced through formal and non-formal educational processes (Unesco, 2003). The Faro Convention (2005) takes a further step, recognizing the right of every person to benefit from cultural heritage and to contribute to its enrichment. It introduces the concept of the heritage community, the group of people who attribute value to a heritage and wish to transmit it to future generations within the sphere of public action (Colomer, 2021; Council of Europe, 2005). From this perspective, heritage is not a resource to be managed, but a process of co-constructing meaning that simultaneously produces a sense of belonging, intergenerational connections, and transformative agency: the very functions that the LC framework would assign to second- and third-order ecosystemic connections. Davis (2011) has shown how the ecomuseum is the institutional arrangements that best makes these principles visible on a territorial scale, providing a collective sense of place in which the community is involved in defining its own territory –landscape, built heritage, knowledges, language, practices, proximate economies – as a continuous process of negotiation rather than a closed inventory. Latin American nueva museología radicalized this principle (Unesco & Icom, 1972), while de Varine (1992) theorized the “museum revolution” as a process of decolonization in which the community moves from the status of object to that of subject of its own heritage. Some examples indicate a direction for LCs.

At the historical and foundational level, the Écomusée du Creusot-Montceau-les-Mines (France, 1973) –the first industrial ecomuseum in the world –institutionalized local participation through a *comité des usagers* and instruments of interaction with inhabitants that anticipated by two decades the vocabulary of participatory governance. Rhyner (2025) shows how the model represented a political response to the inadequacy of top-down economic development, positioning local participation as a form of expertise claimed in relation to institutions: a logic structurally analogous to what the LC framework formalizes as connection R6, the interface between ecosystem and institutions. At the level of intangible heritage, the Batana Ecomuseum of Rovinj (Croatia, 2004) –also inscribed in the Unesco Register of Good Safeguarding Practices for Intangible Cultural Heritage

(Unesco, 2016) –shows how the co-construction of the meaning of a heritage, in this case the traditional batana boat, dialect, and songs, can become a framework of intergenerational and interethnic identity recomposition: both the Croatian community and the Italian minority community recognize themselves in the co-produced heritage (Nikolić Đerić, 2020). Here the principle of the Faro Convention becomes explicit: heritage is not a given, but a heritage community constituted through the collective process of attributing value. At the level of rural rootedness and territorial justice, the Ecomuseu de les Valls d'Àneu (Catalonia) and La Ponte-Ecomuséu (Asturias) show how territorial museology in peripheral and depopulated areas can produce collective agency where the formal learning ecosystem is absent or residual (Brown et al., 2024; Dal Santo et al., 2023). Alongside these cases stands, as an example within the Mediterranean context of structural marginalization, the Simeto Ecomuseum (Sicily), whose “Inclusive Landscapes” project documents how multilevel participatory governance can simultaneously generate public value, act as a device of distributive justice, and function as a laboratory of re-territorialization (Borrelli & Davis, 2012; Cortinovis & Faga, 2020). The examples of ecomuseums share a feature of particular relevance for the LC framework: they express a broader, almost expanded and suspended, spatio-temporal scale that makes it possible to build collective heritage as an object of transformative learning, and not merely as a resource to be valorized. The common datum –from rebel cities to ecomuseums –is that none of them simultaneously realizes all connections in their full form: this would confirm the need for the proposed framework, namely, the strengthening of simultaneous connections. When the ecomuseum functions as an ecosystem of agentive learning, it is not simply a museum spread across a territory: it is the institutional form through which a heritage community, in the Faro sense, exercises the collective right to co-construct the meaning of its material and immaterial heritage and, through it, the right to define its own territory as a space of educational justice. The contradictions and limits of each case would show which ecosystemic connections are fundamental for the transition from an accountable LC to a justice-generating LC. The theoretical challenge is not to find the perfect case, but to build tools capable of reading, in heterogeneous contexts, the quality of the minimum connections that make an educational ecosystem agentive.

## **5. LCs as a combined capability ecosystem: rights and the expansions**

In order not to reduce the LC-as-ecosystem to a technicist exercise, one necessary condition is to anchor participation to an overarching theory of change capable of guaranteeing the expansion of opportunities and criteria of substantive justice: as we have argued, the CA could fulfil this function (Clark et al., 2019; Robeyns, 2017). The contribution of the CA is twofold. On the one hand (the criterial dimension), it provides criteria for assessing whether the formal opportunities offered by the LC ecosystem are translated into real substantive freedoms, including procedures to protect autonomy, subjectification, and individual voice, to limit the stratification of vested interests, to rebalance spaces for the exercise of power, to promote rights, and to cultivate critical learning and collective agency. On the other hand (the analytical dimension), the concept of social conversion factors –that is, the personal, social, and environmental factors that transform resources into real capabilities (Robeyns, 2005) – provides a tool for understanding why the same educational provision produces profoundly different outcomes in different subjects and contexts. In LC ecosystems, social and environmental conversion factors are precisely what ecosystemic connections should guarantee: an ecosystem with weak connections is an ecosystem that reduces the capacity for conversion for the most vulnerable subjects.

The notion of combined capabilities, which, as we have shown, constitutes the core of the proposed framework, expresses the connection between internal capabilities (the dispositions, forms of mastery, and capacities developed by the individual) and external capabilities (the social, institutional, and environmental conditions that make their exercise possible), becoming the actual outcome of the interaction between the two - that is, the effective substantive freedom to act. Walker (2006) applied this distinction to the domain of education, showing that a theory of educational justice must concern itself not only with educational provision, but also with the conditions that make that provision genuinely convertible into freedom. In the LC ecosystem, the quality of connections is precisely the mechanism that produces or inhibits the transition from external capabilities to combined capabilities: the twelve combined capabilities developed in the Appendix represent the formalization of this principle for the specific domain of the LC. The capability to aspire (Bonvin & Zimmermann, 2024; Appadurai, 2004) further expands the framework toward the projective dimension of agency: not only the capacity to act in the present, but also the capacity to formulate, express, and pursue aspirations that are not adapted to the structural constraints of the context.

Applied to LCs, the CA would therefore generate a system of substantive, not merely formal, rights. In Fraser's perspective (2010), parity of participation simultaneously requires redistribution (equitable access to resources), recognition (the legitimation of heterogeneous knowledges and identities), and representation (the power to decide what counts as education and who defines the conditions of urban life). The twelve combined capabilities are intended to show these three dimensions: they are not a catalogue of objectives, but a system of ecosystemic rights, that is, rights that can be effectively exercised only if the relational architecture of the ecosystem provides the necessary conditions of conversion. An LC ecosystem that guarantees formal access without redistributing the power to define what counts as learning is an ecosystem of adaptation to injustice, not one of generating justice. It is therefore equally necessary to support a methodological framework - as a proposal - potentially connected to the inquiry into, and co-construction of, the connections themselves.

A first approach is Participatory Action Research (PAR) integrated with the CA, a theoretical framework capable of analysing PAR processes from a human development and capability perspective, showing how participatory approaches help investigate which capabilities are valued, why certain choices are made, and how capabilities are achieved (Boni & Frediani, 2020; Walker & Boni, 2020). Walker & Unterhalter (2007) have shown that applying the CA to education requires moving from the analysis of policies to the analysis of the concrete conditions through which resources are converted into freedoms: this is precisely what PAR-CA would make possible in the LC context. Applied to LCs, PAR does not measure capabilities from the outside; it generates and reveals them within the participatory process itself: research participants become co-producers of the connections that the framework seeks to map.

A second approach is offered by Mixed Methods Social Network Analysis (MM-SNA). Pantić and colleagues (2022) show how MM-SNA combines quantitative and qualitative methods to generate insights into the subjects and actors involved in social structures, highlighting how agency in networks is constituted by identities, dispositions, competences, resources, and knowledges generated through interactions and relationships. MM-SNA makes it possible to detect the betweenness centrality of actors who perform connecting functions, to observe the density and reciprocity of knowledge flows, to identify clusters that do not communicate with one another, and to explain why certain connections

do or do not work in terms of trust, power, and shared languages. Research on the environmental learning ecosystem of the San Francisco Bay Area identified clusters with both geographical and thematic focus, expanding the understanding of the ecosystem by including actors and collaborators who had not previously been identified (Wojcik et al., 2021).

A third approach is Youth Participatory Action Research and inclusive co-design (YPAR). Anderson et al. (2024) document how YPAR can emphasize the perspectives of young people from historically marginalized communities, bringing to light subaltern knowledge – that is, the knowledge that the non-connected bring to the ecosystem and that the formal network fails to incorporate. Co-design is not mere consultation: it is a methodological device that produces shared artefacts (maps, narratives, prototypes) which become boundary objects (Star & Griesemer, 1989) across heterogeneous networks.

The three methodological approaches described are not alternatives, but complementary, and they derive from the theoretical implications of applying the CA to the LC ecosystem. PAR-CA generates and reveals capabilities within the participatory process; MM-SNA maps the quality of connections and the structural asymmetries that hinder them; YPAR brings to the surface the subaltern knowledge that the ecosystem systematically excludes. Taken together, they constitute a methodological framework that supports the logic of the territorial laboratory proposed by Latour and of ecomuseum practices: tools not for measuring the ecosystem from the outside, but for co-constructing and transforming it from within, thereby restoring to subjects the capacity to define what counts as mastery, as opportunity, as well-being, and as justice within their own territory.

## 6. Conclusions and research agenda

A summary statement may be offered as follows: a Learning City is an agentive educational ecosystem when it achieves a dynamic balance among actors and when the quality of its connections – according to the architecture presented here – converts resources into combined capabilities, generates transformative collective agency, and produces public value and common good over time.

Its pedagogical and democratic quality is not the aggregate sum of what each network produces within an accountability-based perspective on learning. Rather, it concerns and sustains: (a) the connections “between” the parts of the LC as a whole ecosystem, both visible and invisible; (b) the extent to which social conversion factors allow the conversion of resources into substantive freedoms; (c) the extent to which collective agency nourishes subjectification and citizenship in the full sense of rights, for all, as well as the dynamic balance of innovation; (d) the extent to which citizens’ aspirations can be formulated, expressed, and realized; (e) the extent to which the system(eco) becomes generative and transformative of culture and of civilization itself; and (f) the extent to which territory is treated as a subject of the educational relationship, and not merely as a background to be optimized.

The opening of reflection on the connections that sustain the LC as an ecosystem makes it possible to bring together implementation and democracy within education and citizenship. Polycentric and collaborative governance provides a theory of coordination in complex systems; learning ecologies clarify that urban learning is distributed and situated; collective agency – in the distinction between adaptive and transformative agency – and expansive learning describe the transformative threshold; the capability approach, enriched by the

capability to aspire (Bonvin & Zimmermann, 2024), introduces a criterion of justice that makes visible the conversion of provision into combined capabilities. Latour's territorial laboratories, with territory understood as an educational subject, extend the framework toward the ecological-political domain, grounding the capability of re-territorialization. The public value of ecosystemic connections (Gasparin et al., 2024), ecomuseums as configurations of participatory heritagization, the critique of AI as smart-city optimization, and participatory methods as the toolbox of the territorial laboratory complete the framework in its updated version.

Interpreting LCs as agentive educational ecosystems requires acknowledging, without idealization, that the same conditions that may enable learning and agency may also produce opposite effects. The quality of connections does not automatically coincide with equity or democratization. The LC as ecosystem is not intrinsically "good": it is a situated and conflictual configuration, to be assessed according to its capacity to convert resources into combined capabilities, to generate feedback capable of producing observable changes in rules, opportunities, and the inclusiveness of connections, and to redistribute the power to decide what counts as education and who defines the conditions of urban life.

The future direction, for both research and policy, may consist in: (1) constructing relational and capability-based tools that make it possible to compare cases and identify generative mechanisms; (2) developing the framework in diverse urban contexts; (3) testing ecomuseums as permanent territorial laboratories and devices of re-territorialization within LC ecosystems; (4) defining operational criteria for distinguishing AI as optimization from AI as an infrastructure of epistemic democracy; and (5) building indicators of the structural justice of the LC ecosystem that go beyond formal equality of access, toward the real redistribution of definitional power. The definition of an updated minimal relational architecture (R1-R10), complementary to the list of twelve combined capabilities specific to the LC domain, provides both the outcome of this work and the perspective to be further investigated.

The need to advance the interpretation of LCs finds a further reason in the question raised by Paolo Federighi (2018): it is necessary to reverse the direction by which – through reliance on market justice – access to education and training is determined by the resources available to individuals and by the choices that follow from them, thereby minimizing the space for distributive mechanisms determined by the state. If, as has long been the case in adult education and is now increasingly the case in education more broadly, market justice prevails, then social justice cannot exist. Yet it is equally necessary – honestly and at the same time – to acknowledge the failure of an interpretation of adult education that remains subordinate to the utilitarianism of the economic advantages of the training economy, that is, to learnification.

## Appendix 1

The list of the twelve combined capabilities (Figure 2) becomes the framework of the agentive LC-ecosystem. For each capability, the following are considered: its substantive educational core, the ecosystemic conditions necessary for its actual exercise (as combined capabilities), the relational indicator, the reference to the architecture (R1-R10), the subjectification of rights, and the dimension of social justice. Clearly, the list is open and subject to ongoing revision: it is proposed as a starting point for research and inter-urban dialogue, not as a definitive statement.

| <i>CC</i>                                      | <i>Substantive educational core</i>                                                                                                                    | <i>As a combined capability</i>                                                                                | <i>Relational indicator</i>                                                                                   | <i>R relations</i> | <i>Subjectification</i>                 | <i>Dimension of social justice</i>                            |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------|---------------------------------------------------------------|
| <i>CC1<br/>Sense, Imagination and Thought</i>  | To think and reason in a genuinely autonomous way within learning opportunities.                                                                       | A plurality and permeability of contexts; recognition of non-linear pathways; accessible hybrid spaces.        | Permeability across contexts; recognition of non-linear pathways; accessible hybrid spaces.                   | R2, R5             | Qualification + Subjectification        | Distributive: plural provision as a right                     |
| <i>CC2<br/>Cognitive Affiliation</i>           | To think and learn with others through genuinely reciprocal relationships.                                                                             | Permeable networks and boundary spanners that facilitate translation across different languages and worlds.    | Inter-network boundary spaces; heterogeneous participation; cognitive mediators.                              | R3, R4             | Transformative socialization            | Recognition: heterogeneous knowledges are valued              |
| <i>CC3<br/>Practical Reason and Aspiration</i> | To form one's own conception of the good and to plan one's educational trajectory. This includes the capability to aspire (Bonvin & Zimmermann, 2024). | Non-directive guidance; conditions that make aspirations formulable, expressible, and achievable.              | Non-directive guidance services; aspirational trajectories; recognition of self-directed learning             | R2, R6, R9         | Subjectification + capability to aspire | Distributive and structural: aspirations are not domesticated |
| <i>CC4<br/>Recognition</i>                     | To be seen and valued as active subjects, regardless of context, level, age, or origin.                                                                | Norms of recognition generated by the ecosystem; explicit intersectional analysis (Russell; Thompson).         | Validation of non-formal and informal learning; intersectional distribution of recognition.                   | R5, R6             | Socialization/ Subjectification         | Recognition: countering cultural massification (Young)        |
| <i>CC5<br/>Co-governance</i>                   | To co-produce, and not merely participate in, decisions concerning the conditions of learning and the configuration of urban life.                     | Genuine co-governance; agonistic deliberation; non-human entities acknowledged as subjects of decision-making. | Real co-production in policy processes; agonistic deliberation; analysis of systematic exclusions.            | R1, R8             | Collective subjectification             | Representation: redistribution of decision-making power       |
| <i>CC6<br/>Mobility Across Contexts</i>        | To move across different contexts without loss of identity, recognition, or biographical continuity.                                                   | Structural connectivity within the ecosystem; an equitable spatial contract that ensures portability.          | Fluid transitions; credit recognition and transfer; absence of bureaucratic and economic barriers.            | R2, R3, R5         | Qualification/ Socialization            | Distributive: learnfare as a guarantee of continuity          |
| <i>CC7<br/>Contribution to the Collective</i>  | To contribute to the production of collective knowledge, including through urban social movements understood as nodes within the ecosystem.            | Structures of reciprocity that value everyone's contribution, including non-academic knowledge.                | Cross-network peer learning; non-academic knowledge recognized; social movements mapped within the ecosystem. | R4, R10            | Transformative socialization            | Epistemic democracy: who produces knowledge?                  |
| <i>CC8</i>                                     | To navigate                                                                                                                                            | A relational                                                                                                   | Support                                                                                                       | R6, R8             | Socialization/                          | Structural:                                                   |

|                                     |                                                                                                                                                                                 |                                                                                                                           |                                                                                                                              |             |                             |                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------|-----------------------------------------------------------------|
| <i>Biographical Resilience</i>      | discontinuities while sustaining the desire to learn. The capability to aspire must remain practicable in times of crisis.                                                      | support network during moments of transition.                                                                             | networks in times of transition; re-entry pathways; informal communities as containers of identity.                          |             | Resilience                  | countering the compensation trap                                |
| <i>CC9 Embodied Learning</i>        | To learn through direct experience, the body, and the physical context.                                                                                                         | Structural integration between experiential and formalized contexts.                                                      | Integration of experiential and formal learning; recognition of tacit mastery; accessible practical spaces.                  | R2, R5      | Embodied qualification      | Distributive: practical knowledge as a right                    |
| <i>CC10 Democratic Project</i>      | To participate in shaping the vision of the city one wishes to inhabit. This is the fullest collective expression of subjectification.                                          | Genuine public deliberation, agonistic spaces, and the incorporation of subaltern voices.                                 | Quality of public deliberation; agonistic conflict as an indicator of democratic vitality; incorporation of subaltern voices | R1, R7, R9  | Collective subjectification | Representation and structural: the city as a democratic project |
| <i>CC11 Citizenship as Practice</i> | To act as a citizen not as an end-point, but as a mode of education itself. This requires critical literacy (Giroux).                                                           | Spaces of real political practice; structural connections between social movements and educational institutions.          | Spaces of real political practice; widespread critical literacy; social movements connected to educational institutions      | R1, R7, R10 | Subjectification            | Structural: LC as a means of democracy, not compensation        |
| <i>CC12 Re-territorialization</i>   | To enter into a cognitive, affective, and political relationship with the territory. Territory, including non-human entities, is understood as an educational subject (Latour). | Permanent territorial laboratories; participatory mapping of material dependencies; ecomuseums as methodological devices. | Permanent territorial laboratories; mapping of dependencies; ecological governance; non-human narratives; active ecomuseums. | R3, R9, R10 | Ecological subjectification | Structural: justice as a relationship with the living territory |

Figure 2. Twelve Combined Capabilities (CC) for the agentic LC-ecosystem.

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