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Dialogue for decision-making: unpacking the 'City Learning Lab' approach

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1. Introduction

In the last 30 years, climate change coupled with unplanned, rapid urbanization generated significant development challenges worldwide. The impacts of climate change are already being felt globally through increased temperatures, changes in rainfall patterns, and an increase in the frequency and intensity of extreme-weather events. The intersection of climate and urbanization is a point of stress and challenge as well opportunity and learning.

The 'City Learning Lab' approach described here is designed to facilitate multi-disciplinary problem-solving at the intersection of these two trends across five cities in Southern Africa. It has been developed and is being used by the 'Future Resilience for African Cities and Lands' (FRACTAL) project, which aims to advance and integrate scientific knowledge into climate-sensitive decisions on the city and regional scale.

FRACTAL is designed to strengthen collaboration between researchers, city officials and other key decision-makers in Southern Africa, and improve decisions on issues of water, energy or food security over the next five to 40 years; the use of such shared learning-processes for urban decision-making in Southern Africa is new (Tyler, 2012).

This paper will include a literature review of key themes related to the origins of the City Learning Lab process. The 'Cities and Climate Change' section begins with an exploration of the global socio-political and environmental context, which catalysed the City Learning Lab in Southern Africa. The 'City Systems' section then focuses on the complexity and interconnected nature of city systems. Building on some of the key aspects that make city systems resilient, a literature review of 'Knowledge Creation in Complex City Systems' explores knowledge production and inclusive decision-making within a city context that reinforce resilience. Following that, the 'Adult Learning' section provides an in-depth review of how to maximize individual and collective learning. Finally, the paper concludes with a discussion of the 'City Learning Lab Process' which combines themes of previous sections into a model for research and city planning currently being tested in the five cities.

2. Cities and climate change

Half the world's population live in cities; by 2050 two thirds likely will (Lederbogen et al., 2010). Africa's population growth and urbanization rates are significant, with the share of Africans living in urban areas projected to grow from 36 per cent in 2010 to 50 per cent by 2030 (World Bank, 2015).

This presents both opportunities and challenges. Opportunities exist in that much of Africa's development will occur in the coming decades, and this development does not have to occur via the same carbon intensive pathways as in the global North. Challenges relate to existing socio-economic issues, such as poverty, unemployment, crime, and service delivery backlogs are likely to be exacerbated by rapid population growth and unplanned urbanisation.

Climate change in Africa is also increasing the frequency and intensity of floods and droughts. Weather patterns are changing and climate extremes threaten agricultural production, food security, health, water and energy security. Climate-related disasters threaten the provision of basic services such as water and threaten human security and ultimately political stability (Centre for International Governance Innovation, 2009).
Globally, increasing efforts are being made to bring climate change mitigation and adaptation efforts together with the challenges and opportunities of urbanization. The key outcome of the Habitat III Conference in Quito, Ecuador, in October 2016 was the New Urban Agenda, stressing the role of cities in sustainable development, in line with the 2015 Sustainable Development Goal of "making cities and human settlements inclusive, safe, resilient and sustainable".

The COP 21 negotiations in Paris in 2015 also recognized the crucial role that cities play in the global response to climate change, reinforced by commitments made by hundreds of mayors and other leaders there. Global platforms such as the Compact of Mayors and 100 Resilient Cities are profiling the significant impact that cities are making via adaptation and mitigation.

Funding for work on climate change in cities has increased: Between 2010 and 2014, a total of US$842 million of multilateral climate funds was spent to support low-emission, climate- resilient development in cities (Overseas Development Institute, 2015). In 2016 it was decided that a report on cities from the Intergovernmental Panel on Climate Change (IPCC) would be considered in its Seventh Assessment Report ('AR7').

More than ever, planners in cities need climate information to spur new forms of development and ensure they are responsive to climate change and protect the most vulnerable.

3. City systems

Cities are 'multiple interconnected sub-systems' (ALNAP, 2016). In using a climate-resilience lens in planning and implementing their mandates, city governments and non-governmental partners need to consider complexity and scale as defining and interrelated characteristics.

In cities local problems are often caused by non-local phenomena, necessitating solutions be sought outside the community, at local, city, national or sometimes even international scales. Managing the complexity of cities requires engaging across scales while utilizing a 'systems approach', i.e. including analysis of context, interdependence, internal and external influences, and adaptive capacities (Ison, 2016).

One useful way of understanding urban systems is to break them down into three loose categories and identify the information these systems contain and how it is communicated. These are the *physical and natural environmen*t in which people live and operate, such as buildings, parks, water resources, infrastructure and roads; the knowledge, behaviour and connectedness of *people and institutions/organizations*; and *laws, culture and norms* that can enable or constrain information flow and decision making. (Tyler, 2012)

The resilience of these systems is clearly desirable within the wider urban system, but their interdependency can also make a city fragile, and during a disaster a failure in one system can quickly cascade to the next. For example, water may be used not only for drinking and other domestic purposes but also for local agriculture and power generation; a drought would push human consumption up the priority list at the expense of electricity generation and agriculture (ISET, 2014).

In 2014, a study by the Arup group identified six qualifying characteristics for city systems to be resilient. *Reflective* systems are accepting of ever-increasing uncertainty and change in today's world. *Robust* systems include well-conceived, constructed and managed physical assets that can withstand the impacts of hazards without significant damage or loss of function. *Redundancy* refers

to spare capacity created within systems so that they can accommodate disruption, extreme pressures or surges in demand. *Flexibility* implies that systems can change, evolve and adapt in response to changing circumstances. *Resourcefulness* suggests people and institutions are able to rapidly find different ways to achieve goals or meet needs during a shock or when under stress. *Inclusion* emphasizes the need for broad consultation and engagement of communities, including the most vulnerable groups.

Integration and alignment between city systems promotes consistency in decision-making and ensures that investments are mutually supportive. Strengthening resilient city systems is increasingly important in order to manage changing risks due to climate change.

4. Knowledge creation in complex city systems

In response to the complexity of city systems as well as growing social, political and environmental threats, cities are engaging in more inclusive, experimental governance to increase the resilience and sustainability of systems. (Bulkley, 2010; Bulkley and Castan Broto, 2013; Braun and Aria-Maldonado, 2013). A range of literature proposes that alternative models of knowledge production and decision-making are required for governing cities, particularly in developing societies. A central theme of these models is a focus on more collaborative knowledge production. (Whatmore, 2009; Lane et al., 2011; Parnell and Oldfield, 2015).

Three commonly cited and interrelated concepts are co-exploration, co-production and the transdisciplinary approach; many authors use them interchangeably.

Co-exploration

This concept has been proposed to understand and design collaborative decision-making in diverse African cities (Steynor et al.). It is a collaborative approach and proposes that climate-science researchers work with officials, civil society, businesses, NGOs and others to explore climate information needs and uses in urban policy making.

Co-production

A complementary body of literature proposes that with the shift from top-down to participatory government, co-production of knowledge is the most appropriate model, addressing 'burning issues' in cities in the face of increasing complexity and uncertainty, especially in the context of global environmental change (Polk, 2015; Callon, 1999; Thompson Klein, 2013; Swilling and Anneke, 2012; Arias-Maldonado, 2013; Kessel and van Lente, 2014). The model posits that there are many other sources of expertise in addition to an 'elitist' scientific knowledge-production, and that the knowledge of practitioners has a valuable role to play in understanding urban complexity (Gibbons et al., 1994; Bruckmeijer and Tovey, 2008).

The co-production model involving a range of actors and knowledge-holders proposes that collaborative knowledge-production is a social process that results in 'social learning' (Hajer, 1995) and is socially embedded and focused on problem-solving (Polk, Thompson Klein, 2013). It is therefore a shift away from more traditional knowledge production where experts create knowledge for users (Gibbons, et al., 1994; Nowotny, et al., 2001; Thompson Klein, 2013). Co-production entails undertaking research *with* rather than *for* society.

Transdisciplinary

Like the concept of co-production and co-exploration, the transdisciplinary approach represents a major epistemological shift and is said to be more appropriate for the complexities of contemporary society (Austin et al., 2008) that frame research questions (Austin et al., 2008; Thompson Klein, 2013).

As with co-production and co-exploration, another characteristic of transdisciplinary research includes the knowledge of non-academic actors such as civil society, business, and social movements (Thompson Klein, 2013), unsettling the conventional understanding of the relationship between science and society. This is replaced with the idea that citizens collaborate with scientists in constructing solutions for social problems in more contextualised research.

These models embody characteristics such as inclusion, resourcefulness, flexibility and reflectiveness that can increase the resilience of systems in cities.

5. Adult learning

Increasingly, the literature emphasizes the role of value in successful co-production of knowledge and transformative learning (Tschakert et al., 2016).

A framework for creating value

Successful co-production of knowledge creates *value* for the participants. In 2011, Wenger et al. developed a conceptual framework on value creation in communities and networks, allowing learners to transfer and apply knowledge into other aspects of their lives or work.

Communities and networks are integral elements of the social fabric of learning. Wenger argued that value creation always needs to be explored in the context of narratives, both personal and collective, considering community or network activities and what counts as value for whom. Box 1 below summarizes cycles of learning in the Wenger framework:

The Wenger framework for value creation

Cycle 1: Immediate value
The activities and interactions between members have value in and of themselves.

Cycle 2: Potential value
The activities and interactions of Cycle 1 may not be realized immediately, but rather be saved up as knowledge capital whose value is in its potential to be realized later.

Cycle 3: Applied value
Knowledge capital may or may not be put into use. Leveraging capital requires adapting and applying it to a specific situation.

Cycle 4: Realized value
Even applied new practices or tools are not enough. A change in practice does not necessarily lead to improved performance, so it is important to find out what effects the application of knowledge capital is having on the achievement of what matters to stakeholders.

Cycle 5: Reframing value
This happens when learning causes a reconsideration of how success is defined. It includes reframing strategies, goals and values.

(Wenger et al., 2011)

This process of adult learning as described by Knowles (1970) is a process of self-directed inquiry. In 1984, Knowles proposed four principles for adult learning:

1. Adults need to be involved in the *planning and evaluation* of their instruction.
2. *Experience*, including mistakes, provides the basis for learning.
3. Adults are most interested in learning subjects that have *immediate relevance to and impact on* their lives.
4. Adult learning is *problem-centred* rather than content-oriented.

The reasons most adults enter any learning experience is to create change. This may mean a change in their skills, behaviour, knowledge level or their views (Adult Education Centre, 2005). Knowles advocated creating an environment of mutual trust and clarifying mutual expectations with the learner so that cooperation is fostered.

6. Exploring complexity in cities: learning labs

The concept of City Learning Labs is based on the principles of social learning labs: *processes that engage a variety of stakeholders in finding solutions for a specific question or problem* that they all perceive as relevant and urgent (Hassan, 2014). This process embraces the complexity of cities, knowledge creation in cities, and the principles of social and adult learning (Ison et al., 2015).

The core idea of this process is that *all participants are encouraged to share views, needs, insights, research*, etc. on a specific problem or burning question. While sharing these insights, all participants are asked to listen and possibly revisit their own perspectives. Some key elements of the process are described in the 'Theory U' by Otto Scharmer (2009), a useful concept for FRACTAL.

The core of a City Learning Lab is trying to solve a complex problem through innovative solutions *requiring stakeholders to explore it from various angles*.

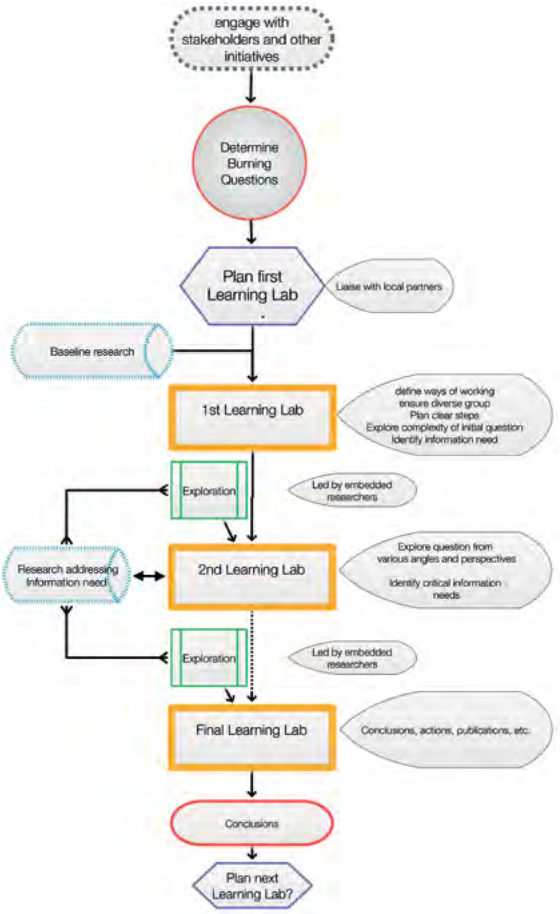
How is this envisaged for FRACTAL?

City Learning Labs will be an *important platform for researchers to create dialogue* on pressing issues, identified together with cities and FRACTAL team members. The facilitated process starts at the first lab, initially through understanding the various perspectives, leading to discussions of possible solutions. This is a carefully facilitated, iterative learning process that will lead to improved action at city level.

The process will seek to actively *explore decision-making structures* in the city, while also *distilling effective climate information* that is also shared with the wider FRACTAL team.

Steps in the City Learning Lab process

The City Learning Lab process is designed to allow a broad range of stakeholders to constructively engage with a complex burning issue. This process is a facilitated engagement where the participants shape action. In the FRACTAL process, the City Learning Labs will be an important platform for exploring solutions, drawing on both research and the expertise of participants.



Suggested City Learning Lab process in FRACTAL with interlinking cycles of city dialogue (B. Koelle)

It can be divided into four phases: scoping; planning and engagement; the City Learning Lab itself; and closure.

Phase 1: Scoping

This initial step is aimed at understanding the complexities of the city, its ongoing processes and networks. It should also explore what burning questions would bring a diverse group of stakeholders to the table through ongoing engagement.

In collaboration with key stakeholders, embedded researchers, and academic and city partners, this internal process will review some of the pressing questions identified and choose one to pursue.

Phase 2: Planning and engagement

This is a crucial step and will determine the success of the City Learning Lab. In collaboration with local partners it is important to determine the appropriate structure and setting for the first gathering, and to consider…

- How can different stakeholders be encouraged to attend?
- What specific resources would be useful?
- What is an appropriate time frame and venue?
- Have all relevant stakeholders been invited?
- Can some baseline information be presented?
- Is the planned process appropriate and engaging?

Phase 3: The City Learning Lab

The participants at the *first City Learning Lab session* will set *ground rules* for engagement, including roles and responsibilities. It is the facilitator's responsibility to ensure that the lab is a safe learning space for all participants.

In each session participants unpack the complexity of the burning questions and focus on a particular aspect. Finally, they decide on further exploration before the next lab – possibly including scientific research, climate information and expert input – and define clear actions.

The next sessions will review the research, integrate findings in the ongoing discussion, and possibly define some new areas for research. This cycle continues until the group feels a way forward has been identified. Actions are jointly planned, implemented and monitored. Learning might pass through many loops as needs for action emerge.

Phase 4: Closure

The final City Learning Lab will conclude the discussions on the burning questions and decide on action or sharing outputs. The group can then decide if this process is concluded or if there should be follow-up questions.

Facilitating the City Learning Lab processes in FRACTAL

It is crucial to facilitate the City Learning Lab in a way that ensures open and constructive dialogue. In order to facilitate engagement we would like to share some insights from the Africa section of ICLEI[1] – Local Governments for Sustainability'.

Engaging with municipal stakeholders: Lessons from ICLEI Africa

Engaging with municipal stakeholders in sub-Saharan African city regions is a complex process, particularly when aiming to influence local government decision-making. Relating to this complexity and the challenges and opportunities in cities, a number of lessons can be highlighted:

Gain municipal buy-in from as high a level as possible:
Gaining high level buy-in for a project, preferably from the mayor and/ or municipal manager encourages active engagement by municipal staff. To achieve this, FRACTAL is engaging with high level university and municipal stakeholders in city regions, for the signing of a three-way memorandum of understanding.

Establish and maintain a focal point/ local champion:
High-level delegation of a focal point/ local champion, preferably that is interested in project involvement is essential. The power relations that exist between this individual and municipal and non-municipal stakeholders is of vital importance.

Small, focused meetings are effective:
Large workshops are useful for awareness raising, enabling different stakeholders to engage and gathering diverse viewpoints. For enabling actions and implementation, small, focused meetings with key stakeholders are most effective.

Listen more than you talk and be humble:
Municipal stakeholders understand their context better than external researchers or practitioners; especially when these researchers and/ or practitioners are not based in the country and/ or city of interest. Listening and being responsive to the context is vital in ensuring that the knowledge disseminated is responsive to local needs/ requirements and is thus utilised.

Project/ programme branding:
Municipal officials receive an abundance of correspondence each day. Establishing clearly recognisable project branding that is eye-catching and represents the project ethos assists in project query response and engagement.

[1] Known by its original acronym standing for International Council for Local Environmental Initiatives.

7. Anticipated results

Through the City Learning Lab approach we plan to create an enabling environment for trans-disciplinary discussion, research and learning on the most pressing needs facing select cities in Southern Africa due to a changing climate.

Utilizing knowledge in adult learning, city systems and climate science, city officials and stakeholders will participate in a joint process to arrive at tailored co-developed solutions to complex problems (Hajer, 1995). The solutions to be addressed could include water management across human consumption, power generation and agriculture. A systems perspective will be developed on how these usage scenarios interact with each other, as well as how they feedback positively and negatively into other city systems. University research partners will then expose these system models to various climate-change scenarios to inform better planning and decision-making in the present, and for a safer, more resilient tomorrow.

Within the city, it is also anticipated that networks between city leaders and technical staff will be strengthened through regular interaction with academic researchers, non-governmental stakeholders and city residents.

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