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Deep listening: A framework for collaborative climate adaptation

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Abstract: This article introduces Deep Listening, a novel transdisciplinary research agenda and framework for collaborative climate adaptation. It argues for the urgency to develop a communication approach in understanding how frontline communities interact with mediating institutions. Deep Listening is presented in five components: 1) knowledge sharing (mutually agreed upon protocols for data production and use); 2) holding space (co-creating spaces where institutional actors and communities can exchange, learn from each other and discuss); 3) the production and sharing of climate imaginaries (where local or Indigenous knowledge and community values are respected); 4) sensemaking with a diversity of perspectives and scientific data; and 5) evaluation and monitoring support to assure accountability and to assess quality of information. Based on a literature review of adaptation studies, the case is made that the Deep Listening approach can enhance the sense of procedural justice and mitigate maladaptive outcomes.

Keywords: climate adaptation, climate justice, co-design, collaborative design

1. Introduction

Over the next decade, an estimated 100 million people will need to adapt where and how they live to accommodate a rapidly changing climate (Jafino et al., 2020). Although mitigation strategies can slow the pace of climate change, the human dimension of adaptation to changing circumstances will be a major challenge for frontline families and communities across the Globe. Mitigation will not be enough to preserve life and livelihood as most societies have come to expect them to be. Government and intergovernmental institutions [hereafter referred to as “institutions”] will need to help lead the way in facilitating adaptation processes (IPCC, 2014). But to do this successfully, they will have to work in collaboration with both urban and nonurban frontline communities, those who are affected first and often in the harshest ways (Orlove et. al., 2019), to develop plans and implementation strategies that are directly responsive to physical, social and cultural needs.



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Those who are required to adapt earliest, many of whom are Indigenous (Ford, 2012; Jones, 2019; Turner & Clifton, 2009), will not only desire to preserve dignity and identity, but they will also lead the way for others in their aspirations for sustainability. For them, effective communication with institutions towards climate adaptation is uniquely challenging.

Adaptation planning is an uncertain science. If communication between institutions and frontline communities is broken, and values are misaligned, adaptation plans can actually exacerbate a community's vulnerability to climate change (Tschakert et al., 2017; Magnan et al., 2016). Eriksen, et. al. (2021), in their review of internationally-funded climate adaptation efforts, demonstrate clear risk factors for maladaptation, including: 1) a shallow understanding of the human vulnerability context, 2) inequitable stakeholder participation, 3) inability to share expertise from planners to local communities, and 4) the inability of the institutions to learn from the populations they are intending to help. To address this threat of maladaptation, there is an urgent need to create the communication infrastructure in which collaborative adaptation processes can take place.

In this paper, we propose an adaptation framework called *Deep Listening* that seeks to address the threat of maladaptation by examining how futures imagined by frontline communities are supported, shared, and implemented by mediating institutions.

2. Towards collaborative adaptation

2.1 Collaborative approaches in climate adaptation

Collaborative approaches are gaining considerable traction in areas ranging from documentary filmmaking to technology design; but it remains challenging in institutional contexts. Blomkamp (2018) describes the codesign of policy within public institutions as a “design-led process, involving creative and participatory principles and tools to engage different kinds of people and knowledge in public problem-solving.” She identifies a set of characteristics guiding the components of co-design: process must be composed by iterative stages of design thinking and oriented towards innovation. The principles are that “people are creative; people are experts in their own lives; policy should be designed by people with relevant lived experience,” and the practical tools should be creative and tangible methods for telling, enacting, and making” (p. 732). This literature is small because achieving true collaboration in institutional contexts is difficult, as it often emerges from agencies without adequate resources devoted to the process and without adequate resources for following through with implementation (Pilemalm, 2018).

Collaborative adaptation means that institutions work *with* Indigenous and frontline communities from the beginning to define social and cultural priorities and plan and execute adaptation initiatives. This collaborative approach is currently all too rare, as frontline communities lack the mechanisms and institutional support to communicate well with institutions that facilitate adaptation. And institutions, even those with the best of intentions, lack the capacity to listen well to those most impacted by the changing climate.

There are a number of reasons why advances in the communication infrastructure of climate adaptation have been difficult. For one, while the 2015 United Nations Climate Change Conference increased awareness and called for higher financial support for adaptation planning, the majority of adaptation resources have focused on disaster recovery (Bronen, 2011). As a result of this focus on the short term, institutions mostly lack the tools, training, and experience to listen to affected people in ways that their voices impact how decisions get made, implemented, and assessed (Ajibade et al., 2020). Barriers of low trust and disrespect between community and governing institutions (Howell & Fagan, 1988; Uslaner & Brown, 2005; Zuckerman, 2021) and misalignment of priorities (Ghose, 2005; Corsaro et al., 2012), lead to antagonism and competition as opposed to the collaboration necessary to meet diverse and critical needs.

2.2 Designing collaborative process for procedural justice

Over the last decade, significant progress has been made in justice-oriented adaptation planning that centers marginalized communities. However, considering the growing number of case studies, there is an incomplete understanding of the distributive outcomes on the ground (Shi et. al. 2016), specifically how they intersect with institutions and achieve implementation. For example, there are many published case studies of Indigenous-led adaptation efforts, most of which are captured in resources such as the UN LCIPP (Local Communities and Indigenous Peoples Platform) and research reports (e.g. UNFCCC report on the use of Indigenous and traditional knowledge and practices for adaptation). Likewise, reports on frontline and Indigenous-led adaptation planning (Care Climate Change & Resilience Platform, 2014; Mfitumukiza et al., 2020; Coll Besa, 2015) often miss out on highlighting the role of mediating organizations, and therefore leave institutional buy-in and follow through as an open question. There is also a growing number of case studies that highlight progressive engagement with frontline communities (e.g. Columbia University's Urban Climate Change Research Network). However, most research in this space does not adequately address matters of procedural justice (Shi et al., 2016); it does not provide a rigorous examination of how climate imaginaries are shared, who is at the table, how decisions get made, how plans are implemented, and how power gets distributed for the purpose of sustainable collaboration.

These experiences highlight the need for collaborative governance arrangements in climate adaptation. Ansell and Gash (2007) define collaborative governance as an arrangement where the government directly engages with other stakeholders in a collective decision-making process with a specific setting and rules, that aims towards consensus, that is deliberative, and seeks to make or implement public policy or manage public programs or assets. Collaborative governance arrangements can emerge within public or private institutions, and can take many forms. They can be informed by values, which can configure the relations between stakeholders and address power imbalances within them (Gordon & Guarna, 2021). In that sense, a deliberate design of a process in which all parties are privy to the rules and the human and environmental consequences of the procedure is imperative to

achieve procedural justice, which implies “recognizing [and respecting] cultural differences and removing procedural obstacles that prevent marginalized groups from meaningfully participating in decisions that affect their property, wellbeing, and risk” (Shi et al., 2016, p. 132). Research has demonstrated that people care as much about how disputes are resolved as about the outcomes they achieve (Thibaut and Walker, 1975; Heuer et. al. 2007). When climate adaptation processes are perceived to be unfair or unjust, the likelihood of maladaptive outcomes is significantly increased (Blader and Tyler, 2003; Holland, 2017; Kuyper et. al., 2018).

2.3 Procedural justice through deep listening

This paper is grounded in the hypothesis that the best way to achieve procedural justice is through Deep Listening, which is a form of institutional and community intake that “holds diversity and seeks to balance the familiar with the unfamiliar, holding tensions and frictions rather than ‘resolving’ and creating ‘inauthentic’ homogeneity, for the sake of imposed health and well-being currencies” (Pavlicevic & Impey, 2013, p. 249). Deep Listening implies both giving Indigenous and frontline communities opportunities and resources to effectively gather and translate stories into institutional languages that impact practice and policy decisions (Yarina & Takemoto, 2017; Farbotko et al., 2020; Ford et al., 2016; Remling & Persson, 2015; Shi et al., 2016), and ensuring that institutions have tools to incorporate insights and plan *with* communities. The human and ecological costs of not transforming institutional listening practices, given the demands of adaptation to climate change across the urban and nonurban geographies of the world, could be enormous.

Deep Listening requires institutions to engage with frontline communities while critically reconsidering their own *value* and *values*. Achieving greater efficiency in the delivery of adaptation plans and related communication strategies is in line with the traditional definition of value-creation by government and aid organizations; however, this narrow consideration of value might reduce the capacity for organizations to incorporate the *values* of local communities that enable them to both flourish and persist (Gordon & Mugar, 2020). Because of barriers of trust in existing institutional structures and a mismatch of priorities between those of institutions and those of communities (Connell & Lutkehaus, 2015), it is clear that the sole technical capacity of institutions is not sufficient to respond to crises. Resources need to be devoted to creating collaborative governance structures (Ansell & Gash, 2007), which prioritize local values through multi-sectoral decision-making arrangements, and that have the ability to translate between community and institutional contexts.

There is a need for accessible, adaptable and accountable communication tools that can make collaborative adaptation the norm, rather than the exception. These tools should be codesigned with facilitating institutions, as well as members of Indigenous and frontline communities, so that they represent the communication priorities of each group. They should support Indigenous and frontline communities in telling their stories of climate

adaptation, while being able to translate and accommodate scientific and bureaucratic factors that influence communication. And, they should support institutional learning so that stories are not lost and insights can be connected to inputs. What follows is the articulation of a conceptual framework and research agenda that will support this work.

3. Five components of deep listening

Based on an extensive review of the adaptation literature, we outline five components of Deep Listening for collaborative adaptation. We devote the remainder of this paper to outlining the conceptual space of each. They include: 1) knowledge sharing (mutually agreed upon protocols for data production and use); 2) holding space (co-creating spaces where institutional actors and communities can exchange, learn from each other and discuss); 3) the production and sharing of climate imaginaries (where local or Indigenous knowledge and community values are respected); 4) sensemaking with a diversity of perspectives and scientific data; and 5) evaluation and monitoring support to assure accountability and to assess quality of information.

3.1 Knowledge sharing

For successful adaptation plans, stakeholders must rely on trustable primary data. However, data collectable by institutions differs from the data potentially collected by frontline communities. Communications and geography scholars have pointed to a tension between place-based and generalized knowledge. In the context of smart cities, “smart” governments see their role as the collector and processor of data concerning demand for public goods and services, so that allocation of resources can be rationalized, quantified and addressed through efficiency-focused tools and processes. As Mattern (2021) argues, smart urbanism is an understanding of what we know about a city and of what is worth knowing about it, which systematically excludes other forms of local, place-based, indigenous intelligences and knowledge institutions. Likewise, as D’Ignazio & Klein (2020) argue, normative decisions behind what data is collected, how it is displayed, its accountability and how it is made authoritative are crucial. In this sense, data feminism, a viewpoint that aims to achieve the most complete knowledge through the synthesizing of multiple perspectives, with priority given to local, Indigenous, and experiential ways of knowing presents a valuable viewpoint.

This division is tangible in Indigenous communities throughout the United States. For example, in Rainie et al., (2017), the authors found data about Indigenous populations in the United States to be inconsistent, irrelevant, of poor quality, produced and used within an environment of mistrust, and controlled by those external to the Native nations. The authors surveyed two successful initiatives to create locally and culturally relevant data for decision making, arguing these are examples of indigenous data sovereignty. Central to their contribution is the prioritization of Indigenous culture and values and Indigenous nation goals, beyond technical and logistic issues that tend to dominate the discourse on data sharing.

While this may appear to be a data collection issue, the incapacity of institutions to align their values with those of communities points to fundamental obstacles in democratic governance. While institutions could invest more in research in their adaptation processes, this would be an insufficient solution. There is a limit to the extent to which they can overcome the barriers of low trust between governments and communities and the misalignment of priorities, which often leads to antagonism and competition as opposed to collaboration.

For institutions to collaborate with communities in data sharing for climate adaptation, there is a need for data sharing *protocols* (social and technical rules) that establish equitable data governance. Indigenous data governance aspires to reflect indigenous data sovereignty, the right of Indigenous peoples and tribes to govern the collection, ownership, and application of their own data (Carroll et al., 2019; Rainie et al., 2017). An example of this is the CARE Principles for Indigenous Data Governance, a result of the International Indigenous Data Sovereignty Interest Group, a network of nation-state based Indigenous data sovereignty networks and individuals that developed these principles in consultation with Indigenous Peoples, scholars, non-profit organizations, and governments (Carroll et al., 2020). In the context of climate adaptation data sharing protocols, this means ensuring that data and information about and from frontline and Indigenous communities are controlled by frontline and Indigenous communities. Such an infrastructure is necessary for effective cross-sector collaborative governance that requires access to and knowledge of a trusted source of information both before and during a crisis (Soden et al., 2014). And, while there are many existing sources for official government data (e.g., government data portals) there is no equivalent trusted source for community-generated data.

While developing such protocols is not technically challenging, the challenge is configuring it such that it addresses both community concerns like threats to privacy, security, and extractive use of data (Carroll et al., 2020), as well as creates avenues for providing local observations that would be of value to institutional actors and climate scientists. In that sense, achieving equitable and efficient protocols means understanding how data and knowledge is shared between frontline communities and institutions (and vice versa), and understanding how data and knowledge come to be trusted by organizations and groups in specific contexts.

3.2 Holding space

Collaborative governance arrangements require specific decision-making situations that enable collaboration. An example of this is urban living labs (ULLs). First introduced by William Mitchell (2003) at the MIT Media Lab in the 1990s, ULLs can be defined simply as a means of testing new technologies and strategies to cope with complex social problems. They are particularly popular in the European policy sphere, with dozens of examples in specific policy areas such as housing, economic development, and energy. According to Nesti (2018), they have three primary characteristics: 1) they are organized by the quadruple helix

(i.e. collaboration between the public sector, firms, universities, and communities); 2) they center an experimental methodology; and 3) they encourage open innovation, where knowledge can be diffused across stakeholders. However, spaces like traditional ULLs can be insufficient for collaborative climate adaptation, due to their common outcome orientation and their insufficiency to destabilize institutional power. In adaptation planning, institutions consult with frontline communities in a variety of formats, often through formal presentations and feedback sessions, interactive workshops, or digital input conversation tools such as WhatsApp. But designing these spaces (physical and digital) such that they are inclusive and accommodating of generative discussion is not easy, and tends to be an afterthought (Gordon et. al. 2011).

Instead, for collaborative climate adaptation, there needs to be a clear intention to create space of democratic discussion. Among civic designers, “holding space” means creating environments of exchange that ensure the necessary conditions for dialogue and that make room for multiple perspectives and is tolerant of dissent (Gordon & Mugar, 2020). It implies not only establishing a field of action through trusted links with the involved stakeholders, but also purposefully designing the conditions (time, place, mediums) through which participants can engage freely. Being intentional about design for democratic exchange means creating spaces that mediate between different kinds of knowledge, as defined above. What Indigenous scholar Eli Enns calls “ethical space,” is an intermediary between two knowledge systems, a common space designed specifically for this collaborative encounter (Ermine, 2017; Parks Canada, 2018; Conservation Through Reconciliation Partnership, 2020). Designers have often made efforts to translate these normative ideas to specific settings and methodologies. For example, transition design aims to generate spaces for open (creative) and safe (sufficiently private) dialogue, recognizing the value of place-based knowledge and understanding their global implications (Irwin, 2015).

The role of institutions in these exchanges is to co-create, legitimize, and participate in these spaces. These interactions involve actively acknowledging institutional actors’ power position, and generatively addressing these power imbalances in a way that necessarily recognizes procedural justice (Shi et al., 2016, p. 132). Furthermore, these practices spur *institutioning*, where discussions and engagement with institutional frames lead to the longer-term transformation of institutions into more equitable ones (Huybrechts et al., 2017).

3.3 Co-production and sharing of climate imaginaries

Jenkins, et. al. (2019) define civic imagination as “the capacity to imagine alternatives to current cultural, social, political, or economic conditions; one cannot change the world without imagining what a better world might look like.” They argue that “the civic imagination requires and is realized through the ability to imagine the process of change, to see oneself as a civic agent capable of making change, to feel solidarity with others whose perspectives and experiences are different than one’s own, to join a larger collective with

shared interests, and to bring imaginative dimensions to real-world spaces and places” (p. 5). Likewise, Baiocchi et. al. (2014) define the civic imagination as “people’s theories of civic life,” the “cognitive roadmaps, moral compasses, and guides that shape participation and motivate action” (p. 55).

Imaginaries are also intertwined with visions of technology in a changing world. In this sense, STS scholars define sociotechnical imaginaries as “collectively held and performed visions of desirable futures,” which are “animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology” (Jasanoff, 2015, p.19). Sociotechnical imaginaries are collective, durable, and capable of being performed, where institutions play a key role in the durability and permanence of these imaginaries. They are “spatial imaginations,” depending on localized, place-based knowledges and practices.

Climate imaginaries incorporate concepts from these two strands of research above. Climate imaginaries are future visions of climate change and specific pathways for its transformation. Like civic imagination, they are political perceptions that act as theories of change: depending on how they are positioned, they legitimize and value political actors, motives, and goals. And similar to sociotechnical imaginaries, they are visions of science and technology intertwining to allow these visions of political change.

But climate imaginaries are not new. Indigenous people and frontline communities already engage with visions of climate change. Many are adept at telling stories about their places and imagining their futures. Often such stories are told within communities, reflecting imaginations that are imbued with community-based knowledge and narrative practices. But these efforts, typically emerging long before the start of official planning processes, are overwhelmingly disconnected from institutional procedures, providing barriers to much needed integration of Indigenous and scientific knowledge (Callison, 2014).

Scholars have rightly pointed at how media discourses and representations contribute to specific framings about climate change, which can construct political agents and subjects who have an effect over climate futures (Carvalho, 2010; Goodman et al., 2016; Lakoff, 2010). But furthermore, there is a need for research on tools designed for and with frontline communities to turn their imaginaries into concrete future visions, enabling these stories to effectively reach and support institutional decision-makers in ways that are discernable to them. Likewise, there is a need for institutions’ model-based future climate projections to be translated into languages/stories that make sense to communities. It is important to highlight that collaborative climate adaptation does not need only data to be shared, but that information needs to be effectively guided and organized by storytelling techniques that project specific visions for the future.

3.4 Sensemaking with a diversity of perspectives and scientific data

Deep Listening involves enhancing communities' capacity to listen to scientific data and enhancing institution's capacity to listen to communities' climate imaginaries. In this way, there is an opportunity to develop specific artifacts and technologies that support this goal.

A key component of climate adaptation is the assessment of vulnerability. A common process of vulnerability analysis (Brooks, 2003; Füssel & Klein, 2006) includes risk identification, risk assessment, risk valuation and suggestion of measures. Specific technologies like decision-support tools can be utilized to incorporate different viewpoints into vulnerability analysis for climate adaptation. Decision-support tools complement steps in validated processes for climate adaptation such as risk and vulnerability analyses, and aim to inform discussions, show weak points, knowledge gaps and uncertainties, and visualize trends (Andersson-Sköld et. al. 2016). They can incorporate a diversity of values, visualizations, and organizational frameworks that can accommodate power sharing through collaborative decision-making, and communication and feedback mechanisms that lean towards greater transparency.

Furthermore, technologies can be utilized for the dialogic function of reconciling multiple points of view sourced from aggregated imaginaries into nuanced suggestions and documented decisions. Environmental communications practitioners often employ structured conversations as a method for facilitating participatory communication relating to environmental policy decision-making (Walker, 2007), but the capacity to analyze these conversations is usually limited. While artificial intelligence is often seen as a means for rationalizing knowledge and depriving it of context, there is an opportunity to utilize it to develop and test mechanisms to pull insights from a range of Indigenous and frontline stories, scientific reports and news articles, so that institutions and partnering communities can "see" the same data. Technologies like Hughes and Roy's (2021) *Keeper* are examples of how artifacts can facilitate conversations in an equitable way. Furthermore, the *Local Voices Network*, developed by Deb Roy at the MIT Media Lab, proposes a methodology for community members to share stories, which are processed by a software that can retrieve the deeper texture and complexity of the views of the community through qualitative data captured in conversation (Blades & Parsa, 2021). These insights are useful for institutions to understand the values of the community engaging in planning processes in a language that institutions can act upon, taking part in effective institutional transformation that bypass communicative disconnects and produce effective collaborations between institutions and the communities central to climate adaptation processes. This is not to dismiss the scholarship on the biases of artificial intelligence, especially towards gendered and racialized individuals, (Buolamwini & Gebru, 2018), frequently coinciding with frontline communities and Indigenous peoples particularly at risk by climate change. Co-creating these technologies between institutions and communities will require a collective effort of development, testing, and accountability throughout time, in line with what Gordon and Mugar (2020) name "persistent input."

3.5 Evaluation and monitoring support to assure accountability and to assess quality of information

Collaborative adaptation planning requires ongoing evaluation and monitoring, well beyond the official timeline of a discrete process. This involves the evaluation of information before, during and after the formation of a plan, to assure that it is fact-based and adherent to cultural context. This also involves having mechanisms and tools to monitor the details of a plan to hold institutions accountable, including how they adapt their plans to emerging climate science.

Monitorial citizenship (Schudson, 1998) refers to “a form of civic engagement in which people collect information about their surroundings or track issues of local or personal interest in order to improve their communities and pursue justice,” where “common activities of the monitorial citizen include collecting information, sharing stories and insights, coordinating with networks of other civic actors, and pursuing accountability for institutions and elite individuals and their perceived responsibilities” (Graeff, 2019). While these practices are frequently performed outside the scope of institutions (Rosanvallon, 2008), climate adaptation processes must incorporate tools for communities to evaluate and monitor in a way that shares factuality of claims between institutions and communities and holds institutions accountable for their actions.

In order for participants to be able to track elements of climate adaptation plans and appropriately hold institutions accountable for implementation, there is a need to create tools that challenge the power imbalances in sustainability science (McGreavy, et. al., 2021) and allows communities to actively engage, manipulate and understand scientific data, and further engage with it in the context of collaborative work. Examples of this are Indigenous-oriented evaluation methods (see Bowman et al., 2015) and Indigenous Evaluation Frameworks (LaFrance, 2010). Furthermore, there needs to be a concrete examination on the role of communities as partners in collaborative change processes. Evaluation and measurement of progress and change within communities must be carried out through agreed-upon standards, and owned by communities in a way that holds them accountable for their commitments. In that sense, collaborative climate adaptation plans must critically assess how institutions can be held accountable to frontline communities for the details of adaptation plans, and likewise, how frontline communities should be held accountable to institutions as well. Accountability systems must represent every stakeholder as having a role and responsibility in effective planning.

4. Discussion

To achieve collaborative climate adaptation, policymakers must understand the value of investing in equitable communication infrastructure that is able to engage with communities and allow for democratic exchanges. We call this communication infrastructure Deep Listening, and we have outlined five components that should be investigated and developed through transdisciplinary research and collaboration to mitigate maladaptive outcomes in

the near future. We need to understand and develop new tools for 1) knowledge sharing, which includes the explicit articulation of data sharing protocols. We must reimagine how institutions are 2) holding space for frontline communities, and create mechanisms and design specifications so that these inclusive physical and digital spaces can be replicable. We must support local 3) climate imaginaries by co-creating the tools and platforms that support stories of possible futures. We must ensure that institutions can 4) make sense of a range of inputs gathered from frontline communities, including quantitative and qualitative data, and that incorporates AI tools carefully to build trust between actors. And we need to build systems of 5) accountability, where stakeholders have the ability to archive promises and apply pressure to ensure follow through. While each of these components opens a range of research inquiries, the power of the Deep Listening agenda as described in this paper, is to see them as necessarily connected and to encourage transdisciplinary collaboration. In order to confront a problem at the scale of climate adaptation, we need to embrace the complexity of communication infrastructure, and seek to understand how design research can be applied to transform systems. Over the long term, the knowledge and tools generated during and beyond the project's duration will provide frontline communities and institutional actors worldwide the capacity to lead actions that effectively reduce the mortality rate and loss of livelihoods induced by climate change, increase accountability, and bridge the critical communication gap between communities and institutions.

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