

## **The value of interdisciplinarity: a critical reflection on urban sustainability research**

**Catalina Turcu** (UCL), **Lauren Andres** (UCL), **Melanie Crane** (University of Sydney) and **Ding Ding** (University of Sydney) explain the importance of interdisciplinarity for tackling complex and “wicked” problems associated with urban sustainability. A critical reflection is presented to unpack some of its challenges.

The challenges of urban sustainability require moving beyond disciplinary silos into interdisciplinary thinking (Crane et al., 2021). The benefits of interdisciplinary knowledge have been recognised by both the research community (Van Noorden, 2015) and research funding agencies. Over the last decade, significant investments in interdisciplinary research consortia have focused on some ‘big urban questions’ and ‘wicked problems’ in cities (IDS, 2019; Rylance, 2015).

In this commentary, a range of issues regarding the various challenges of interdisciplinary working are considered.

One issue is the multiplicity of views on what constitutes interdisciplinary research. It can be broadly defined as research that integrates knowledge and methods from different disciplines and uses a synthesis of approaches (Klein, Weingart, & Stehr, 2000). This approach to research is sometimes distinguished by additional terms such as multi-disciplinarity which contrasts views from different disciplines and trans-disciplinarity which brings together theories, methods and knowledge from a wide range of stakeholders: scholars, and practitioners work together to extend disciplinary-specific perspectives that can translate into solutions to pressing scientific and societal problems (Stokols, Hall, & Vogel, 2013).

Interdisciplinary research is a crucial means of generating new knowledge and learning with potential for more theoretical creativity and innovation (Rhoten, 2004) and drives epistemological pluralism (Miller et al., 2008). Yet, there is a prevailing misperception that interdisciplinary work compromises scientific rigour (Müller & Kaltenbrunner, 2019) and theoretical consistency (Jacobs & Frickel, 2009). On the contrary, the obstacle to realising interdisciplinary theoretical innovation is often because it takes time and effort for individuals to integrate knowledge drawing on different disciplinary concepts, models, methods and languages.

On the other hand, interdisciplinary research is more likely to have an impact beyond academia because of its approach to knowledge generation. It provides translational knowledge which becomes ‘evidence’ for policymaking (Greenhalgh & Russell, 2009; Wang, Thijs, & Glänzel, 2015) by engaging with the diversity of policymakers’ disciplinary backgrounds in doing so (Schneidera & Blythb, 2017). Its achievements may then be realised in greater ‘real-world’ impact via outputs such as policy briefs, popular media articles, and propositional publications.

Individuals and groups engaged in interdisciplinary research collaboration can gain substantive benefits through the process of unifying disparate epistemological values and intellectual interests, and by the need to gain broader problem-solving skills and new awareness. Such an intellectual exercise requires learning, un-learning and re-learning across disciplines including within one’s own discipline. Learning from interdisciplinarity enables the development and sharing of ‘boundary spanning’ knowledge (Brown & Duguid, 1998).

### Straddling urban science and urban studies

Broadly, two dominant paradigms of research have been at work in the urban context: positivism and post-positivism. Positivism underpins the major principles of natural sciences; it acknowledges one single truth and an external reality; as such, its knowledge is rational and empirical, usually evidenced through quantitative methods by an objective researcher. This approach has been criticised as reductionist and some argue that it perpetuates a strong hegemony of natural sciences in urban health research, for example (Nastar, Boda, & Olsson, 2018). Post-positivism also focuses on external reality and the objective (and empirical) nature of knowledge; however, it acknowledges multiplicity and complexity which is determined by the subjective role played by the researcher. This implies a qualitative dimension in any empirical base and a preference for mixed-use and qualitative methods. A criticism of post-positivism is brought by methodology ‘purists’ who acknowledge fundamental differences between quantitative and qualitative methods of data collection hence, their irreconcilable union (Rhoten, 2004).

The two research paradigms also frame research on urban sustainability and broadly overlap with two fields of scholarship in urban research:

- urban science - primarily positivist

- urban studies - a combination of positivist ‘universalising theories’ and post-positivist approaches (Clarke, 2015; Paddison, 2015).

The distinction between urban science – urban studies echoes debates on ‘hard’ versus ‘soft’ science in urban sustainability (Kitchin, 2020) and health (VanLandingham, 2014) studies, and does not always reflect clear-cut disciplinary affiliations. For example, complexity and systems researchers can transcend the areas of urban science and urban studies when looking at the urban context as a ‘complex system’ requiring multiple forms of evidence to provide knowledge (Rutter et al., 2017; Turcu, 2013; Wolfram, Frantzeskaki, & Maschmeyer, 2016). However, a number of differences still remain.

In our experiences, interdisciplinary research is developed when researchers are able to move beyond common research paradigms and engage across the worlds of urban science and urban studies, while acknowledging both paradigmatic and disciplinary differences.

## Looking forward

How can interdisciplinary and transdisciplinary research on urban sustainability be further facilitated?

Solid theoretical foundations crossing the nexus between practical and empirical evidence need to be created at the intersection between urban science and urban studies (Müller & Kaltenbrunner, 2019). Interdisciplinary researchers can offer insightful and whole-system expertise into complex urban sustainability. They are also invaluable ‘experts’ at co-designing solutions to such issues by involving non-academic stakeholders and ‘translating’ expert knowledge into the social and political worlds of policymaking (Oliver & Boaz, 2019).

There are a number of efforts that could begin to help perforate the disciplinary silos with which urban and health researchers tend to work.

Although many academic institutions have established interdisciplinary research centres or programmes on urban sustainability and health, there remain institutional tensions including clashes with academic departments to which some of their researchers are affiliated. This can impact on individual career progression through power networks and the evaluation of publications. To overcome current roadblocks, research institutions can support interdisciplinary research training exchanges to enhance existing research investment or

grants, and facilitate dialogue to enhance understanding and promote knowledge creation. This can also address some of the difficulties in evaluating peers' academic contributions.

Funding is an important mechanism for exercising influence over researchers and academic systems. To improve the impact of interdisciplinary research and move towards transdisciplinarity, it would be beneficial to have more joint funding initiatives between academic, public and private funders. This would unify different interests and agendas while tackling common societal challenges at hand. Funders should also re-think how to evaluate the 'success' criteria for funded projects including how to evaluate the track record of an interdisciplinary or transdisciplinary researcher against a disciplinary expert in this hyper-competitive environment. There should also be increased flexibility with timelines and deliverables to acknowledge and account for the messiness and time-consuming process of interdisciplinary research.

More research will be needed on health, sustainability and resilience in urban settings in connection to the climate change emergency (Watts et al., 2020). We call here on funders to see the true value and challenges of interdisciplinary research and support interdisciplinary research in this field during very challenging times ahead.

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