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Localising and reimagining urban planning knowledge for effective Global South climate urbanism

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ABSTRACT

This paper acknowledges the limitations of the current system of urban knowledge production concerning climate change and its applicability to the Global South. It explores whether climate urbanism pedagogy, emerging in higher education, takes effectively into consideration local contexts and how this translates into curricula innovation. Drawing on insights from 14 interviews with engaged scholars and practitioners, the paper argues that advancing effective Global South climate urbanism requires reorienting planning education towards the historical specificity of places and their climate justice issues while experimenting at the same time with new forms of knowledge co-production.

1. Introduction

Efforts to build up climate knowledge to inform policy and practice have grown exponentially in recent years, as evidenced by the regular Intergovernmental Panel on Climate Change (IPCC) assessment cycles, which have driven the UN climate change agenda since the early 1990s. However, it was only in the early 2010s that cities began to receive serious attention in the international policy arena, despite growing evidence of their significant contribution to greenhouse gas emissions (UN-HABITAT, 2011). Therefore, and not surprisingly, planning schools worldwide have been reluctant to introduce climate change in their curricula (Preston-Jones, 2020; Hurlimann *et al.*, 2021). However, today, climate education has gained momentum, and climate knowledge, while gaps still persist (Schmitt & Magnusson, 2024), is likely to become more systematically embedded in urban planning programs worldwide.

Assuming this to be true, there is a concern that simply adding climate-related contents to the core of urban planning programs may not be enough. In the recent past, scholars have highlighted the relative lack of Global South case studies in international academic and policy discourse (Seto *et al.*, 2014). While research in this field is now increasing (de Macedo *et al.*, 2021), this process should not be viewed merely as a quantitative exercise, but as an opportunity to critically revise the whole philosophy of urban climate education. Broadly speaking, climate urbanism is here defined as the

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assemblage of climate change-related policies, plans, and actions which are shaping cities in response to the need for adaptation and mitigation (Broto *et al.*, 2020). Given its context-specific nature, the development of new curricula for climate change should focus on '*developing new pedagogical approaches with greater emphasis on critical thinking and problem-solving skills*' and '*new curricula should be flexible enough to be adaptable to local contexts*' (UNESCO, 2015, p. 5).

The implications for Global South cities are evident. A growing number of scholars argue that urban theories, which primarily emerged within the Euro-American context, do not adequately apply to the Global South (Mukhopadhyay *et al.*, 2021). Theories presented as universally valid have been challenged, given the very different political and social environments of places and contexts (Watson, 2016). Concretely, this has led to a reorientation of interests and actions towards addressing persisting vulnerabilities and global inequities, framed through a postcolonial perspective (Connell, 2014). In the specific field of urban planning, climate urbanism is therefore considered far from being a neutral field, as it may perpetuate, locally, structures of colonial oppressions. This calls for new transformative pathways to challenge and dismantle these enduring legacies (Shi, 2020). It is therefore against this backdrop that the paper examines the notion of the suitability of climate knowledge, aiming to identify more effective educational processes to achieve just outcomes.

This paper is based on two broad considerations that have informed the design of the research project. Firstly, urban knowledge – and therefore solutions for urban problems including climate adaptation and mitigation strategies – has predominantly been produced in the Western world. More critically, this knowledge has been applied in the Global South, where most of the world's urbanization is currently taking place (IPCC, 2014). This process of global policy transfer has shown a bias '*towards a rather unidirectional transfer of knowledge*' (Blanc *et al.*, 2023, p. 750). Secondly, and closely related to the first point, universities across the world have been criticised as institutions failing to acknowledge the limitations of their knowledge production. They have been called upon to incorporate more diverse contribution from people and approaches. This critique aligns with a broader ambition to decolonise universities (Bhambra *et al.*, 2018).

Under these premises, this research explores how urban planners operating in the context of the Global South should be educated to effectively address climate change. The following research questions have guided the research process: 1) Is there concern among educators that climate knowledge (including content, case studies, skills, approaches, etc.) predominantly produced in the Global North, is not adequately applicable to the Global South? And, if so, is there evidence of existing climate urbanism pedagogies that are better suited to the Global South?

The responses to these questions are derived from interviews conducted with urban planning scholars and practitioners involved in curriculum development, with a particular interest in climate responsive planning. The paper is structured as follows: First, it presents a literature review on the limitations of global climate urbanism, and the role of transformative education for sustainable development. This is followed by a methodology section and the findings, which are presented thematically based on the interview results. These emerging themes – broadly categorised in two areas: context-sensitive climate urbanism and transformative climate education – are used to develop a conceptual framework that links climate education to the built environment climate

challenges of the Global South. The paper concludes with a discussion section outlining limitations and potential pathways for achieving effective climate urbanism in the Global South.

2. Literature review

2.1. Climate urbanism: origins and limits of its application in the Global South

Cities are recognized as major contributors to climate change. Given that urban forms (including density, land use, connectivity, and accessibility), housing, and infrastructures are key drivers of energy consumption and Greenhouse Gas (GHG) emissions (IPCC, 2014), urban planners and architects have been called upon to promote and develop low-carbon, climate resilient urban settlements (Blakely, 2007).

The existing literature on urban forms and infrastructures, and by extension, mainstream spatial planning, and climate change mitigation and adaptation strategies, is traditionally 'dominated by case studies of cities in developed countries' (Seto et al., 2014, p. 949). Solutions such as compact cities, Transit-Oriented Development (TOD), and even approaches to financing urban development and enabling successful private–public partnerships, are typically tailored to advanced economies, particularly in North America (Seto et al., 2014). A clear example of this is the set of solutions for sustainable neighbourhoods based on the 'new urbanism' movement. While these solutions aim to prevent unsustainable urban sprawl, they have, at best, addressed the issues of middle-class North American and European neighbourhoods, without providing plausible and truly sustainable solutions for countries in Asia, Africa or the Middle East (Sharifi, 2016).

Overall, there remains a general sense of a lack of suitable, context-based solutions to climate resilience in the Global South. The technical summary of the latest IPCC review highlights how the ability to respond to climate change varies across regions and countries and is influenced by factors such as socio-economic conditions, levels of wealth, stages of industrial development, and the quality of institutions and governance (IPCC, 2022). While it is important to tap into both scientific innovation in climate science and local indigenous knowledge, the risk of uncritical transfer of idea is ever-present.

Nevertheless, the situation is changing: for example, south-to-south learning is improving and new countries are emerging as models for knowledge exchange. Notable examples include China, with solutions for climate adaptation like 'the sponge city' and the prominent case of the Bus Rapid Transport (BRT) system in Curitiba, Brazil, which has been adopted across the Global South. Efforts to fund and publish research from the Global South, enabling south-to-south cooperation and rebalancing available knowledge, remain an ongoing challenge (Nagendra et al., 2018). There is also the issue of the misallocation of climate research funding, which tends to disproportionately favour natural and technical sciences over the social sciences (Overland & Sovacool, 2020). This imbalance may hinder a comprehensive understanding of local socio-economic and institutional contexts, knowledge that would be, highly relevant for policy transfer to and from the Global South.

Overall, current global urban practices still retain connections with modernist assumptions and paradigms formulated during the twentieth century. The risk is of

perpetuating long-lasting urban problems and preventing sustainable solutions from being implemented on a global scale, as highlighted in the so-called 'Quito Papers' (UN-HABITAT, 2018). A critical reflection around the 'New Urban Agenda', the document intended to guide sustainable urbanization for the next two decades, has been put forward (UN, 2017). Scholars have emphasised the dominant modernist, Euro-centric ideology implicit in many top-down urban developments around the world, such as: the over-specification of forms and functions, the ideology of 'tabula rasa', and the twentieth-century bureaucrat's fear of disorder, particularly in the large megacities of the Global South (UN-HABITAT, 2018). At the same time, a 'homeless professionalized practice' - stemming from a glorified global architecture education that promotes individualism and cultural indifference – has suppressed the emergence of alternative, locally embedded, participatory practices (Harriss *et al.*, 2023). This ideology has only amplified existing social and environmental problems in cities, leading to calls for changing the mind sets of architects and city planners, and fostering a new critical imagination of cities based on open-system thinking (UN-HABITAT, 2018), transformative and participatory city changes (Fokdal *et al.*, 2021), and even bottom-up experiments of 'designing disorder' (Sendra & Sennet, 2020). In some cases, it has led to rejection of the modern urban form, reassessing positively the organic and more flexible legacy of pre-modern traditional cities (Rohe, 2009), linking sustainability to the planning and design of compact and livable communities (Wheeler, 2013). More recently, however, advocacy has emerged to overcome the generic discourse of sustainable urban development and its risks, within international urban climate change practices. The underlying argument is that these discourses often obscure historical inequalities embedded in the diversity of places and climate-related vulnerabilities. Therefore, only an explicit agenda focused on just urban spatial climate politics and initiatives could help address this imbalance (Gho, 2021).

In other words, there is a need to strengthen the critical assessment of policy frameworks in the Global South contexts, to uncover contradictions and underlying injustices. This is crucial when Western examples are explicitly mentioned as reference points. A significant example in this respect is the case of the Integrated Urban Development Framework (IUDF) of South Africa, a national policy document published in 2016 to steer sustainable urban growth in the country. The document largely relies on compact city advocacy and TOD (COGTA, 2016). In a recent assessment, this reliance is seen as potentially reinforcing inequality and undermining its broad impact on mitigating climate change. This has led to calls for shifting the policy focus to reinforce urban–rural linkages, mobility for low-income groups, integrate indigenous knowledge systems and promote rural revitalization (Sirayi *et al.*, 2021; Han, 2024).

Globally informed climate urbanism suggests developing a critical mass of climate-related diagnoses and solutions to urban problems across diverse political, geographical, and social contexts, particularly in the Global South. It also involves uncovering underlying power relationships in cities, the conflict between technocratic and abstract climate urbanism regimes, and more transformative people-centred pathways (Broto *et al.*, 2020). While this increasing awareness has, in recent years, fed into the so-called debate around 'comparative urbanism' – aimed at giving visibility to other forms of urbanities and social practices in city transformation processes (Robinson, 2016) – its focus on climate change remains loose and ill-defined. The importance of examining complex articulations of

power, politics, and uneven governance to understand issues of justice and resilience particularly in the Global South is increasingly acknowledged (Griffin *et al.*, 2017). However, how to recognize, frame, and potentially scale up insurgent, and possibly transformative, practices of climate urbanism is still far from being common practice (Gho, 2021).

2.2. Transformative education for sustainable development in the built environment and the quest for epistemological decolonisation

The discussion about the challenge of academic knowledge production and the importance of enabling transformative changes in urban education and practice for sustainable development has been framed as both an interdisciplinary and transdisciplinary challenge in the urban field (Fokdal *et al.*, 2021). Addressing this challenge implies the need to deal with integrated knowledge to solve complex problems, such as climate change, beyond traditional disciplinary boundaries (interdisciplinarity). It also involves ensuring the social relevance of the knowledge produced, which requires the inclusion of non-academic actors in the process of knowledge co-production (transdisciplinarity). Pursuing social relevance in pedagogy demands research and education to '*simultaneously incorporate, acknowledge, and honour local and indigenous ways of knowing*' (Woiwode & Bina, 2021). This approach helps to better understand that '*the transdisciplinary paradigm also poses a critique of the colonial legacies [. . .] and knowledge imperialism that has long dominated the relationship of the Western World with the rest*' (Woiwode & Bina, 2021, p. 247).

The focus on inter- and transdisciplinarity finds obvious parallels with efforts by decolonial activists to challenge disciplinary hierarchies in the process of knowledge production. Genuine interdisciplinary collaboration, for example, allows natural science disciplines – generally perceived as neutral – to uncover power structures and the broader conflicts within which they operate (Last, 2018). Concerning climate change knowledge, which has frequently been mainstreamed as a neutral set of targets to achieve, this has meant '*ignoring equity and historic emissions [and the fact that] climate crisis is a symptom of a much larger crisis: the sustainability crisis, the social crisis, a crisis of inequality that dates back to colonialism and beyond*'.[1] Similarly, in the field of architecture, critical approaches to developing an education for the Anthropocene involve analysing how the built environment has been produced throughout the history. This perspective aims to uncover and challenge the habits of overproduction and overconsumption that are often taken for granted (McEwan, 2023).

Education for Sustainable Development (ESD) requires a profound transformation of '*how we think and act*' towards developing knowledge, skills, values and attitudes to achieve a positive impact in the real world (UNESCO, 2017, p. 7). Such a transformation is crucial in addressing grand societal challenges such as climate change. Recent studies suggest that the concept of ESD, rooted in the goals of wellbeing and common good, shares similarities with emerging approaches of curriculum decolonisation (Padayachee *et al.*, 2018). In the context of urban planning curricula, fostering of a more critical pedagogy of place – implicit in decolonised approaches – has addressed concerns regarding both content (new knowledge) and learning processes (ways of constructing new knowledge) (Gruenewald, 2003).

Overall, decolonising education and practice is here understood as a move towards '*alternative ways of thinking about the world and alternative forms of political praxis*' (Bhambra *et al.*, 2018, p. 2), centred on multiplicity beyond the hegemony of unilateral Western civilization (Dennis, 2018).

With respect to content, this means advocating for urban planning and design education that challenges Western and urban-centric theories by pursuing comparative global urbanism (Robinson, 2006). This approach is more considerate of other forms of urbanity (e.g. rural-urban), the diversity of places, indigenous knowledge and local cultures, indigenous modernity, and alternative human-nature relationships (Hosagrahar, 2005; Robinson, 2006; Edenson & Jayne, 2012). It rejects educational practices that focused solely on the abstract design of the built form in hypothetical settings (Salama, 2023). Instead, it favours a more nuanced understanding of the complex institutional, socio-cultural, and political processes of city design (Tonkiss, 2014; Berlanda, 2017), to develop context-sensitive climate approaches and solutions (Okoye, 2002).

With respect to learning processes, this entails challenging the system of power embedded in disciplinary boundaries and embracing opportunities for meaningful inter-action with non-academic actors (Verdini *et al.*, 2018). This approach should align with a student-centred, interactive learning environment that emphasises inclusion, diversity, and the co-construction of knowledge, fostering critical thinking and skills development (Icaza & Vásquez, 2018). Within the discourse of decolonising universities, the two strands are here understood as a move towards 'localising' and 'reimagining' the curriculum, aiming to create a non-exploitative international, interdisciplinary and interactive learning environment (Last, 2018).

Finally, environmental sustainability has been systematically integrated into urban programs worldwide in recent years. Explicit climate-related programs have been established although primarily in the USA, UK, and Australia.[2] However, institutional challenges and the need to comply with professional accreditation policies have often hindered a broader integration of climate knowledge into curricula, thus showing that significant gaps still persist (Hurlimann *et al.*, 2021). Additionally, effective mechanisms for the transfer of climate knowledge between academia and the outside world remain limited (Hidalgo *et al.*, 2019).

3. Methodology

To explore the needs for improving planning education with respect to climate urbanism, urban planning scholars were consulted. The sampling process entailed the distribution of an open call to recruit interviewees through the UN-HABITAT Planners 4 Climate Action network, a global collective of planning practitioners and educators concerned with accelerating and shaping climate actions internationally. Additional participants were recruited through snowball sampling, where initial respondents referred colleagues who met specific criteria. The selection criteria included a demonstrated interest in climate change in their teaching and research practices, particularly within the context of the Global South; representation from both Global North and South Universities, ensuring broad international coverage (South Asia, Southeast Asia, MENA region, Eastern and Southern Africa,

Latin America, Western and Eastern Europe, Australia and the USA); disciplinary diversity across sub-fields of planning, such as city and regional planning, urbanism and design, urban geography, environmental management and sustainability, and others.

Fourteen semi-structured, in-depth (1–2 h long) individual interviews were conducted remotely.[3] This qualitative approach ensured access to a richness and breadth of insights, allowing participants to reflect deeply on experiences and perspectives unique to their role (King & Horrocks, 2010). The interview questions were structured around key themes including: the integration and origins of climate knowledge in their urban programs; the role of their universities in leading urban climate agendas; experiences of teaching innovation currently occurring within higher education; reflections on contextually adapted (or not) solutions to climate change challenges used in their teaching practice. These questions were designed to elicit both broad reflections and specific examples, ensuring a balance between experiential depth and thematic focus. Upon completion, the interviews were transcribed and thematic coding was applied in order to identify patterns across responses and to capture common themes as well as unique insights. Respondents were also anonymised and coded (INTx).

While snowball sampling provided access to a network of relevant experts, it inherently carries certain biases, such as the potential for homogeneity in perspectives and an overrepresentation of certain viewpoints. Reliance on peer referrals may have limited the diversity of opinions, as participants might recommend colleagues with similar perspectives. To mitigate this, we explicitly encourage referrals from scholars with differing research foci or institutional contexts; however, some degree of bias may still persist. Future research could benefit from expanding sampling methods to include more randomized or stratified approaches to enhance representativeness. Furthermore, this study could be complemented by a thorough exploration of practical examples of urban planning curricula, particularly from non-Western contexts, that have successfully integrated climate change education.

4. Findings

4.1. Context-sensitive climate urbanism

Interviewees generally emphasised that planning theories and models originating from the Global North, as well as solutions for climate adaptation and mitigation, can no longer be taken for granted and adopted in the Global South without careful assessment of local conditions [INT1; INT3; INT6; INT12]. In particular, internationally circulated sustainable urbanization models, tailored around the specificities of Western cities, face significant challenges when applied in the Global South, despite their success in their original contexts. Participants were encouraged to provide examples to substantiate their perspectives. The findings have been systematised and are presented under two main categories: exogenous urban models and colonial planning, and alternative and community-based urban solutions. The first category highlights current limitations, while the second explores potential ways forward.

4.1.1. Exogenous urban models and colonial planning

Urban planning models currently adopted in Global South contexts often fail to adequately consider aspects of informality and weak planning procedures. For instance, in urban transportation, informal mobility in Asia and Africa is frequently underestimated, with local implementations often overlooking the needs and perspectives of low-income people [INT4]. This creates a risk of adopting exogenous models without carefully assessing their local suitability or climate risks. A notable example is the implementation of TOD projects in the flood-prone Msimbazi Valley in Tanzania, which failed to account for the area's vulnerability to flooding [INT8].

Urban design indicators for environmental sustainability developed in the West, such as French 'Haute Qualité Environnementale', are often unsuitable for evaluating contexts with different geographic or climatic conditions. This highlights the need for new, context-specific models, indicators, and assessment methodologies, as exemplified in Algeria [INT13].

Across the Global South, colonial planning legacies continue to influence policy and practice. In India, public health improvements during colonial times fostered social segregation, leaving indigenous communities in urban pockets and informal settlements without minimum sanitation facilities [INT1]. Similarly, the Garden City urban models imposed during South Africa's colonial era created secluded areas for the wealthy, while marginalized informal settlements [INT12].

In many parts of the world, indigenous cultural practices related to public space utilization and the informal economy are still criminalised by authorities in the name of modern city planning [INT12]. Regrettably, poor planning and superimposed projects continue to occur across the Global South, largely due to fragmented governance, top-down approaches, reliance on foreign consultancy and a disregard for local knowledge and expertise. Vulnerable communities, already among the most severely affected by climate change, are often further marginalised by such practices. These approaches frequently exacerbate impacts by neglecting local geographic, climatic, and socio-economic conditions and failing to engage communities meaningfully or leverage grass-roots know-how. An example in this respect is the '20.000 Plots Project' in Mbweni, Dar es Salaam – a housing development project carried out without a resilience plan and with little regard for topography and climate – has become an abandoned site that causes flooding in near-by low-income settlements [INT6]. As one interviewee stated: '*Actually you cannot even say that it is a climate change problem ... which is what makes me frustrated. It is planning that caused this problem*!' [INT6].

4.1.2. Alternative and community-based urban solutions

Nevertheless, emerging initiatives aimed at tackling urban climate issues in a more collaborative manner and with respect to local cultures and geographies are opening up space for innovation across the globe. Many of the most successful cases couple indigenous modernity and innovation with more traditional knowledge systems and heritage elements. A notable example is in Ksar Tafilelt in Algeria, a new city built primarily with earthen materials and traditional techniques (Manel & Siham, 2019; Fondation Amidoul, 2021). This approach has emerged as a response to environmentally unsustainable and contextually unsuitable construction methods involving materials like concrete and cement. Here, live projects in collaboration with local universities have been

undertaken [INT2; INT13]. The aim is to study how neo-traditional urban and architectural models can serve as sustainable examples of contemporary urban life. Algeria's commitment to this vision is further exemplified by the establishment of CAPTERRE, a governmental institution promoting earthen architecture as a means to safeguard heritage, adapt urbanism to local culture, and address environmental challenges (INT2, INT13, CAPTERRE, 2020). Other cities in the Global South are also positioning themselves as knowledge and innovation hubs for sustainability. For example, in Ben Guerir, Morocco, a newly built urban expansion known as the 'Green City or 'Ville Verte', serves as a testing ground for sustainable building techniques, climate-specific design solutions, and renewable energy systems within the so-called 'campus biophilique'.[4]

Meanwhile, various challenges in the Global South are being turned into opportunities, especially when resources and expertise are scarce. The challenge of governing complex territories, as in Surat in India, has become an opportunity to experiment with coordinated governance models based on multi-stakeholders management and consensus-building for city resilience (INT1). Leveraging these platforms of innovation, governance support and public–private partnerships, the city now boasts the largest renewable energy capacity in India (Mathur, 2019), and a digital platform for urban health monitoring (Chu, 2016). Other initiatives focus on fostering circular economies by addressing resource scarcity in low-income communities, and raising awareness on the risks of environmental pollution, as seen in a peri-urban community in Chihuahua, Mexico. In many cases, the lack of accessible climate data has spurred innovative data collection strategies. In Albania, for example, a participatory methodology is being piloted, in which experts walk through the territory with communities to map vulnerability and assess disaster risk [INT14]. Similar approaches have been adopted in Armenia, where local guidelines for implementing the 'Local Level Risk Management' (LLRM) methodology rely heavily on community participation (Sargsyan *et al.*, 2012; UNDP Armenia, 2021).

4.2. Climate-focused urban programs

Interviews uncovered a degree of variation in terms of climate knowledge integration within urban curricula across universities. This variation reflects differing institutional contexts and is apparent in both curriculum contents and pedagogical models. Participants were also asked to provide examples to support their arguments. Below the findings are systematised into the following categories: Integration of climate knowledge into curricula and its epistemological limits; Innovation, de-colonial pedagogy, and the quest for inter-disciplinary. The first category addresses current limitations, while the second explores potential ways forward.

4.2.1. Integration of climate knowledge into curricula and its epistemological limits
Most interviewees highlighted the lack of systematic integration of climate knowledge into urban planning curricula, citing insufficient institutional support and resources (INT7), and legacies of obsolete and outdated planning cultures (INT12; INT14). However, incipient efforts to integrate climate concerns into programs have been done (INT10; INT13). Particularly in the Global South contexts, interviewees reflected on how urban curricula might further integrate context-related environmental concerns. These concerns stem from the context-specific histories of places, for example, when

environmental challenges or disaster risks are exacerbated or triggered by climate change (rising sea level, earthquakes, flooding, etc.), as in the case of Indonesia [INT5]. Academics often feel compelled to adapt and expand beyond curricula, especially when these curricula are inherited from abroad, to address local challenges. One interviewee working in Zambia stated: '*We live the impacts. When you're teaching it's very difficult to ignore those impacts. Yes, they are embedded in part of the curriculum but I think most of us are forced to go beyond because we face them. We face the impacts every day*' [INT9].

Importantly, the relationship between climate change and issues of informality, vulnerability and inequity in research and teaching is increasingly recognised in both the Global South and North (INT11). The impacts of climate change are felt more strongly by socio-economically vulnerable communities living in urban informal settlements, particularly in flood-prone areas [INT3, INT8]. Concomitantly, academics in the Global North acknowledge the need for discussing vulnerability in the relationship to dispossession, exclusion, or green gentrification, when teaching about climate issues (INT11). Nevertheless, curricula often fail to systematically explore the interrelationships between environmental and social problems, as highlighted by a recent inquiry into European urban and architectural programs (Bina *et al*., 2019).

Whether addressing broader environmental sustainability or more specific climate change issues, Western epistemologies remain predominant. This dominance is linked to the availability of data, the predominance of published research from and about the Global North, disciplinary boundaries, and unchallenged institutional structures. There are, however, efforts to address these imbalances and contextualise knowledge. In the Global South, such efforts often align with agendas to challenge established knowledge production paradigms from a decolonial standpoint [INT2, INT3, INT8, INT12] and to prepare graduates for the demands of local practice [INT3, INT8, INT9]. Additionally, in the context of rapid transition, local policy debates are frequently examined. For example, Indonesia EMAS 2045 new urbanization agenda, which includes opportunities for climate adaptation, is well integrated into the curriculum [INT5] (see also: Setiawan & Sunarharum, 2020).

4.2.2. Innovation, de-colonial pedagogy, and the quest for inter-disciplinarity

Universities in the North are increasingly addressing the legacies of their colonial pasts (e.g. Australian universities' Reconciliation Action Plans [University of Melbourne, 2018]), and the needs of their diverse, international classrooms [INT7]. Curriculum innovations in these directions are often associated with paradigm shifts, generational changes within universities, and more meaningful engagements outside of academia [INT10, INT11]. Specific attempts to localise knowledge include the following: drawing from case studies and examples more relevant to local contexts, and encouraging South–South comparisons [INT3]; diversifying reading lists and using teaching materials such as national policy documents, local case studies and local reports [INT5, INT8] (e.g. the Thematic Atlas on the importance of natural resources for the city of Dar es Salaam, which is regularly used in teaching [INT8] [See also: Karutz *et al*., 2019]); incorporating alternative and indigenous knowledge, and encouraging students to listen and learn from a variety of stakeholders, most importantly communities. This approach is being piloted in universities in South Africa with respect to local rural communities [INT12], as well as

in spatial justice co-design labs in New Zealand, where students work with indigenous groups affected by rising sea level to suggest alternative scenarios.[5]

Nevertheless, most interviewees highlighted that there is a long way to go in decolonising curricula. In Northern contexts, challenges with globally oriented teaching point to the need for more diverse staff profiles and expertise [INT7, INT11]. Similarly, it remains difficult to balance encouraging international students to consider perspectives different from their own, with preparing them for returning and practicing in their home countries [INT11]. More exploration is needed into how education in Western countries shapes students from the Global South. Significant gaps also remain in addressing the legacies of colonial pasts and pre-colonial urban traditions within urban curricula. For example, Ethiopian architectural studies still largely disregard the country's urban traditions prior to colonial times [INT6].

Overall, there are strong links between sustainability knowledge and fields such as engineering, land use, meteorology, and others. Additionally, numerous urban programs across various regions share a strong urban design focus when it comes to teaching about environmental sustainability [INT2]. This focus can have advantages in certain contexts, promoting hands-on and project-based teaching practices, but it may also have drawbacks. An overwhelming emphasis on design might undermine the comprehension of other essential aspects such as management, policies and governance, as was the case until recently in China (Bina *et al.*, 2016). In this sense, interviewees universally acknowledged that urban programs must challenge and transgress disciplinary boundaries for addressing climate change, in a move towards more genuine inter-disciplinary teaching and improved intra-departmental collaborations.

Despite well-known institutional and logistical challenges, various attempts are being made to work across disciplines in all regions, both in research and teaching. These efforts materialise in various forms: requiring students to take subjects outside of their degree, conducting cross-departmental research projects, offering 'inter-disciplinary studios', or setting up entirely new sustainability programs that operate across disciplines and break departmental barriers (i.e. Sustainability Sciences, at Universidad Nacional Autónoma de México) [INT7, INT10]. At the same time, urban programs are increasingly focused on practice-oriented teaching, with efforts to engage more deeply with actors outside academia. This is deemed crucial for preparing not only employable graduates but also responsible ones who are ready to face complex challenges in varied contexts. In some cases, there are also cultural considerations emphasizing the importance of academia's involvement in practice. For example, in Indonesia, contributing to sustainability and society includes helping communities, with university staff and students expected to 'descend from the ivory tower' [INT5]. University programs across all regions, as reflected upon by interviewees, attempt to promote practice-oriented teaching, placement, and live projects [INT5; INT8; INT11].

It was also reported that an effective education for sustainability should equip future graduates with skills, values and dispositions identified as crucial by our interviewees. These include 'being able to challenge what they know in their heart is wrong' [INT7], as education should help students profoundly understand the causal drivers of the negative conditions they encounter in the world and provide them with technical skills and institutional knowledge to identify which levers to pull to solve these issues [INT11]. This means equipping students with critical thinking

skills and creativity, combined with a sense of responsibility and awareness, to shape their value systems and empower them to challenge the status quo. It was also noted that for students to become change agents, they must develop soft skills and an understanding of politics, advocacy, institutional and legislative frameworks. Furthermore, they must learn how to listen to and support those the most vulnerable through their work, learning from a variety of stakeholders and contexts [INT7; INT11].

What is more, universities themselves can play a greater role in turning ideals for a better society into reality. This can be achieved if academia improves its communication and engagement strategies, and ensures that knowledge produced within universities is transferred more effectively to society, particularly to the most vulnerable communities. Current programs, such as university-led capacity building on environmental sustainability aimed at governments or policy and project work conducted in partnership with universities, remain insufficient. There is still an urgent need to integrate academic research and expertise into project and policy outcomes. It is also crucially important that research produced in the Global South is more effectively disseminated and integrated within urban curricula [INT2; INT9] and that universities diversify the profiles of their researchers and educators [INT7]. Universities can lead by transforming themselves into hubs for innovation and sustainability, for example, by reducing their carbon footprint [INT10], or integrating SDGs at multiple levels [INT7]. Last but not least, suggestions from South Africa as to how to localise spatial planning and architecture include the idea of 'community professors', alongside conventional professors who can teach about indigenous knowledge [INT12]. This resonates with the ideas of 'barefoot' planners and architects that have been discussed in India for a long time (Al-Adel, 2018).

5. Discussion

Innovative forms of city climate pedagogy and practice are emerging across the world. These approaches are more considerate of the diversity of places they address, and, contextually, more sensitive to pedagogical issues of 'inclusion' and 'diversity' in current programs. Moreover, they incorporate at their core a wider range of practices of climate mitigation and adaptation moving beyond Western analytical frameworks and solutions. As an increasing body of the literature and the results of the interviewees in this study suggest, such frameworks might not always generate suitable or applicable knowledge to solve problems that matter to specific places and people, particularly in the Global South. Therefore, the need to further 'localise' and 'reimagine' knowledge to develop more effective local solutions to climate problems becomes imperative. In other words, it emphasises the importance of developing context-sensitive diagnosis and solutions to climate change problems, while promoting transformative and inclusive teaching and learning strategies.

To reflect on the material gathered in this research, key summary points are here reported. For each point, the challenges for knowledge innovation are highlighted. A final table (Table 1) is also included to illustrate the overall coherence between the themes highlighted, the findings (articulated as limits and potential ways forward), and the discussion points. The table also presents suggestions for

Table 1. A globally informed agenda for education and practice around climate urbanism. Summary of findings, discussion points, and further research is needed.

Broad theme	Findings	Discussion points	Further research
Context-Sensitive Climate Urbanism			
Limits	Exogenous urban models and colonial planning	(1) Global Urban Models and Indicators to tackle climate change (2) Legacy of Colonial Planning and nexus with climate change	Developing case studies and assessment literacy.
Potential Ways Forward	Alternative and community-based urban solutions	(1) Climate-resiliency beyond modernism planning (2) Community-based climate solutions	Developing case studies, and experimenting action-research practices. Building coalitions beyond the locality.
Climate-focused urban Programmes			
Limits	Integration of climate knowledge into curricula and its epistemological limits	(1) Climate-related knowledge and historic specificity (2) Link between climate change and vulnerability	Extensive scholars/students surveys targeting academic curricula, particularly in Global South universities.
Potential Ways Forward	Innovation, de-colonial pedagogy and the quest for inter-disciplinarity	(1) Inclusive, diverse, and student-centred pedagogy (2) Interdisciplinarity and co-production led by 'barefoot' planning scholars	Extensive students surveys, and experimenting co-production teaching practices.

Source: authors.

advancing a robust research agenda in the near future. These key findings help shed light on areas of urban planning where climate knowledge should be carefully reconsidered.

In terms of context-sensitive climate urbanism, the results show:

(1) The challenges in applying urban models and indicators to tackle climate change – models generally accepted as positive or successful in the cultural and institutional contexts where they originated – when applied to different local conditions.

The key issue lies in the transfer of knowledge without a comprehensive understanding of different local contexts (institutional, political, cultural, etc.). While this is not a new challenge in development studies (Dolowitz & Marsh, 1996), it has increasingly being framed through a post-colonial critique, particularly when referred to as the Global South (Shin, 2021). A central aspect of the emerging 'Southern Urbanism' framework (Schindler, 2017) is that difficulty in challenging mainstream discourses. This can be a mammoth task requiring evidence (not always available), championing good practices, dismantling established imaginaries, and ultimately confronting the inertia of global knowledge transmission systems, including technologies, ideas, and the funding of the education system (Richardson, 2018). This might be a lengthy process, conflicting with the global rhetoric of international organizations calling for a steadfast move from theory to action.[6]

2) The need to recognize the legacy of colonial planning in perpetuating problems of segregation and informality, today aggravated by climate change.

The challenge is to reassess colonial planning legacies through a more explicit climate lens. The critical aspect is that colonial legacies are deeply entrenched in laws, plans, and

customary practice, requiring therefore effective and progressive reforms of planning systems and climate actions, in the context of reforms, decentralization, and adaptation (Song, 2016). Research has delved into the history of colonial urban planning (Silva, 2016), and, more recently, into the linkages between this colonial burden and the current inability of post-colonial countries to effectively reduce climate risks (Robinson *et al.*, 2023).

3) Successful experimentation with endogenous traditional and more climate-resilient techniques and urban morphologies for the construction of the built environment, challenging modernist urban forms.

The challenge is to reassess traditional techniques and pre-modern urban forms as energy-saving and low emission solutions, focusing on construction materials as well as planning and sustainable design options that promote walkability, slow mobility, and suitable design of public space (Cities Alliance, 2024). The critical aspect in this case is that not all elements of the past are climate resilient (Liyanage *et al.*, 2024), requiring careful assessment of both buildings and urban forms (Turner, 2016). In many cases, there is also a need to balance the adaptive reuse of historic buildings with the demands of climate change (Conejos *et al.*, 2012). While combining traditional and modern techniques is possible, questions remain about its overall scalability, especially in historic contexts (Mohamed, 2020).

4) Promising experimentations with local collaborations and creative, community-based climate solutions in cities – such as addressing local institutional weaknesses to overcome complex stakeholders environments.

This is certainly an area that will deserve the most attention in the future. The challenge here is to identify suitable local governance arrangements, co-production mechanisms, and strategies, and to adapt them to complex stakeholder environments, uneasy power relationships, and diverse levels of information availability in order to pilot and scale up effective climate resilient local approaches (Fokdal *et al.*, 2021). Co-production as a tool to achieve urban sustainable development is now in use in both Global North and South contexts. However, its implementation remains 'challenging, time-consuming, and unpredictable' with very limited comparative efforts to evaluate its long-term effectiveness (Simon *et al.*, 2020, p. 3). What is certain, following the stream of reasoning of Simon et al. is that collaborative forms of knowledge production – integrating a wider variety of voices, including indigenous ones – are now widely accepted and advocated in global development agendas, from the Paris Agreement on Climate Change to the UN 'New Urban Agenda'. This will certainly reinforce comparative efforts, although whether their role will be to transform existing power relationship – becoming potentially more effective in climate actions – or merely to legitimise them remains to be seen, thus echoing a long-standing debate in planning (Purcell, 2009a).

In terms of transformative climate education, the results show:

5) A relatively weak presence of climate-related knowledge in urban curricula worldwide, although an increasing inclusion of climate and environmental issues linked to the history of places, their culture, and their resiliency can be noted.

The challenge is to increase the presence of climate knowledge into curricula, making sure that the link between the history of places, their regional and cultural specificity, and climate knowledge is fully articulated, as suggested by the Jena Declaration on Sustainability (UNESCO Chair Global Understanding for

Sustainability, 2021). Another critical aspect is to liaise effectively with professional accreditation bodies, which are sometimes in delay with respect to climate knowledge, and, meanwhile, adopt bottom-up innovations at the school level (which are often student- and staff-led) (Preston-Jones, 2020; Hurlimann *et al.*, 2021).

6) There is evidence of the need to better connect climate-related knowledge to social issues, with different regional emphasis (e.g. targeting informality, equity and vulnerabilities particularly in the Global South, and dispossession, exclusion, or green gentrification in the Global North);

The challenge is to strengthen the theoretical link between environmental, climatic and social problems, although this might require substantial improvements of the educational tools available to educators and appropriate training, as many often lack climate knowledge (Langlois, 2019).

7) There are incipient efforts to innovate curricula across all regions by tackling colonial legacies, and exploring a more inclusive and student-centred pedagogy through diversifying content, reading lists and teaching models, while promoting practice-based learning.

The challenge is to foster inclusive and student-centred pedagogies promoting diversity. However, every university is different in its student composition (e.g. domestic vs. international; mono ethnicity vs. multi-ethnic and class-based structures), thus requiring ad hoc strategies to acknowledge and address inclusion and diversity (Sanger, 2020)

8) There are examples of interdisciplinary programs aiming to promote sustainability at the centre of their pedagogy, breaking old disciplinary barriers. Similarly, some universities are attempting to enhance knowledge exchanges with the outside world, facilitated by the so-called 'barefoot' planner.

The challenge is to widen inter- and trans-disciplinary university efforts, mobilising key scholars as agents of change. However, institutional barriers and a lack of suitable incentives to promote the right motivations, attitudes, skills, and behaviours still persist (Guimarães *et al.*, 2019).

Finally, it is also important to note that while this paper focuses on the decolonisation agenda, which has gained traction in recent years as a response to the Eurocentric focus on urban planning education, it is not without limitations. While decolonisation emphasizes the integration of Indigenous and Global South perspectives, it may not fully address other critical dimensions of urban inequality, such as gender or socio-economic class. Alternative perspectives, such as feminist and postcolonial urbanism, highlight that decolonization should not be seen as the sole pathway to achieving a just and inclusive planning curriculum. For instance, feminist perspectives on urbanism and climate injustice emphasise how intersectional inequalities are exacerbated during crises, disproportionately affecting women and other marginalised groups (Kern, 2020; Sultana, 2021). In this sense, a more comprehensive approach to climate education that mobilises multiple frameworks, and multiple actors, could better address the complex urban problems present everywhere, beyond a strict dichotomy between the Global South and North. This is essential if we are to envision potentially more effective actions by heterogeneous and trans-local/national groups converging toward the same cause (Purcell, 2009b).

6. Conclusions

This paper has attempted to identify, in the conclusion, patterns to localise and reimagine the system of climate urban knowledge production, showing the limits and potential ways forward of both context-sensitive climate urbanism and climate-focused urban programs. The summary of findings suggests that an effective move towards localising climate urbanism should be based on a deeper critical understanding of the relationship between global urban practices, colonial legacies, and emerging climate-related community problems. This, in turn, should focus on reorienting planning education towards the historic specificity of places and their vulnerabilities, ultimately addressing issues of climate justice. However, a number of potential ways forward suggest opportunities for innovation in urban planning climate education. These are related to an underlying critique of modernist planning, and conversely to the experimentation with community-based climate solutions. These should, in turn, be supported by inclusive teaching practices, and the experimentation of co-produced forms of knowledge with climate-affected actors.

By looking holistically at the challenges and critical aspects of current practices, it becomes clear that most of the ambitions behind the aim to localise climate urban knowledge require systemic changes, paradigm shifts, and a systematic review of normative frameworks and ways of operating. In this respect, educational innovation is key, and it is an indispensable condition to pursue that. We suggest that this can be achieved by referring to the conceptual framework developed in this paper, which brings climate education into conversation with the climate challenges of Global South cities. However, achieving that in a world that is rapidly heading towards the red line of the 1.5 degree temperature increase seems difficult to attain. The rhetoric of climate urgency might, nevertheless, be counterproductive here, as it would only legitimate a 'doing nothing' approach. Instead, the paper has shown that things have changed and are constantly changing, despite their complexity, and this paper has helped unpack such complexity in precisely critical areas to be carefully assessed and reconsidered. By acknowledging the importance of examining more carefully the correlations between environmental and social marginalities in climate-related vulnerabilities, issues of inclusion and diversity, and the complex processes of knowledge production beyond traditional disciplinary practices, this paper defines, in conclusion, a globally informed agenda for climate justice in urban education and practice. This shows how a Global South climate urbanism could further emerge. This is liberating, in that it is a horizon challenging Western-centric biases in climate knowledge, offering concrete ways forward, and identifying areas for potential learning from the South for the South, and beyond.

Notes

1. From the speech of Greta Thunberg at the Youth 4 Climate meeting in Milan on the 28th September 2021 available at: https://twitter.com/GretaThunberg/status/1442860615941468161?s=20
2. See the repository of Course manuals of P4CA in the UN-HABITAT website: https://unhabitat.org/p4ca-and-uni-course-manual-repository

3. Only one interview held with Algerian-based scholars was conducted jointly together with two scholars, given their different disciplinary focus (INT2 and INT13).
4. https://chroniques-architecture.com/benguerir-architecture-studio-campus-biophilique/
5. https://www.youtube.com/watch?v=pStI19sTH_w
6. The United Nations Secretary-General have called for the so-called Decade of Action in 2019 at the global and local level: https://www.un.org/sg/en/content/sg/speeches/2019-09-24/remarks-high-level-political-sustainable-development-forum

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