Article

Building Equality: A "Litmus Test" for Recognising and Evidencing Inequalities and Segregation in the Built Environment

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Abstract

The current convergence of global challenges, particularly the climate change emergency, the Covid-19 pandemic, and the Black Lives Matter movement, have highlighted the need for a new lens to challenge and interrogate key urban planning assumptions related to spatial urban inequality. Yet urban inequality is often and invariably described from a limited economic perspective, commonly interpreted and measured as income inequality. This is an overtly statistical measure, or Gini-Type index, often giving limited and unsatisfactory results. Yet, in practice, the spatial distribution and concentration of income inequality is a multi-scalar, multi-variant, and multi-disciplinary issue and has links with other and wider dimensions of inequality and well-being. As such, this article argues for a holistic understanding of urban inequality that goes beyond narrow empirical and quantitative models. It presents collaborative research that aims to impact the actions of urban professionals, to accurately identify and adequately respond to urban inequalities. Through the establishment of an interdisciplinary expert panel, we have uncovered a series of provisional mechanisms and responses to aid practitioners to achieve more spatial equality. We introduce an integrated analytical method, the "litmus test," that acts as a planning tool for understanding, evaluating, and responding to inequalities and segregation present in the built environment. This novel methodology and procedural framework will assist us in (a) identifying and defining different forms of inequality and segregation beyond the current scope of physical and agency-based forms; (b) measuring and demonstrating the latter with a combination of qualitative, empirical sources that are materially significant in supporting and evidencing planning strategies; and (c) setting out a series of planning and built environment specific responses.

Keywords

Issue

1. Introduction

Rousseau (1754, p. 9) draws a distinction between two broad categories of "inequality among men":

> One which [he] call[s] natural, or physical inequality, because it is established by nature, and consists in the difference of age, health, bodily strength, and the qualities of the mind, or of the soul;…the other which may be termed moral, or political inequality, because it depends on a kind of convention, and is established, or at least authorized, by the common consent of mankind. This species of inequality consists in the different privileges, which some men enjoy, to the prejudice of others, such as that of being richer, more honoured, more powerful, and even that of exacting obedience from them.

This paper principally engages with this later form, the recognition of it, and efforts to mitigate it.

Urban inequality is a multi-dimensional phenomenon, yet it is often narrowly described and measured purely in terms of economic inequality (Belfield et al., 2016). In turn, economic inequality is defined through a variety of overtly statistical measures and indices with a relationship to the Gini coefficient (Andreoli et al., 2021). In response, the research informing this article has been informed by a variety of mixed and multiple case studies of inequality from both advanced and developing economies that aims to demonstrate these multiple and complex dimensions. Despite the differences between individual case studies, there are commonalities which facilitate the construction of a common conceptual and analytical framework of inequalities manifested in the social sphere.

Addressing urban inequalities is a hugely topical challenge in the United Kingdom (UK), where the current government and its most recent predecessors have engaged with a social Levelling Up policy (Department for Levelling Up, Housing and Communities, 2022) that repeats the same empirical bias to understand inequality. This is a poorly defined concept within the policy context of the UK that relates to multiple forms of inequalities, whether they occur at local, regional, or national scales aimed at addressing historic social mobility and economic inequality issues affecting various regions in the UK, and yet which has become a flagship policy of the current administration. Here, much of the framework around equality is about it being predominantly an economic concern (Martin et al., 2022), with many of the wider social, health, and welfare metrics being aligned with the dominance of economic activity. And while the focus on economic inequality can clearly be useful for indicating spatial distributions at various scales, and longitudinal patterns based on census data, these different operational scales of policies addressing inequality still seem to be largely defined by such empirical measures even while it reminds us that social policy is not this simple in practice, or more accurately is not just about wealth redistribution between areas and communities (The Guardian Editorial Team, 2023).

Some commentators have suggested that urban inequalities are a result of ineffectual leadership (Sainsbury, 2021) for regional economic development, and that they can be addressed through increased planning and coordinating powers for services based in the underperforming regional urban centres (Swinney & Enenkel, 2020). The policy responses in this context of inequality have often focused on economic strategies, investing in research and development within spatial clusters of high value and high skill jobs (Gruber & Johnson, 2019), or more recently in a competitive list of physical investment projects (Department for Levelling Up, Housing and Communities, 2023). Yet, in practice, the concentration of income inequality is also multi-dimensional and multi-variant (Koshevoy & Mosler,

1997) and has links with other dimensions of health and well-being. In addition to income levels, there are many other forms of inequality that, while they can be partly evidenced by looking at the underlying economic data sets, have impacts on different characteristics and sectors of the population which are treated separately when considering any response to urban inequality and segregation.

Research into societal bias suggests that institutional discrimination has taken on a new covert form (Ayton et al., 2020), with the effects often disregarded. Any solely statistical measure contains a level of structural bias (Brynin & Güveli, 2012) that is ultimately transferred into urban policy. Thus, there is a concern with how policy responses are based on evidence with this structural bias. The aim of this article is to clarify this multi-dimensional relationship between ethnicity, class, sexual orientation, gender, race, and other individual characteristics. This is achieved through a sequential approach to (a) recognising the broad scope of inequalities and segregation in the built environment, (b) defining and classify, and (c) applying a framework for assessment. These topical challenges have formed the basis for the ongoing research objectives, and the structure of this article.

We are aware that there is a requirement to put in place a disclaimer about the ambition of this sort of project at the outset. We are dealing with complex social systems and how they interact with policy. We are aware that as a research team we all carry our own cultural biases regarding weighting given to different forms of inequality. However, this ambition to identify and respond to multiple forms of urban inequality is similarly embedded within the relevant United Nations Sustainable Development Goals (UN SDGs) and is presented as part of an ongoing engagement with the academic and practitioner community.

2. Recognising the Scope of Spatial Inequalities

This section describes the themes and grounding literature relating to the scope of inequalities explicitly referred to within the SDGs. As the initial research stage, this grounding began with the collection of definitions for different forms of inequality and segregation as a collaborative overview of the scope of the literature. It is similarly acknowledged that the body of work on systemic inequalities is extensive regarding individual characteristics, and this section is limited to the most influential examples. The resulting output (Figure 1) summarises the scope of the work being considered and maps this against 11 discrete SDGs (UN, 2015). This goes beyond any narrow interpretation of inequality, highlighting the complexity of the different forms of observable inequalities and acting as a guide or signposting towards wider reading.

The relationship between social justice, inequalities, and sustainable development is complex and interrelated as demonstrated by the content of the SDGs.
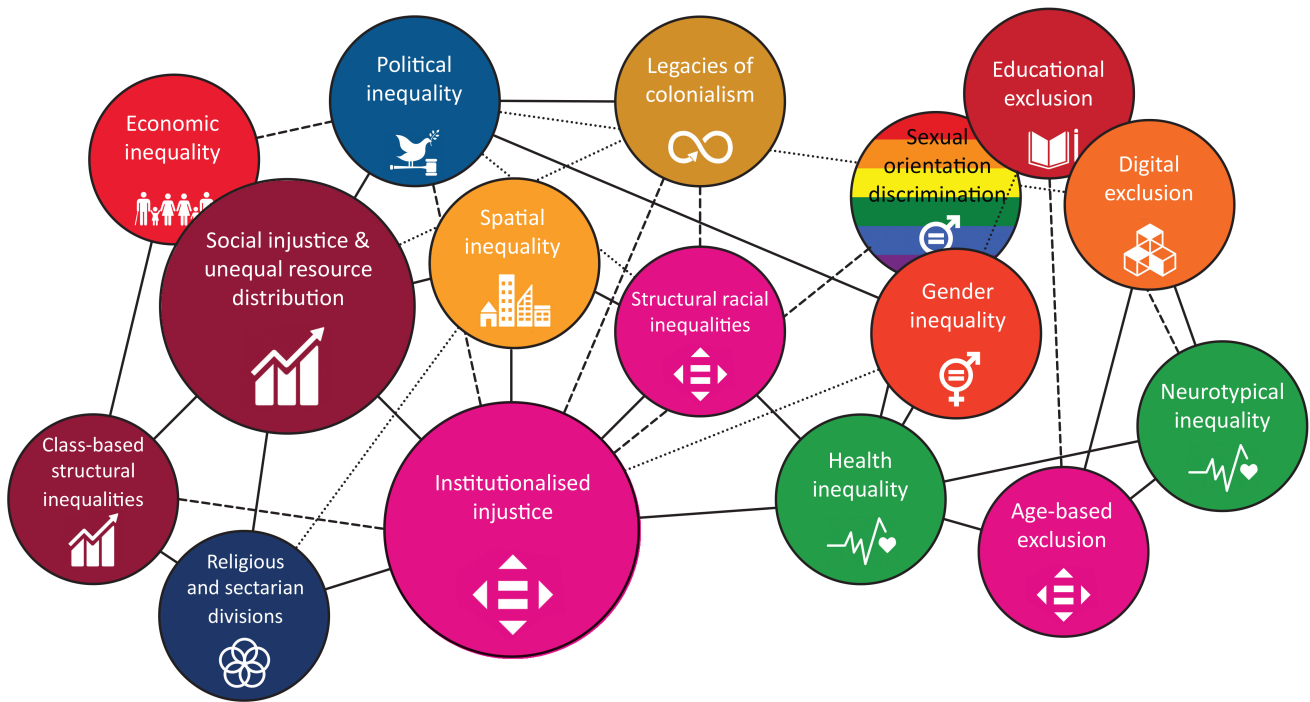
Figure 1. Dimensions of inequality "mapped" against the UN SDGs.

However, one "fact that should be glaringly obvious: the environmental emergency is rooted in systemic racism" (Kapoor et al., 2022, p. 5) for both the historical causes and the unequal distribution of its effects. The plethora of forms of inequalities have impacts across most of the SDGs, with resulting environmental, economic, and social impacts of the climate crisis having disproportionate effects on the Global South, racial and ethnic minorities, women, disabled people, and indigenous communities. We present an initial mapping of these historical and contemporaneous effects as part of our initial research process (Stage 1 in Figure 2) in Table 1, where the sources were identified and summarised by the expert panel.

3. A Methodology for Recognising Spatial Inequality

The approach for this study was based on the Delphi method (Dalkey & Helmer, 1963), an innovative and

Table 1. Mapping the typologies of inequalities and segregation.

Typology of inequalities and segregation	Descriptor of key theory and grounding references
Social injustice & unequal resource distribution	John Rawls (1971) connects social justice to fairness in the distribution of resources, as an updated form of social contract (Hobbes, 1651; Rousseau, 1762). Central to this principle is the notion that all inequality is grounded in ideas of private property (Rousseau, 1754).
Health inequality	Famously reported by Chadwick (1842), who created one of the first evidenced account of spatial inequalities in health, linking life expectancy with social status; inspiring future research into health (Green et al., 2018) and their correlation with other "measurable" aspects of social inequality (Wilkinson & Pickett, 2009).
Economic inequality	Unequal income levels and income distributions as a variation of the Gini Index (1912) that is reflected in the "Spirit Level" (Wilkinson & Pickett, 2009).
Structural racial inequalities	Awareness of structural racism and forms of nationalism (Givens, 2022) and racial supremacy based on the control of power and resources leading to expectation and entitlement (Ansley, 1989).
Religious and sectarian divisions	Sectarianism is a collective characteristic of nationality or religion (Calame & Charlesworth, 2009). There are spatial implications for excluding groups from areas or spaces, where forms of religious markers are still used as signifiers (Naylor & Ryan, 2002).

Table 1. (Cont.) Mapping the typologies of inequalities and segregation.

Typology of inequalities and segregation	Descriptor of key theory and grounding references
Digital exclusion	The digital divide (Bynner & Heinz, 2021) is an emerging concern based on the lack of reliable, free, and open access to digital services, due to a mix of cost, skills, or locational issues. There are unequitable benefits (Bukht & Heeks, 2017) arising from the provision of digital technologies and services.
Age-based exclusion	Stereotyping based on the characteristic of age/ageism (Nelson et al., 2004) leading to stigmatisation, reduced status, and marginalisation, exacerbated by increasing urbanisation and the lessening of social ties.
Institutionalised injustice	Injustice as a by-product of the dominant capitalist system and according to Marxist political analysis (Castells, 1977; Harvey, 1973), requiring an end to capitalism and the ownership and distribution of goods.
Political inequality	Exclusion from the democratic decision-making process with mechanisms of voter suppression (Hainal et al., 2017). Lack of participation is often a result of other forms of structural inequalities (Gilens, 2012).
Gender inequality	Gender is a categorial and hierarchical form of inequality (Ridgeway, 2011) with material effects and dependencies due to control of resources and opportunities. Unequal control over employment, status, salaries, property, and other assets results in gender gaps that are perpetuated by prejudice, stereotypes, and assumptions (Fiske et al., 2002).
Sexual orientation discrimination	Discrimination in relation to sexual orientation (Bailey et al., 2013; Correia & Kleiner, 2001; Levine & Leonard, 1984) arising from "the complex and intersectional nature of queer marginalisation…and spatial oppression" (Goh, 2018, p. 463). Implications for the built environment impacting on movement, safety (Shelton, 2013), and activism (Browne & Bakshi, 2013).
Spatial inequality	Unequal distribution of public resources (Jones et al., 1980), leading to scarcity in the provision of or access to public services and infrastructure (Pahl, 1971). Fairness in spatial distribution of resources is embedded in the function of statutory planners (Krumholz & Forester, 1990) to deliver the "right to the city" (Lefebvre, 1968).
Class-based structural inequalities	An inevitable consequence of power accumulation. In his theses on the city, Lefebvre (1968, p. 17) states "the realization of urban society calls for a planning oriented towards social needs….The working class suffers the consequences of the rupture of ancient morphologies. It is victim of a segregation."
Legacies of colonialism	Historical inequality arising from the deliberate exploitation by colonial regimes (Rodney, 1972) starting with the "Doctrine of Discovery" (UN, 2012) and the continuance of neo-colonial regimes maintaining this structural inequality. The didactic views of Rodney are a critique of globalism capitalist agents (Wallerstein, 1986) that exploited race and class.
Educational inequalities	Opportunities are restricted due to unequal access to quality education (Nurse & Melhuish, 2021) and exacerbated by a combination of household income and locational aspects (Lareau & Goyette, 2015), with explicit links to other characteristics, such as "Resident Status" (Barnes, 2007), limiting choices in real estate and education.

Note: This tabulation of the forms of inequalities is not definitive but a summary of the work in progress with the expert panel introduced below.

collaborative methodology for the application of research that requires multiple rounds of sequential scoping, questioning, workshops, and interviews targeted at expert practitioners (Linstone & Turoff, 1975). After each iterative stage, we summarised and aggre-gated the collective responses to elicit controlled feedback with the aim of achieving consensus (Giannarou & Zervas, 2014) and adding case study detail and content. This Delphi method has been demonstrated to be well suited for many different business planning and product

development applications. This choice of method is also one of the most appropriate for face-to-face meetings and when working with geographical limitations (Geist, 2010), and online applications (Gordon & Pease, 2006). Other heuristic research strategies were considered, including systematic literature and policy reviews and extensive quantitative data collection but were rejected on the grounds of pragmatism and opportunity. The Delphi method was considered the most effective as a collaborative process that could include multi professional disciplines, perspectives on urban inequalities and linking qualitative desk-based and primary data collection with case study work. A detailed breakdown of each of the stages undertaken as part of this Delphi research strategy is described in detail in Figure 2.

The Delphi methodology followed an initial scoping stage (Stage 1 in Figure 2) that included a review of work undertaken to inform policy responses and provide a theoretical underpinning to common definitions of inequality and segregation. The first collaborative stage responded to this scoping through the collection of case studies that fall within the architecture, planning and built environment disciplines and that highlight the variety of forms. This was organised as an expert panel workshop (with a mix of virtual and in-person attendees) where the scoping was presented, with attendees each preparing and identifying an exemplar as the basis for discussion. In total, over 50 detailed global case studies highlighting different forms of urban inequalities were

prepared, presented, and discussed as part of the expert panel workshops (Stages 2b and 3b in Figure 2). Extracts of selected case studies are included as examples in Figure 3 and Figure 4. The recruitment of this expert panel was undertaken through a snowballing sampling technique, using individual professional contacts based on stakeholders' interest in and knowledge of the subject area (Avella, 2016). The outcome of this initial workshop (Stage 2b in Figure 2) was the organisation of an operational framework for different forms of inequality (Stage 3a in Figure 2). This has initially been represented in the form of a "litmus test" for placing the forms of segregation and inequalities into a rank-able scale.

A second collaborative workshop (Stage 3b in Figure 2) with an expanded expert panel was presented with the draft "litmus test," alongside case study examples of positive interventions. This was followed by a series of one-to-one semi-structured interviews (Stage 4 in Figure 2) that explored individual case studies in more detail and reviewed and tested the emerging scalar definitions within the early versions of the "litmus test."

Overall, this Delphi process engaged with over 45 different academics and professionals working in the field of the built environment; each participant was directly engaged for at least one expert workshop (each lasting 2 to 2 ½ hours) or a 1–2–1 interview (each lasting ½ to 1 hour). The professional scope of the participants included quantity surveyors, property managers, urban planners, urban designers, structural engineers,
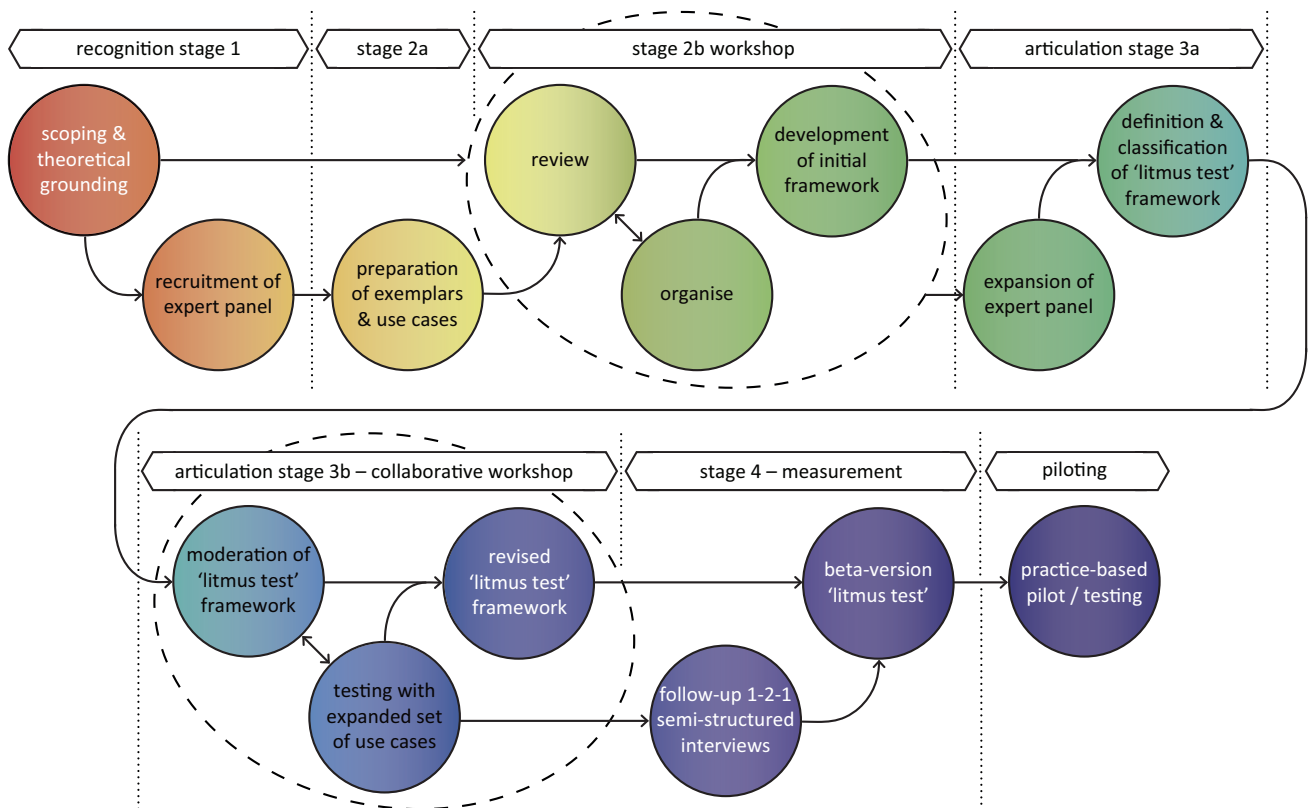

Figure 2. Summary of research methodology in the development of the "litmus test."

Figure 3. Example extract from a UK case study collected at Stage 2a (Figure 2) of the study. In 1933, the City of Oxford sold a site to a private developer who consequently constructed several brick walls that blocked any direct links with the adjacent public housing estate; this was reportedly in response to impacts ranging from "privacy" to the "protection of property values" (Organic, 1964, p. 112). It took post-war changes in compulsory purchase legislation of the land on which the walls stood and 11 years of legal challenges for the City Council to remove them, albeit the physiological barriers seemingly remained for a lot longer (Collison, 1963). Source: Photos and maps from Bowie (2018) and Hall (2018).

geographers, civil engineers, and architects drawn from diverse geographic and working backgrounds. At each stage, participant presentations and views expressed in discussion were digitally recorded and transcribed for the purposes of thematic analysis.

We are aware that it is ambitious to integrate all the dimensions of inequality into a single method or framework. The best-case outcome is that the proposed "litmus test" described in section 4 is an abstraction of reality and is applied as a guiding tool to understand and explain the multiplicity and variety of types of inequalities embedded in the built environment. However, the expert panel considered it an innovative, pedagogical, and practical planning tool for expanding the current understanding of inequality and segregation, which gave us confidence in pursuing this further.
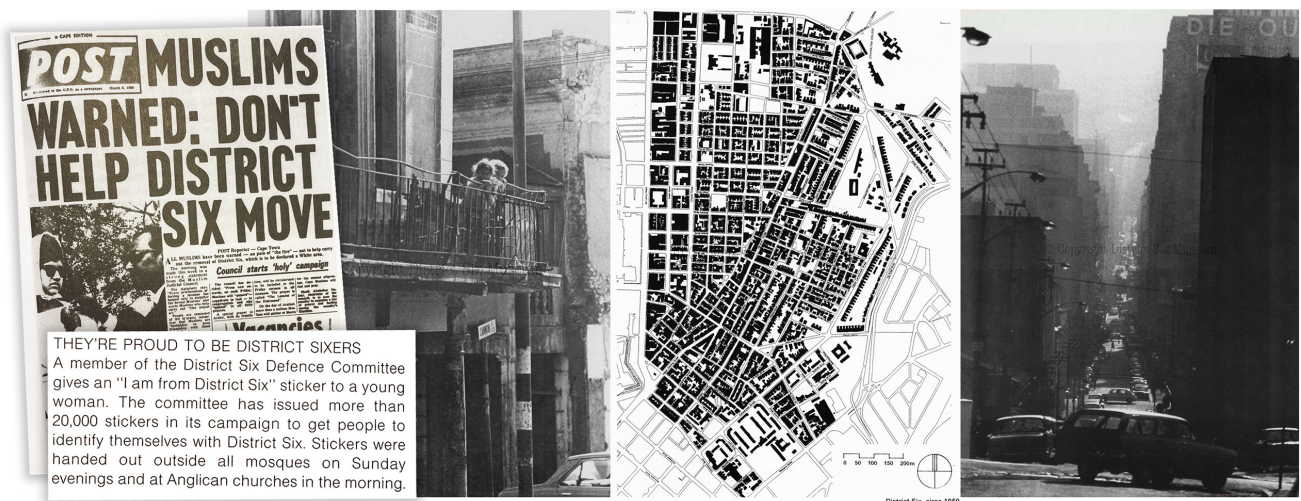

Figure 4. Example extract from an international case study (Stage 2a in Figure 2) of District Six, Cape Town. The district was one of the most historic and most architecturally impressive, as well as one of the most ethnically and racially diverse in the city, understood as "cosmopolitan, socially harmonious, culturally hybrid and heterogeneous" (Soudien, 2001, pp. 119–125), yet apartheid policy was the basis for forced relocation and demolition. District Six and its citizens became a symbol of diversity in the face of apartheid: "The razing of District Six in the late 1970s was a high-handed and dismissive act, the results of which were unbelievably cruel. In many ways its destruction is for us a local example not only of the wilful annihilation of an urban community but also of the loss of urban place, so much lamented by sociologists and urban planners" (Le Grange, 1996, p. 7). Source: Photos and maps from Greshoff and District Six Museum (1996).

4. Creating the "Litmus Test": Critical Findings From the Research Methodology

This section presents the revised output from the Delphi workshops. The design, based on the pH litmus scale used to measure levels of acidity, emerged from the initial expert workshop (Stage 2b in Figure 2) where the idea of a scalar framework that was suitable for assessing difference was debated. Some of the case studies presented appeared more symbolically diverse, locally specific, and with inequalities less implicit than others, and the expert panel felt there was need to express this in the way they were organised. While the initial workshop (Stage 2b in Figure 2) concentrated on case studies (extracts of case studies used are included in Figures 3 and 4) that demonstrated negative impacts of urban inequalities, the second workshop (Stage 3b in Figure 2) addressed the potential positive interventions that were underrepresented during the initial stage. The choice to represent this as a "litmus test" was linked to a desire to make this a relatively accessible way for recognising and measuring a complex set of social situations.

A central question from this collaborative research process concerned the potential benefit of another framework for assessing inequalities in our built environment. There was conviction among the expert panel members that our method is valuable because of its analytical "spyglass" qualities, helping to zoom in to see the detailed reality and zoom out to the more holistic picture. The panel members also recognised the empirical bias embedded within our urban policy making processes, and the need to address this as one of the key motivations for this research.

In many cases, current urban planning practice has a narrow evidence base that is influenced by the availability of numerical data sets. In consequence, a basic auditing is not possible because it prematurely forces a breakdown of complex phenomena into discrete issues, with information being lost in the process. Hence without addressing the current limitations of how we measure inequality, urban policy is in danger of being data-driven rather than being evidence-based. At the core of this research was the authors' recognition of the multiplicity of dimensions of spatial inequality that were being left out of policy considerations. In effect, the ethos of "if you can't count it in theory, it doesn't count in practice."

4.1. The Value of An Innovative, Multi-Dimensional Descriptive Framework

The first high-level finding was how a descriptive framework mixing qualitative and empirical sources becomes useful to our understanding of inequality. This has value and:

> [The expert panel participants] are interested in this project, because this is about underrepresented groups, not just on [the] lines of race, or ethnicity or sexuality, but looking at society and asking, who is being severely disadvantage and how is the way we design buildings and plan cities and build our infrastructure affecting the everyday lives of underrepresented groups. (Expert panel participant, 2022)

Regarding the need for a multi-disciplinary framework, "nobody's really tried to bring it all together" (Expert panel participant, 2022) or been able to clearly recognise inequality with an ability "to point it out to people who may be blind or oblivious to it" (Expert panel participant, 2022). Indeed, it seems that "the word 'framework' gets bandied around quite a lot…to the point [where] I don't even know really what it means anymore, but [we] know, [we] are looking at some kind of series of semiotics that suggest where segregation is happening" (Expert panel participant, 2022), and that the benefits of any such framework was dependent upon clarity in descriptions and semantic definitions attached to each of the different levels. So, "basically there's a need to catch some attention [to] start to assess what we do as professionals" (Expert panel participant, 2022). Certainly, compared to other disciplines there are limitations "when it comes to social matters [and] politicians and civic infrastructure [we often] make sweeping generalisations with sometimes very little evidence" (Expert panel participant, 2022) and that professionals and politicians end up enacting policies "without understanding, without a true diagnosis" (Expert panel participant, 2022) of the underlying inequalities.

4.2. Balancing Requirements Between Breadth and Depth of Information

The second high-level finding from the expert panel centred on the balancing of breadth in understanding the complex nature of inequalities, as opposed to depth of experience. The potential danger of strategic thinking was the loss of detail in the individual use cases and so to some extent there was the anticipation that there should be some collective views regarding a suitable way for optimisation. As one participant observed, "what we are trying to do [targets] this intersection of shared consensus and interests" (Expert panel participant, 2022) that occurs between different sectors and stakeholders as a shared professional or practical interest in this "agreed intersection." This approach to optimisation has implications for the mix of supporting evidence and the associated methods used in its collection. The most popular statistical measures are "due in part to the overall simplicity as a single and easily interpreted figure" (Expert panel participant, 2022; see Sitthiyot & Holasut, 2020), yet "we're kind of interested in the balance between empirical measurements…and how we can get a bit more understanding of the multi-dimensional aspects" (Expert panel participant, 2022):

Yes…[if we] were able to recognise and define it and be able to record it and…somebody mentioned the word "assess" it, [then this] assessment can actually sometimes just be photographs, it can be from talking to people….We can value the qualitative perceptions and rethink the kind of evidence that we should be gathering. (Expert panel participant, 2022)

Considering this ambition, "one way forward is to develop an analytic lens" (Expert panel participant, 2022) that can expand to evaluate the breadth of issues within and identify points of commonality across cases studies but can also focus to interrogate a single use case with the specific semiotics (de Jesus, 2016; Lorino et al., 2011). This is an initial attempt to develop a semiotic framework for recognising how segregation and inequality are expressed in planning policy. A detailed look at any specific case study facilitates a rich phronetic critique of how inequity and segregation operate and the particularity of any semiotic system. This ability to provide a detailed and specific analysis can unpack fresh discourses and perspectives (Deleuze, 1995, pp. 177–182). In effect, the "litmus test" is concerned not only with semantic words but with the signs and symbols of inequality and the semiotics or meanings attached to such symbols. In each case, using mixed and multiple sources of valid evidence. This insight was expressed by an expert panel participant who reflected that there are "many shades of grey [with inequalities] so it's the same with the practical measures and measurements when looking at people's perceptions and awareness and qualitative issues arising" (Expert panel participant, 2022). Taken in conjunction with another participant who observed "when I think that somehow, I understand all the complexity, not just think that I can grasp a bit of the complexity or the dynamics of what happens in public spaces and cities" (Expert panel participant, 2022), then it seems reasonable to propose adaptive methods with which to critically review planning policies.

4.3. Requirements to Be Practical and Impactful

The expert panel raised the challenge of making any framework on inequality suitable for practice and ultimately go beyond theory to begin impacting on real situations:

The first [dimension of inequality] is "capability" and in judging your city on the idea of justice [see Sen, 2009]…we need to focus not only on who gets what, but also what people can do with what they get….I think that has a really good resonance with the issue of segregation. The question is whether they can convert the resources that they get into capability for functioning in a life they choose for themselves…and this is clearly a departure from concentrating on the means of living to the actual opportunities. (Expert panel participant, 2022)

Having a framework or checklist from the outset could be considered a beneficial step towards better practice, where "for a 'just city,' well it's more of a practical thing…to help planners and designers and so on, when they consider the built environment, to see beyond just economic inequality" (Expert panel participant, 2022) you benefit from a framework that maintains a broad description of the different forms of inequalities. Relating this semantic understanding to a series of case studies proved effective and has the benefit to grow into a larger set of co-produced examples at different scales of intervention: "The United Nations has an extensive amount of literature out there on social justice and if any single country implemented anything [from the] body of literature that's available…then there wouldn't be segregation" (Expert panel participant, 2022). Hence the challenge is to embed this evidence into practice.

One way to achieve this was around the exploitation of the educational resources within the framework: "It has quite good pedagogical potential…especially young planners interested in professional advocacy working with the system" (Expert panel participant, 2022). At one level, a way of achieving impact is through "teaching material…overtly [linked to] a framework…where we can actually help somebody trying to make an impact on the way they make better decisions" (Expert panel participant, 2022), educational material that can "rework theory…translate the theory into practice, into something that is going to support decision making" (Expert panel participant, 2022), or support "training…through a number of tools or techniques or methods" (Expert panel participant, 2022). Thus, one output has been pedagogical material suitable as a foundation for built environmental professional supported by rebalanced reading lists.

There was acceptance around the production of structured learning materials on the scope of equality that could provide a foundation for degree programmes or as a stand-alone short course or massive open online courses suitable for other modules and continuing professional development (CPD). The coproduction of learning materials and a co-curated reading list was considered one key output from this research. The emphasis within additional learning materials was to provide a structured and standardised way of recording case studies useful for recognising and benchmarking other local examples of interventions. Indeed, one participant thought that "exposure will also emerge out of embedding this approach and training into the planning profession" (Expert panel participant, 2022).

4.4. Recognising and Labelling Inequalities in the Built Environment

The labelling of the "litmus test" (Figure 5) directly relates to keywords and associated descriptors found in the scoping examples presented and discussed during the expert workshops (Stages 2b and 3b in Figure 4). The authors chose this approach, for two reasons. Firstly,
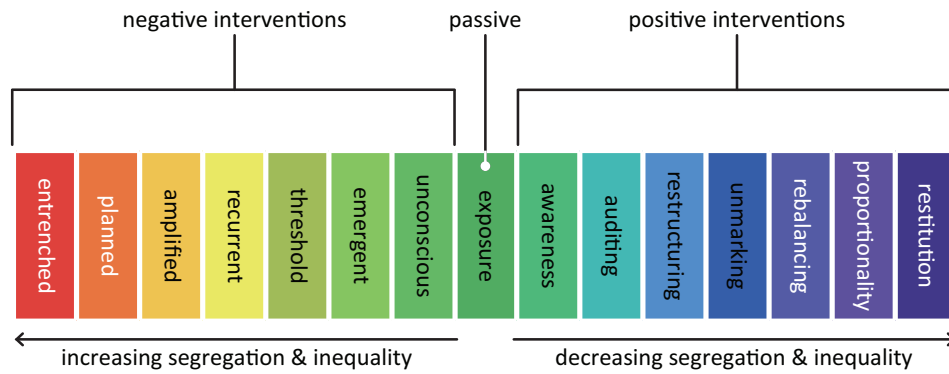
Figure 5. Conceptual "litmus test" framework following expert panel workshops.

participants in the workshops agreed that a simple, yet illustrative way of organising the various keywords was appropriate. Secondly, that it had analytical rigour as a flexible tool for planning pedagogy and practice. We are aware that this is an artificial separation of the different forms of inequality used for the purposes of clarity, and that in practice these will inevitably have multiple points of connection and overlaps and be fuzzier.

4.5. Defining and Exemplifying the Different Levels of the "Litmus Test" for Building Equality

This framework describes an escalating scale of inequality. We have set out a systematic, and replicable approach by including a short descriptor of each level on the "litmus test," with an abbreviated case study to provide a specific built environment example relating to that level, together with other supporting semantic keywords (Tables 2 and 3). This has been collected, collated, and edited as part of the preparatory stages, during, and following the expert workshops (Stages 2b and 3b in Figure 2) and presented in Tables 2 and 3 in a systematic manner to support coding and digitisation. The ambition is to provide an example of what each specific level in the "litmus test" looks like and detailing which specific keywords may be present when considering it, and how it is evidenced with the different methodologies being used within each use case.

Table 2. Definitions of negative interventions to segregation and inequalities.

Litmus level	Description (keywords) and example case study associated
entrenched	Layered and complex forms of physical segregation, on grounds of race or religion, to the point of being outside the remit of any interventions within the built environment and made explicit in national or local legislation. For example, following repeated sectarian rioting in Ahmedabad, Gujarat, primary legislation (Government of Gujarat, 2021) was used by the state and weaponised the law to disincentivise property transactions with Muslims, causing spatial segregation (Nileena, 2019) as well as *entrenching* these property divisions (Gualdrini, 2021). Keywords: Illegality, statutes, by-laws, disturbed areas. Methods: Content analysis, statistical mapping.
planned	*Planned* segregation and homogenisation based on individual characteristics are embedded in legislation within formal statutory documents; evident in the implementation of the Group Areas Act of 1950 (South Africa) and the "iconic removals of Sophiatown (Johannesburg) and District Six (Cape Town)" (Kentridge, 2013, p. 135) leading to a loss of inter-racial communities. Keywords: Apartheid, planned segregation, forced removals, relocation, community fragmentation. Methods: Content analysis, interviews, mixed-method qualitative case studies.
amplified	Inequalities are *amplified* by a range of funding regimes (Birkner, 2002; Rothstein, 2017), and discriminatory practices (Pietila, 2010) that individually or collectively perpetuate social divisions. Typical mechanisms range from "redlining," bad mortgages, racial steering, as well as evidence of intimidation when people migrate. Through a story of journalistic ethnography, Moore (2016, p. 1, our italics) highlights how such "segregation *amplifies* racial inequalities" in the city of Chicago, which is superficially diverse but with racial enclaves, and inward-looking "riot architecture" (Dickinson, 2015). Keywords: "Redlining," "Blockbusting," restrictive covenants, defensive space, "riot architecture," ghettoization. Methods: Content analysis, racial mapping.

Table 2. (Cont.) Definitions of negative interventions to segregation and inequalities.

Litmus level	Description (keywords) and example case study associated
recurrent	Inequalities evidenced by a range of displacement, land dispossession, and gentrification, in part the legacy of colonialism, the behaviour of companies, and the flow of capital (Henrique & Faletto, 1979; Piketty, 2014). This has the effect of *repeatedly* exceeding a threshold level where impacts escalate into physical manifestations and unrest, such as the North American urban riots of the late 1960s (McAdam, 1982; Spilerman, 1976) through to the Black Lives Matter protests of 2020. Keywords: Heterogeneity, "Right to Rent," dependency theory. Methods: Content analysis, interviews, social network analysis, qualitative case studies.
threshold	Schelling (1971) suggested that patterns of segregation can be dynamically modelled from the perspective of agent-based rules, and that over time, exaggerated patterns of segregation emerge. This led to the concept of tipping points or *thresholds* (Gladwell, 1996, 2000; Granovetter, 1978) when one group collectively changes behaviour. Where two recognisable groups are based on racial definitions, this tipping has also become known as "white flight," with reference to how "white and non-white citizens of the U. S. are being sorted out in a new pattern of segregation....The suburban towns have employed restrictive zoning, subdivision and building regulations to keep Negroes out" (Grodzins, 1957, pp. 33–47). Evidence suggests that this trend can be validated in most North American cities (Card et al., 2008). Keywords: Tipping point, critical mass, threshold model. Methods: Mathematical population modelling, statistical analysis, agent-based simulations.
emergent	New forms of inequality, such as digital exclusion, associated with developments in accessing technologies, *emerge* without an awareness of the implications for different social groups, that arise from a denial of the existence of unconscious or implicit bias. Keywords: Inequality in opportunities, obsolesce, skills deficiency, redundancy, requisite variety. Methods: Content/discourse analysis, interviews.
unconscious	*Unconscious* bias results from psychological assumptions being made without realising their collective and disproportionate impacts on certain characteristics, or a hidden set of prejudices described as "a sort of implicit bias that has more to do with associations we've absorbed through history and culture" (Eberhardt, 2019, p. 160). Keywords: Implicit bias. Methods: Psychological testing, statistical analysis.

The second stage of the "litmus test" summarised in Table 3 was the primary focus of the second expert workshops (Stage 3b of Figure 2) undertaken as part of the Delphi methodology, with a collation of positive interventions. The creation of this was undertaken through invited expert panel members taking responsibility for preparing additional examples and built environment case studies as examples of an effective response to the different levels already identified (Table 2), as the basis for presentation, group discussion, and peer-review.

Table 3. Definitions of positive interventions to segregation and inequalities.

Litmus level	Description (keywords) and example case study associated
exposure	Through media *exposure* to the wider debate on inequalities, six separate professional institutions (CIOB et al., 2022) have produced a memorandum of understanding around a shared "common language," of expectations, and definitions. Initially this raises awareness based on monitoring of standardised data relating to membership(s). Keywords: Equality monitoring. Methods: Content analysis, compliance checking.
awareness	Training is one response to raising a*wareness* about the importance of equitable places. One example is "Inclusive Environments," an online course created in partnership with the Design Council (2018) as an explicit response to the UK Equality Act 2010 and how these rights have been embedded within the National Planning Policy Framework for England (Ministry of Housing, Communities & Local Government, 2021). Keywords: Legislative/planning compliance, equality training. Methods: Training (CPD) records, institutional policy analysis.

Table 3. (Cont.) Definitions of positive interventions to segregation and inequalities.

Litmus level	Description (keywords) and example case study associated
auditing	The social integration toolkit (PRD et al., 2021) is a supporting *auditing* methodology for planning in London, as an explicit requirement to work with the *Social Integration Strategy* (Greater London Authority, 2018) for the city. Created through a co-design process (Mayor of London & Design Council, 2020) to turn a set of principles on social integration into a set of specific project examples. The toolkit is about understanding the shared definition of social inclusion. Keywords: Social integration, measurement, auditing. Methods: Equalities monitoring.
restructuring	*Restructuring* policies targeting characteristics and how these factors can be reflected in relative or unequal incomes. There are compositional effects for different genders and racial and ethnic groups (Khan, 2020) that may be demographically and educationally different when combined with cultural preferences for locations or employment choices. Architecture is male-dominated with a gender pay-gap (Nicholson, 2020) that is reflected in the professional culture. In response to this, the Matrix feminist design collective created a manifesto, highlighting multiple sexist assumptions about family life and the role of women (Matrix, 1984) and advocated *restructuring* through a mix of formal and informal education. Keywords: Restructuring policies, targeted characteristics, gender assumptions, de-gentrification. Methods: Policy analysis, content/discourse (media) analysis.
unmarking	Deliberate policy (Commission on Flags, Identity, Culture and Tradition, 2021) to create "neutral spaces" through removal of provocative signage. Increasingly understood through forms of demarking and the use of inclusive signage/dual naming. The treatment of the multiple Northern Irish peace walls, flags, and symbols are being addressed with uncontentious public art (Hill & White, 2012), mixed social housing allocations, and a range of legal measures (covenants/transfer deeds) for the deliberate *unmarking* of territorial symbols (Hughes, 2022). Keywords: Shared spaces, neutral spaces, contested spaces. Methods: Policy analysis, participant observation, georeferencing, segregation mapping.
rebalancing	The location of services and allocation of resources based on compensatory (Krumholz, 1975) principles to *rebalance* any class, gender, and racial inequalities (Talen, 1998) with examples in Cleveland and Savannah (Toulmin, 1988). A specific policy response (Soja, 2010) to multiculturalism or mixed income communities (Bish, 1973). Keywords: Compensatory planning, mixed communities, "Right to the City Alliance," National Neighbors/Neighbourhood Diversity. Methods: Planning policy analysis, spatial/diversity indicators.
proportionality	As a quasi-legal term, *proportionality* transferred to development is concerned with the local rights (Urbina, 2017) and control of property assets in an equitable and representative manner for stronger forms of legitimate neighbourhood planning. There are examples around the provision of affordability, and restrictions on second homes. Keywords: Positive discrimination, proportional representation. Methods: Policy analysis.
restitution	Land *restitution* is the unravelling of disputed historical ownership and reallocation of land and assets to former displaced owners, or alternatively placing it under community or state ownership for wider public interest benefits (Beyers, 2008). It is a deliberate reallocation backed by legislation. One ongoing example is the land restitution programme within District Six, Cape Town (Republic of South Africa, 1994). Keywords: Public interest, land rights. Methods: Policy analysis.

The purpose of this outcome from the Delphi research process is a systematic approach to defining and recognising the scope of inequalities and their associated semiotic meanings. We are aware that this approach will need validation as a potential contribution to the practice and pedagogy of planning. However, having a multidimensional framework that has been established from the outset as a collaborative activity and with broad consensus regarding definitions, descriptions, and methods used for collection does have the potential to address the empirical bias behind current policy work.

5. Discussion and Next Steps

This research has used collaborative processes, in the form of the Delphi method utilising multidisciplinary

expert panels, to explore, define, and describe the multi-faceted, inter-disciplinary, and complex nature of urban inequality, ranging from the physical embodiment of legal restrictions through to more subtle and implicit forms of inequality. This article presents definitions, examples or case studies, keywords, and references to relevant literature with respect to each of the 15 scales of the "litmus test." The examples included are diverse and represent various kinds of inequalities manifested in advanced as well as developing economies. The "litmus test" proposed in this article is, therefore, holistic and can be used by readers and built environment professionals to categorise inequalities presented in the urban sphere. This categorisation shall serve as a precursor to formulating measures which redress or rebalance or rectify inequalities.

While the authors recognise the need to validate, test, and improve the "litmus test," they believe it is a tool that can be readily applied to better understand and categorise or code inequalities. We recognise that the conceptual model presented is attempting to encapsulate complex and systemic issues affecting the experiences of individuals and communities. The specificity of the local conditions cannot be fully considered in a generalised framework such as the one presented. How this can be done in practice remains a task for the next stage of this research where we "need to validate this theoretical model, as it seems to be very sound and rigorous….It needs to be validated and tested out there in society, [because] without validation any impact will be limited" (Expert panel participant, 2022). Thus, part of the next phase of this research will be to undertake field studies and comparative case studies to test the application of this framework at different scales and legislative contexts for urban planning.

Built environment professionals can benefit from a clear systematic way, and in this case an accessible and highly visible mechanism of recognising the diversity of these forms of inequality. The reality is that different forms of inequality will require different perspectives to be recognised, different methods to record their presence and extent, and ultimately different practical responses. We feel therefore that one of the key challenges for built environment professionals is to embrace this broader scope and definition of inequality, and certainly to go beyond the normalised application of statistical coefficients of economic inequality. Statistical measures will never provide this complexity and in response we consider the "litmus test" as one way to address this shortcoming in a systematic, robust, iterative, and replicable manner.

One poignant example of *rebalancing* that emerged during this research was the recognition of the work of American abolitionist and reforming politician Frederick Douglass, when naming a new research and learning "Frederick Douglass Centre" for Newcastle University (2022), near to the location where Douglass stayed during his trip to the English city in 1846: "Where justice is denied, where poverty is enforced, where ignorance prevails, and where any one class is made to feel that society is an organized conspiracy to oppress, rob, and degrade them, neither persons nor property will be safe" (Douglass, 1886).

Conflict of Interests

The authors declare no conflict of interests.

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