Cite this article
Romice O, Rudlin D, AlWaer H *et al.*
Setting urban design as a specialised, evidence-led, coordinated education and profession.
Proceedings of the Institution of Civil Engineers – Urban Design and Planning,
https://doi.org/10.1680/jurdp.22.00023

Research Article
Paper 2200023
Received 09/05/2022;
Accepted 15/06/2022

Urban Design and Planning

ice Publishing

Setting urban design as a specialised, evidence-led, coordinated education and profession

Ombretta Romice MArch equiv, AssocRTPI, PhD, AoU, UDG
Reader, Department of Architecture, University of Strathclyde, Glasgow, UK (Orcid:0000-0002-5776-5632) (corresponding author: ombretta.r.romice@strath.ac.uk)

David Rudlin BA, MTP, AoU, UDG
Principal and Director, URBED, Manchester, UK

Husam AlWaer BArch, MRTPI, PhD, BREEAM AP, AoU, UDG
Reader, Duncan of Jordanstone College of Art & Design, University of Dundee Architecture and Urban Planning, Dundee, UK (Orcid:0000-0002-5325-0797)

Mark Greaves BA, MCD, MRTPI, AoU
Local Places Coordinator, South Ayrshire Council, County Buildings, Ayr, UK

Kevin Thwaites BA, DipLA, PhD
Senior Lecturer, Department of Landscape Architecture, University Sheffield, Sheffield, UK (Orcid:0000-0002-2597-4544)

Sergio Porta MArch equiv, PhD, AoU
Professor, Department of Architecture, University of Strathclyde, Glasgow, UK (Orcid:0000-0003-1458-95)

Urban environments are complex, impacting on climate change, social justice and health globally and locally. Their spatial, social, economic, environmental dimensions are interlinked *and must be studied from a complexity viewpoint*. Yet, while *complexity* has successfully entered urban scholarship and practice in many fields, *urban form*, a key component of urban environments, is not yet studied in these terms and consequently they *are not yet designed as complex*. This paper argues that the discipline of urban design should be (re)defined as the understanding and design of urban environments as places of *organised complexity*. It can become the discipline best placed to manage a useful global overview of sustainable placemaking. It does so by tracing urban design's historical relationships and attitudes towards the evolution of the city, contrasting definitions of complexity in science, with the deterministic way in which the early urban design practitioners viewed design. It then looks at urban design's relationship with other design professions in the UK and suggests its lack of clarity and efficiency is an enduring consequence of this historic trajectory. Finally, it proposes urban design as the discipline concerned with the understanding and design *of complex-adaptive urban environments* and advocate its establishment as an independent *profession*.

Keywords: built environment/design/education & training

1. From the modernist legacy of urban design to placemaking

There is little agreement among practitioners about the definition of urban design. There has been an unwillingness to define what it does preferring instead to keep its boundaries blurred and flexible. Urban designers have decided in the past not to define it as a profession, seeing it instead as a subset of architecture, planning, landscape architecture and in part transport engineering. The two – lack of clarity and a blurred remit – are linked. Resolving these two points is timely, given the importance being attached to urban design and placemaking by governments, local authorities, professional institutions, private sector organisations and communities worldwide. This paper, proposes that urban design does occupy a distinctive territory and, while this does overlap with other professions, there is also a core to the discipline that is not covered, or at least not covered properly, by the other professions. This territory is a combination of the art and science of making places by providing the physical framework and guidance for their successful development by the hand of different actors over time.

Before suggesting a solution though, it is necessary to understand how urban design has become what it is today; this is first done by tracing its approach to the city, highlighting in particular how it has dealt with issues of *complexity* and *time* since its modern establishment, including how this has influenced past and current practice. Next, highlighting important criticism, which has taken urban design, at least partly, along a different path over the last 50 years. Both these very different interpretations are active today, but not appropriate to address current and forthcoming urban challenges; the last section of this Introduction will explain why this is the case.

1.1 Traits of the modernist legacy: taming chaos and designing to fix

Urban design's historic roots since the nineteenth century draw back to the 'municipal engineering' tradition in the context of the emergence of the 'housing question' in rapidly urbanising European cities (Riboldazzi, 2010 in Cherri, 1973). At the same time, the middle of the nineteenth century, the social medicine approach to health for the new urban masses in

Germany (Taylor and Rieger, 1985) and the first 'Public Health Act' in England (Rosen, 2015) had also emerged. Without major distinctions between them, urban planning and design accompanied this process and developed as the branch of public health dealing with the design of healthier cities for the new industrial age. Yet, this history of municipal engineering goes hand in hand with the emergence of another, competitive tradition in the 1920s: modernism, represented by the Congrès Internationaux d'Architecture Moderne (CIAM).

These two traditions could not be more different. Municipal engineers concerned themselves with *updating* the traditional city with technological, sanitary and transport advancements, while remaining fully rooted into the traditional city model. Whereas the CIAM nouvelle vague adopted an agenda of radical innovation and an expansive repertoire of new 'scientific' disciplines, spanning from sociology to ecology, statistical mathematics and modelling. According to Le Corbusier, co-founder of CIAM with Sigfried Gideon, 'modern society is in full renovation; everything is turned upside down by the machine; evolution has followed a fiery rhythm in a hundred years; a curtain fell, it rejected forever what belonged to our habits, our means, our jobs; an immense expanse opens up before us, and the whole world has rushed into it'(LeCorbusier, 1973). Certainly CIAM's visual impact was revolutionary and relegated the municipal engineering tradition to the attic of history, so much so that by the late 1940s most traces of it even in the historical accounts had been cancelled (Riboldazzi, 2010). The urban boom of the 1950s–1970s, which produced most of the built environment that still is in place today, the whole cultural and technical infrastructure of planning systems, regulations and procedures, public administration bodies and officers, university staff and programmes and the new professional practices that followed, all have been fundamentally an expression of the CIAM's design culture monopoly, at international level. What is known today as 'urban design' is one such product, in fact the result of the CIAM's radicalism in architecture, scaled up to the urban level.

Even though CIAM itself developed through a variety of different approaches, and some are keen to distinguish rather antithetical attitudes within (Mumford, 2009), their views shared something fundamental, which characterised this discipline from its inception: the intention to rationalise chaos, where chaos was considered the inescapable result of a lack of centralised design. The good city was seen as 'a rational body of social structures integrated with new technologies', as 'a metropolitan *organism* in biological harmony' (ibid: p. 14) where statistical understanding could help amend the city form into configurations in a stable state of equilibrium, to re-engineer the natural environments with disciplined organisational, recreational and even ethical structures.

Despite all its radicalism, CIAM's *relation with nature* has remained, quite conventionally, of a *metaphorical* kind, predominantly visual, symbolical at times, often mediated by conceptual mimicry and entirely contained in the realm of aesthetics (Aldrich, 1968). And while the organic metaphor is evident at the architectural scale, it is at the urban scale that it dominates the structure itself of CIAM's intellectual proposition, as apparent in Jose Luis Sert's 'Can Our Cities Survive' (Sert, 1942). Published in 1942, when he was chair of CIAM, this book represents a collective effort of the CIAM élite to define and test how the modern city should look and function, and what principles modern designers should obey for its making. As explained by Sigfried Giedion in the introduction, 'in Europe in 1928 housing for the lower income classes was in the foreground' (ibid: p.ix), and so it was for CIAM, which linked to it the problem of designing the modern city *as a whole*. The Association worked systematically on this problem for 12 years through five consecutive congresses, until the war cancelled the sixth in 1939. As early as in 1930, at the third congress in Bruxelles, 'city and regional planning, which from the first had been considered indispensable for any real solution of architectural problems, now became the centre of interest' (ibid: p.ix). Three years later in 1933, the flagship theme of the fourth congress was 'The functional city'; that was the congress held on the Paris II steamship on a return route from Marseille to Athens where the 'Charter of Athens' was famously laid out.

> It has become necessary to resort to all the means of research at our disposal, both old and new, in order to know our cities thoroughly. This knowledge should not be sought in the manner of the past, ignoring the mobility, the changing structure, and the future possibilities of cities, but *by considering cities as living organisms* [italic is original]; as things that are born, and which develop, disintegrate and die' (Sert, 1942: pp. 3–4).

It is here that the foundations of the continuous referencing to the city as the 'organism', the neighbourhood as the 'cell', the road network as the 'circulatory system' and so on are visible. As inadvertently manifested in this whole statement though, the organic metaphor betrays the evolutionary approach just as soon as it declares it, revealing no proper understanding of the role of uncertainty in change, nor actual reference to the city as the temporary result of its evolution at any point in time: rather, 'the city' itself is seen as the individual organism subjected to a closed cycle of birth, development to adulthood, decay and death, whereby the scope of design is to determine the form of its healthy adulthood and keep it enduring as long as possible by continuously taking care of any 'illness' that may occur. The whole picture is *developmental* rather than *evolutionary*, missing the difference between the two: developmental change happens within a one generation timeframe to the *individual* organism, while evolutionary change happens

across generations to a *population* of organisms. The former is a closed cycle, the latter is open. Cities, as a matter of fact, never die (unless under very rare and special circumstances). The CIAM vision of the city as a living organism stands to evolution in the same way the Lamarkian theory stands to Darwin's: a fascinating early mistake of science.

This vision brings with it a whole array of consequences and flaws straight into every aspect of design and of the position of designers themselves. The most important of which is the assumption that, were the resources to analyse the city *enough*, it would be possible to *know it all* by knowing every single aspect of it. This does not acknowledge the reality of the fundamental ignorance of the subject and, which is more important, of *the role of time in it*. 'Only on a *town-planning scale* [italic is original] can our housing problems be solved. For the roots of these problems are deep-seated, originating where the problems of our cities usually do – in their spontaneous and unplanned development' Sert argues (ibid: p. 41). A vision of nature as something for which 'spontaneous change' brings nothing but chaos is essentially still very close to the Newtonian clockwork, with the planner considering herself/himself as the clockmaker. This is a vision that brings Le Corbusier's assertion that 'the donkey traced the plan of all European cities' (LeCorbusier, 1929), closer to Descartes' one nearly three centuries earlier, that 'things made up of different elements and produced by the hands of several master craftsmen are often less perfect than those on which only one person has worked.' (Descartes, 2006, c.1637: p. 12), rather than to anything resembling Warren Weaver's 'Science and Complexity' paper published just 6 years later.

1.2 A long legacy, and the first seeds of doubt

This vision, founded on a naïve design approach to the complexity of the urban problem, shaped the new emerging professions of urban planning and design right to the core, and delivered the reconstruction of the European cities after the end of the war. Here is how.

Sert's remarkable book in 1942 can be identified as the date of birth of the *term* urban design, but it still took about a decade for this vision to be fully fleshed out. It is not by chance that it was with Sert himself as dean of the School of Architecture that the first conference on urban design was held at the Harvard Graduate School of Design, in 1956. The mission of the conference was to bring together the architect, planner and landscape architect into the composite new field of urban design (Gosling, 2002) and to make cities, the economy and society better and more efficient through the manipulation of urban forms. However, a party always takes the tone of the guests that attend it, and the participation to the conference was quite revealing of the view of form and beauty advocated: to this regard, Gosling and Mumford go to great lengths to trace the participants' professional work in the first half of the century (ibid). The common denominator of their work was the determination to comprehensively account for all relevant aspects of how cities function, and to streamline them through design, transport modelling, economic and land-use planning, social and technical engineering or a combination of the above. This was, effectively, also an efficient professional machine, in which roles and competencies were clear and specific: to justify, to zone, to design: every established profession had its role, apart from, ironically, urban design.

Yet, the conference, the very first official outing of urban design already contained the seeds of its most important criticism, or at least planted the first seeds of doubts: in the form of Jane Jacobs – attending as editor of The Architectural Forum – and Louis Mumford, both warning of the dangers of the reductionist nature of rational-comprehensive planning over the city's intimate, constantly changing and largely unpredictable social and relational structures. In particular, Jane Jacobs famously pointed out that urban design mistook 'the kind of problem a city is' (Jacobs, 1961), referring to Warren Weaver's 'Science and Complexity' article published in 1948 in 'The American Scientist' in which he suggested that cities are complex problems and need a completely different approach to deal with them. This criticism was soon followed by Kevin Lynch, who saw the physical pillars of city-building stemming from more complex citizens' perceptions rather than the other way around; by Christopher Alexander, who warned in his 'the City if not a Tree' (Alexander, 1965) against the mechanistic nature of modernist hierarchical structures as inherently incapable of respecting the profoundly complex network of relations that only give life to organic, evolving cities; by Jacobs and Appleyard (1987) who framed a more socially oriented urban design manifesto where form would best respond and adapt to the many requirements of life rather than attempting to dominate it. Since these initial powerful seeds of doubt, entire bodies of knowledge in environment-behaviour studies, environmental psychology and human geography have built precious evidence of how the human spirit of cities finds its best and worst expressions in certain spatial forms, with significant impact on practice and education. In the 1990s, this critique led to a reconceptualisation of urban design's principles. In the UK this was led by a group of academics and practitioners at Oxford Brookes University who took the writings of Lynch and Cullen and created a set of principles set out in the book Responsive Environments. A Manual for Designers (Bentley, 1985). It included ideas as permeability, variety, legibility, robustness and richness that arguably have formed the basis for all urban design since. The aim was not to make urban environments more efficient but to create the conditions for good places to be created. The principles were taken up initially by organisations like The Prince's Foundation in the UK and the Congress for New Urbanism in

the US. Many, especially in architecture, regarded these urban design principles as traditionalist and in opposition to the notion of modernism; this perception still persists, with New Urbanism still being associated with traditional architecture in the US. However in the UK the movement has transcended these stylistic connotations, initially through the backing of the Urban Task Force in 1999 (Urban Task Force, 1999), under its chair the architect Sir Richard Rogers. This continued through the government body CABE in England and A&DS in Scotland, to the point that some of the principles of urban design promoted in Responsive Environments have become mainstream, with the backing of government policy.

These are, no doubt, remarkable achievements, but they focus on physical form rather than process. They may have replaced CIAM's utopian visions with mixed use, street-based urbanism, but this is still being conceived as something that can be designed rather than the result of complex urban growth. The need for some form of change in this direction has been promoted by many key figures over the past decades, even if not explicitly: Lang's (2005) classification of urban design types for example – total, all-of-a-piece; piece-by-piece; plug-in – does n't yet see this approach but leaves space for it acknowledging that some change will happen, will be transdisciplinary and attempt to manage increasing conflict and diversity. In 2016, {Marshall} put forward the case for urban design as a functional, collective art where urban designers create the ground for participation, and place making is transient (Marshall, 2016). This implies a notion of urban environments as complex.

Reviewing past and current approaches to urban design, Loukaitou-Sideris called for a shift in the twenty-first century towards an alternative vision, centred around issues of sustainability, resilience and justice, where design is participatory, bottom-up and integrated across people and scales. Again, this is a complex system of both parts, actors and interests (Loukaitou-Sideris, 2020).

It is therefore important to take these ideas further and tackle the issue of organised complexity in a way which is agreed on, shared and operative. There is in fact a growing level of dissatisfaction that these widely accepted principles of urban design are so often ignored or not comprehensively embedded in new development, and that the discipline of urban design is yet to rise to the expectations placed on its shoulders. The time is right therefore to be much clearer about the scope and core expertise of the urban designer as a professional (Figure 1).

1.3 Enduring challenge of designing complex places

Since the events and debates described above, many say the intrinsic complexity of urban environments has grown fast, especially over the past few decades, following unprecedented expansion and profound qualitative innovations. Others question this, but suggest that, at least, finally places have started been looked at from a complexity point of view (Lang, 2005).

One way or the other, it is a fact that in Western countries (with a special focus on the UK, as this is where the authors operate), current macro-economic (recessions), social (inequality), and broadly environmental (climate-health) conditions are the context in which urban environments are planned, designed and managed, and planning, architecture, landscape architecture, engineering and urban design are called to operate, at a time when stakeholders are increasingly engaged in decisions affecting where they live, work and prosper. At the same time, market conditions and the availability of investment are uncertain, and policies are distinctly linked to the philosophy of the powers in government and therefore often in contradiction with each other. This very context is also marked by under-investment in, and poor achievement of, quality design by the construction industry (CIC, 2012, 2016; Gulliver and Tolson, 2013); by capital markets with short planning horizons, that make it extremely difficult for businesses to engage in the long-term planning necessary for investment that is fundamental for effective good quality design (Carmona, 2010), whose time scales may stretch to 10 or 20 years and beyond. As a consequence, a low-quality built environment (buildings, streets and public spaces and neighbourhoods) has often become the accepted market standard for both public and private sectors (AlWaer and Illsley, 2017; Cooper and AlWaer, 2017). In fast developing countries on the other hand, urbanisation offers a lose-lose alternative for the emerging middle class between unsustainable and place-insensitive business-as-usual developments and rare small realisations of high quality, all the rest being extensive informal settlements for those who do not find their way into mainstream society (Cheapelianskaia, 2019). In both contexts, increasingly multicultural societies challenge built environments and their spaces with contradictory if not opposing demands (Lang, 2005).

The challenge is how, given these constraints, differences and conflicts, is it possible to put in place processes of change that add value to places *in time and for all their users, to account for the big threats to cities and all types of settlements and their residents, such as climate change and social justice* (Loukaitou-Sideris, 2020), and what role urban design in particular should play in such processes across the local, national and even global scale. Understanding and supporting the *city and urban environments as organised complexity,* the approach that Weaver described in 1948 (Weaver, 1948), is the response here put forward to this challenge by the authors. It is important to clarify that one is not arguing for an overhaul of the precious principles and theories that one has produced until today;

rather, that the processes of change and the figures to accompany them ought to adopt new ways of approaching them, the cities' and settlements' constituent parts, their interrelations and dependence. But before addressing this, it is necessary to reflect on the state of urban design education, policy and practice; this will be done with a focus on the UK which is where the authors are based. Because here urban design is not an accredited profession which stipulates how to train and develop its workforce, it is useful to start from education as the main source of training of urban design skills. And here, an issue is immediately encountered (Figure 2).

2. Issues with urban design education, policy and practice

2.1 Education

While many have long highlighted the fragmentation of education in urban design, including Moudon (1992), Cuthbert (2001, 2007) and Inam (2002), consensus on how it should be taught or what an urban design curriculum should include is still lacking. Much urban design's terminology is also contested (Dovey, 2019). Urban design is generally a post graduate taught (PGT) specialism in schools of architecture, planning (especially in Europe) and landscape architecture (especially in North America) (Palazzo, 2014). Sometimes it is taught through modules in undergraduate courses, often combined with other subjects. Many of the PGT courses are a year in duration, occasionally two. Given the scale of the knowledge base that urban designers need to be aware of, this time is very limited and often comes too late in the curriculum, once other disciplinary imprinting has happened and dominated.

The *range* of urban design courses is also quite wide: comprising those with a focus on critical theory and policy, real estate and urban development, spatial planning, political engagement, place assessment and appreciation, place design and strategic design. There is a general agreement on some theoretical principles as delivered in theoretical/historical modules, as expressed through the literature of reference (although even these vary greatly and some even question whether these theories are

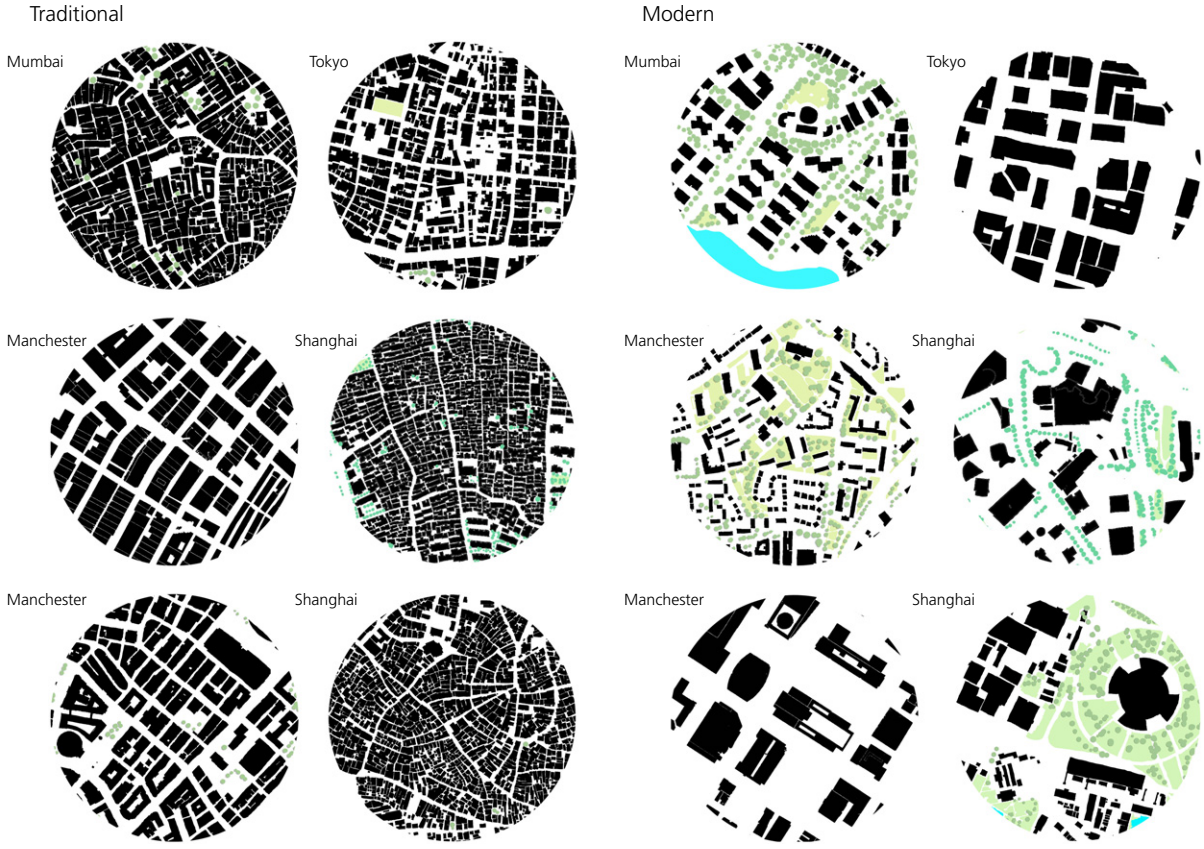

Figure 1. Urban design and distinctiveness. Extracts of figure grounds of Mumbai, Tokyo, Manchester, Shanghai, Los Angeles, Lagos. Traditional urbanism has taken centuries to give cities across the world diverse but familiar character, through evolution; modernist urbanism took just a few decades, designing its recognisable character straight away

Figure 2. Urban design is a global issue. With more than half of the world's population now living in urban areas and with the rapid urbanisation of many countries, the design of settlements of crucial importance to the wellbeing of people, the health of economies and the future of the planet. The most urbanised areas are often those where planning systems are less developed and where informality is the main engine of growth. However, all areas are now interconnected, impacting on global issues of climate change, justice and health

actually being confused with practices), but less so on practical design principles (i.e. hands-on projects), how and to what extent these might be taught. Markets and processes tend to be reliably included in their curricula, but less so shared practices on how these relate to form and delivery. Design is central for some, less for others which emphasise more social, economic and market issues and processes. Urban morphology as a specialist body of knowledge for example is rarely made part of the curriculum, nor is the art of subdividing land in independent parcels, despite its crucial relevance to the future adaptability of the spatial structure. The result is that often these courses hardly overlap, covering a full spectrum between urbanism and urban design. '…. if you do a university course in 'urban design', exactly what you learn will depend on which university you choose, and the particular emphasis of the course' (UDG, 2022). And what has been for years a generally dominant Western outlook, is recently being questioned following an internationalisation of education, as no longer relevant or sufficient for students from developing countries and the East (Palazzo, 2014). Here the demand for greater emphasis on local distinctiveness in both understanding and shaping places, is evident to counteract the risk of globalisation of theories and practices (inevitably from the countries with longer established traditions in urban design); great progress is being achieved, where in some instances urban design is managing to 'positively' disentangle itself from architectural and planning education, finding space to experiment on the balance between domestic and international viewpoints (Tang and Hack, 2017).

Furthermore, not all urban design courses are accredited by professional bodies, and when they are they are generally subsumed within the accreditation systems of other professions. Hence, urban design courses are accredited not so much due to what or how they teach but because they sit within a department or school that is accredited for its core teaching in planning, landscape architecture or architecture.

While benefits might derive from this professional freedom this comes at a price too.

In general, all professional bodies are founded on and maintained by three requirements, which when in place give clarity, a remit, credence, standards, protection and relevance to their members. These requirements respond to specific *motivations* and are delivered through specific *methodologies* (Cole, 1990)

- Education – accredited institutions award degrees provided they meet requirements and attributes set by the accrediting professional body. CPD maintains upskilling within the same framework.
- Experience – through application of principles learned in practice.
- Examination (for registration with a jurisdiction) – of knowledge and professional parameters.

Without an accredited profession which stipulates these requirements, those who teach (and practice) urban design are

hostages to fortune, lacking certainties, established practices and the accountability and credibility that they both can give. They lack a confraternity that reliably supports each other and validates but, and this is important as well, that also holds accountable the work produced. When urban design courses seek specialist accreditation from other accredited professions they need to meet the requirements set for *different motivations* and through *different methodologies* (even when only few are required compared to those to be met by the courses of recognised professions); the equivalence can never be perfect.

Therefore, without accreditation or accredited by other professions, urban design courses are *secondary* by definition, with benefits (less scrutiny) and disadvantages (less support, investment, influence) and the risk of being pulled in directions that do not necessarily engage with urban design's true essence and purpose.

2.2 Policy and practice

Similar limitations extend to practice. Development (especially in western countries) is a dynamic and fluid process, needing to be constantly adaptive to the interactions between 'People, Place and Capital flows', which might now originate from anywhere in the world (Hill *et al*., 2013, p. 16). This fluidity puts built environment professionals under pressure as they have to help mediate the tensions between local and extra-local priorities and imperatives and broader policies and goals; it is a flexibility that requires special skills that few possess in the amount and type needed.

To compound this, these environments are increasing and experienced people who can deliver them are in growing demand. While there are a relatively small number of specialist urban design practices, most work in the private sector is done by architects and the output is generally masterplans. Sometimes these practices have specialist urban design teams, but very often urban design is seen as *something that architects or landscape architects can do*. In the public sector, by contrast, most urban design is practiced by planners (private sector planning is very rarely involved in urban design); their outputs tend to be policy and guidance, often constrained by lack of influence over key transport issues which are seen as strategically dominant and therefore leading the design process. These two types of urban designers are trained following the specific professional standards of their respective disciplines, although some may have achieved an urban design qualification or at least undergone some form of teaching on the subject (this is not generally a requirement). The practice of urban design therefore owes its success mostly to personal experience, growth, interest and individual talent, rather than on established practices passed on through education and continued professional development.

In the UK and North America, organisations such as the Urban Design Group (UDG), the Academy of Urbanism (AoU) and the Congress for New Urbanism, respectively, provide a forum for the discussion of issues relating to urban design and a place where urban designers and others can share experience. The UDG has a recognised practitioner scheme by which urban designers can apply to have their experience recognised. The AoU has academician status which again is subject to a vetting process and comes with the right to use AoU after one's name. Both were developed in response to a call for professional accreditation but both fall far short of providing this. The enthusiasm demonstrated by the members of these groups and their increasing range of initiatives shows a growing appetite for and awareness of the potential that urban design offers. And yet, recent important reports on design quality have highlighted the lack of skills as major contributor to a still widespread low quality (Building Better-Building Beautiful Commission, 2020; Carmona *et al*., 2020; Carmona and Giordano, 2017, 2021). The House of Lords (2016) and RTPI *et al*. (2019) have also conducted regular surveys of urban design skills of those in planning and architecture to conclude that urban design education, while widespread is still shallow; skills are still very low in local authorities, with the consequence that urban design plays a little role in decision making overall; skills have diminished over time and any urban design guidance is interpreted with much variation. Over the last 10 years, the situation has worsened due to recession, austerity and cuts in resources and funds to support urban design skills (at least in the case of public sectors) (Carmona and Giordano, 2021).

How can the principles of (good) urban design be upheld if they do not filter through those who practice it in both the public and private sectors? The failure of urban design to create and promote good places, and its lack of clarity and identity as a discipline are connected, and both are at odds with the growing demand of urbanised space. Theories and practices need to be streamlined around a shared common denominator of an agreed identity of urban design as a legitimately distinct discipline. This will help tackle the education of those who will then practice, make policies based on, and teach in this area, without having to rely mostly on goodwill and talent. And it will help drive research towards new, focused and useful questions. Much is now done in the remit of urban design, and rigour, accountability, streamlining practices are necessary to benchmark and do consistently better. Without this the risk is to produce further generations of substandard development, which cannot be afforded.

From all the above, it is argued that urban design should be:

- *1. More reliable*. Those who practice urban design need to be *more consistent, informed and accountable* in delivering quality places for all, if society and the environment have to be able to endure dips, be resilient and prepared to address climate change and health challenges which are of global scale. This paper will argue that those practising and teaching urban design should rally internationally around an agreed definition and principles, and to produce a shared knowledge base.
- *2. More impactful*. Urban design must claim its own fundamental *spatial remit in the form of scales of development large enough* to produce significant impact and benefits (districts and neighbourhoods). This paper will argue that to this purpose, adaptive masterplans are the disciplinary competence of urban design.
- *More systematic*. The pursuit of efficient, responsive and sustainable places can only result from founding urban design on an established, informed, rigorous and measurable knowledge base. This paper will argue that effectively combining *Design Codes* with masterplans are critical to do so. To satisfy these three needs, an urban design *discipline* that is *both distinct and new* is now needed.

3. A 'new' urban design discipline

So far, the paper has traced the intellectual foundations of current urban design, and highlighted a fundamental issue: the definition and treatment of complexity and, with it, of evolutionary change. It has then explained how this has subsequently impacted education, practice and policy. It now discusses the notion of urban design as an independent discipline, and clarifies why this is the fundamental condition for it to establish positive transdisciplinary connections with established disciplines. This view of urban design is now contextualised in relation to the idea of *places as complex systems in evolution*. To do so, its object of study, aim and knowledge base are clarified and two key tools to deliver settlements as complex systems in evolution are identified. Together, these make urban design reliable, impactful and systematic. Finally, the paper will reflect on education and normative implications of this idea.

3.1 Defining urban design

All involved in urban design agree that several disciplines contribute to it, with ideas, principles, tools, goals and objectives. This is a strength, but also creates confusion and can be an obstacle. Architecture, urban planning, landscape architecture, social policy and geography are multi and to a degree inter-disciplinary, but also have their own object of study, principles and tools, which are specific and appropriately distinctive. While urban design benefits from and is enriched by them, the fuzziness around the extent of the territory in which it operates this also generates a 'fog of urban design generalities' (Krieger, 2006, 2020) which undermines its influence, accountability and impact. As noted above, while urban design has emerged contextually with public health and modern urban planning, the planning profession has ceded the territory and it is architecture that took advantage of this ambiguity claiming influence as the lead design discipline in the built environment, often together with inputs from transport planners/engineers and landscape architects.

Concerns have been voiced for a while. Palmer *et al*. {Palmer, 1997 #1631} saw confusion around core terms and concepts in urban design, stemming from different value systems of the disciplines with a stake in them, creating confusion in terminology, definitions and interpretation. Cuthbert (2007) lamented its fuzziness, lack of clarity and absence of clear connection to sociological issues. '*…there has been no concerted attempt within the discipline (urban design) to link the material creation or 'designing' of urban space and* form to fundamental societal processes' (ibid: p. 177). Many are rightfully adding issues that urban design should deal with to an ever-growing list, therefore expanding its competencies to include for example, health (Sepe, 2020) and social justice (Loukaitou-Sideris, 2020) thus highlighting even more the issue of disciplinary boundaries. Interdisciplinarity and transdisciplinarity, terms often used in regard to urban design, are positive aspirations for it, but they can only become reality when its own disciplinary realm is clear (Elshater and AlWaer, 2022).

While there is now a growing awareness that urban design should be founded on harmonising the processes of change in the spatial system as related to all other relevant urban systems in time (Carmona and Giordano, 2021), how to do so remains quite controversial (AlWaer *et al*., 2014; AlWaer and Illsley, 2017). Many in the profession remain reluctant to define it as a discipline, arguing it deals with such a complex field that its boundaries need to remain porous and its focus flexible. Lang (2005) wished for 'urban design to remain a collaborative field of design rather than an independent discipline and profession'. The authors of this paper are not of this opinion.

Cozzolino (Cozzolino *et al*., 2020) recently defined urban design with the help of 12 of the most established urban designers in the UK and US, putting at its forefront that it deals with urban forms at many spatial scales to manage a process that occurs in time. The paper takes this definition further to argue for urban design as *a design discipline is focused both on the design and post-design phase.* Its main purpose is to set, *by design*, the spatial and regulatory *conditions* that contribute to the evolution of the urban system as a whole towards the direction of travel that the relevant

community of stakeholders defines as desirable. These spatial and regulatory conditions concern with what in settlements is 'structural', hence *relatively* stable in time, with the *explicit mission of making such structures as lean as possible*. Urban design must aim to *design less but design better*, and to *set rules to manage the contribution of other disciplines in a way that contributes positively and coherently to the place system.* This way, the system will, in time and as needed, be in the condition to shape place as fit, and continue to do so and adjust after design and construction are over (Figure 3). Let 's never forget that what urban designers do *not* design will always be more abundant and as, if not more, important than what they *do* design, because it is the former, rather than the latter, that mostly expresses the culture of the places and the people they are designing for. Nevertheless, these design decisions have a profound effect on the decisions taken by others in the future. By setting urban design on these principles, this paper effectively advocates a different, perhaps a new, urban design discipline, with a different *motivation* at its basis.

This new discipline requires to some degree different design tools and focus of investigation – that is, *a different design knowledge-base*, which is in itself a major area of innovation (*methodologies*). On top of that, it also requires a different way of *relating its design tools with each other* and altogether with the non-design knowledge base, which implies important changes to urban design education, research, practice and policy. A provisional framework for what these might become is here presented in the concluding section of this paper. In the next sections, this new discipline is defined through three clarifications, or tests: (*a*) its *object of study: urban form*; (*b*) its *theoretical focus: urban adaptivity and resilience* and (*c*) its *area of knowledge: urban morphology.* If it is *motivation* and *methodology* that distinguish professions, and tie them (often too tightly) to specific interests (Cooper and AlWaer, 2017), then urban design defined as one does, that is based on the knowledge of a system's evolution, loses any conspiracy connotation and distinguishes itself from other specific professional interests, perhaps temporarily important but less so across longer timescales.

These three tests are answered in steps, which together help overcome the issue of urban design's unique 'signature pedagogy': this is the unique identity that 'implicitly defines what counts as knowledge in a field and how things become known, how knowledge is analysed, criticized, accepted or discarded and the functions of expertise in a field, the locus of authority, and the privileges of rank and standing' (Shulman, 2005).

3.2 The object of study: urban form

As a first step, it is important to define and reclaim this territory so that urban design's *necessity* and *capacity* to work alongside other disciplines becomes a mark of true interdisciplinary character and expert leadership rather than an ambivalent card which creates issues of responsibility and accountability.

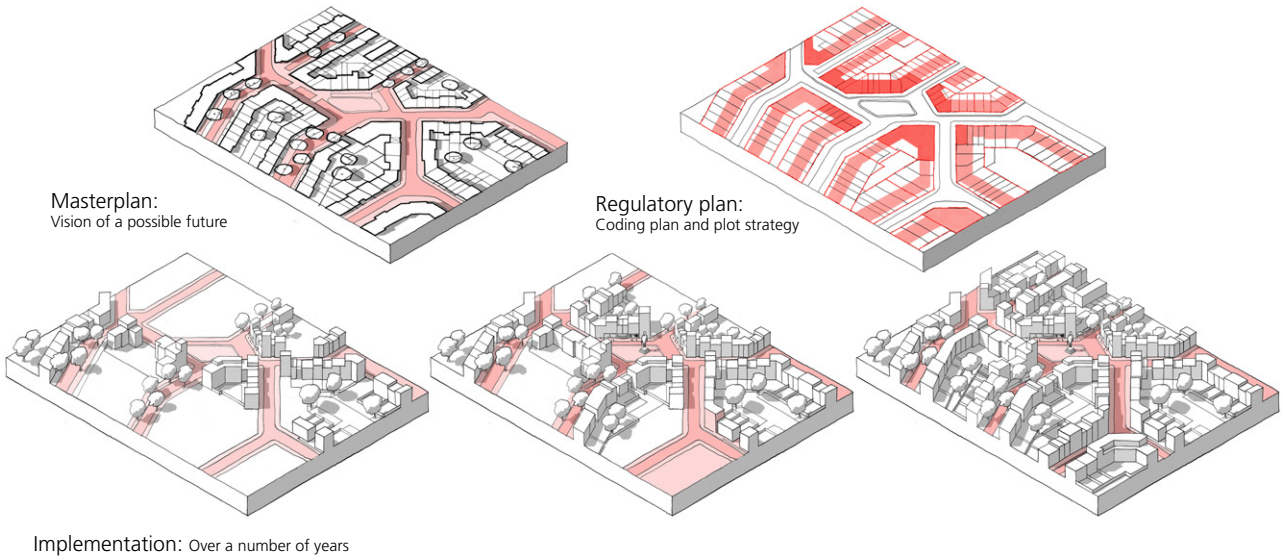

Figure 3. Urban design works over a long time period. A fundamental difference between urban design and architecture is the passage of time. A masterplan creates a vision for an area that has to be translated into instructions (often called a design code or regulatory plan) for future developers and their architects. The scheme is implemented over many years, often without the involvement of the original urban designer. The key to success is therefore the clarity of the instructions, the balance of fix and flexibility and the way in which they are enforced

The distinctive territory of urban design – its *object of study* – is the physical manifestation of the forces that shape places. It includes all elements that constitute urban form – buildings, plots, streets, street edges, blocks, districts and landscape, the relationships that link them and the way they can be used. This sum of physical elements and their relationships is a *complex adaptive system* (Cooper and AlWaer, 2017; Feliciotti *et al.*, 2018; Holling, 1973) that interacts with other social, economic and environmental complex adaptive systems (Romice *et al.*, 2020) to form places within a larger complex adaptive system.

By nature, a complex adaptive system cannot be understood by looking at its parts only: any event internal or external to the system will affect its parts differently, depending on where it occurs; its present conditions and future developments are built on past ones (AlWaer *et al.*, 2014); and finally, the relationship between an event and its reaction is not linearly proportional (Holling and Goldberg, 1971). Urban form obeys the same principles and urban design ought to treat it accordingly. This is a vantage point, because it helps understand in a practical way 'the kind of problem a city is' and transform into actionable reality Jane Jacobs famous idea, after Weaver, of the city as *organised complexity* (Weaver, 1948). This is in fact the fundamental turning point in this proposition: urban form is not large-scale architecture, nor it is detailed planning, but rather a different way of looking at the urban space, one which puts time first, and designs spatial relations between urban form components with the post-design in mind.

> Urban design uses a series of distinctive tools to achieve this which are quite different to those used by the other built environment professions. They include masterplanning, design coding, design guidance and plot passports. Together these constitute a strategy *intended as the design of complex-adaptive urban form system* including a set of instructions for those that will implement the strategy almost certainly in the absence of the urban designer.
>
> The masterplan ties upwards to the settlement and downward to the building. As a system of elements in a relationship, it contains all the spatial interfaces in between these two extreme spatial scales, through which it interacts with functional, societal and cultural systems, through its lifetime. The interplay of urban form and these other urban systems will occur as part of relatively independent and constantly interacting streams of change in each of them, including crucially the urban form system itself. In this form, the masterplan is missing from current mainstream architectural, planning or landscape architecture education, and even many urban design programmes. Planning and design-based courses may require students to engage with delivery of masterplans at various scales. Too often these are conceived as abstracted visual patterns rather than anything that can be understood in terms of human experience 'on the ground', as well as deterministic and top-down-driven devices of control rather than structural frameworks designed to enact and direct local change. Urban design must take charge of masterplans, teach and practice them as its core, so that they are no longer confused with scaled-up architecture, spatially neutral zoning or purely visual formations.

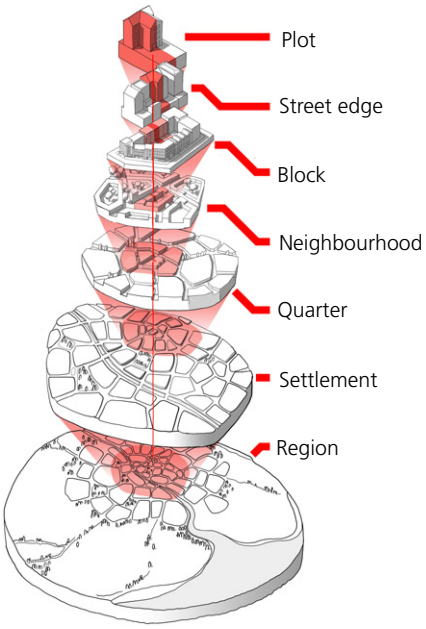

Figure 4. Urban design works at different scales using a 'kit of parts' including street networks, plots, building typologies, which it then assembles to make up places, street edges, blocks, masterplans for neighbourhoods, towns, cities, through regulations

The combination of urban form components in constant evolution and their relations in space and time across all scales, is responsible for the capacity of places to move in time adaptively and as such, is the main object of study of urban design (Figure 4). This notion of adaptive behaviour leads to *resilience* which is a fundamental property of complex adaptive systems (Feliciotti *et al.*, 2018; Holling, 1973) and should, therefore, prominently be addressed in urban design practice.

3.3 Theoretical focus: urban adaptivity and resilience

Resilience can be defined as the 'bounded domain of stability in a system's trajectory of change' (Holling and Goldberg, 1971). Working under this perspective implies shifting the emphasis of intervening on the system (design) 'from maximizing the probability of success to minimizing the chance of disaster. […] It shifts our interest from increased efficiency to the need for resilience. Most important, it focuses attention on

causes, not symptoms' (ibid: p. 226). Seen in this light, urban design, whose task is to shape urban form, becomes a moving target where there is neither a 'state to be reached' nor a 'one-size-fits-all' solution (AlWaer and Illsley, 2017). Urban design is not about the beautification of spaces, or the delivery of planning strategies, or even resolving social, environmental and economic issues, and it is not about fitting architectural design in context. Rather, it fulfils all the above by designing urban form and spaces that are adaptive in time.

One of the properties that characterise complex adaptive systems is their 'historical quality'. This works both ways, towards the past, and the future: first, by ensuring that everything that is designed builds on and values of the existing (linking design with the pre-design phase); and second, by ensuring that everything that is designed sets in space the conditions that allow continuity into the future (linking design with the post-design phase). This property of urban form suggests a rule of continuity between the *analysis* of existing and past urban forms and the *design* of places in the future.

3.3.1 Time element of resilience: allometry in urban form

Time is crucial to the practice of urban design because masterplans take many years to implement. During that time circumstances change as well as the personnel, so that the designer is rarely around to see it implemented. These changes affect all aspects related to urban design: contexts (climate, demographics, economics, (im)migration, transportation modes, health, wellbeing, quality of life); the frameworks employed for delivery and for quality control; perceptions and mindsets. The means to implement the process of urban design also mutate: neighbourhood units, Radburn units, sustainable neighbourhoods, resilient neighbourhoods, low carbon or carbon neutral neighbourhoods and so on, have emerged successively over the past decades to shape settlements (Carmona, 2010); the limitation of many of these means has been in not recognising that the pace of change among these elements is variable (Thwaites *et al.*, 2007): buildings, plots, street fronts, blocks, streets and districts, each change at their own pace. Certain elements do so rather frequently, such as the internal arrangement or use of a building; others more slowly and rarely, such as the layout of a street (Berke and Vernez-Moudon, 2014). Here, the natural law of *allometry* applies: *the scale* of a component is linked to its pace of change, so that *smaller things change faster than bigger ones* (Figure 5). In the same fashion, housing markets can change over a few months or years, while urban regeneration can take decades to bring results.

Many recognise the element of change (Adams and Tiesdell, 2012, p. 74) stressed that, whether the pace of change is slow and almost unnoticed, or rapid and highly distributive, the design of places needs to be viewed as a production process

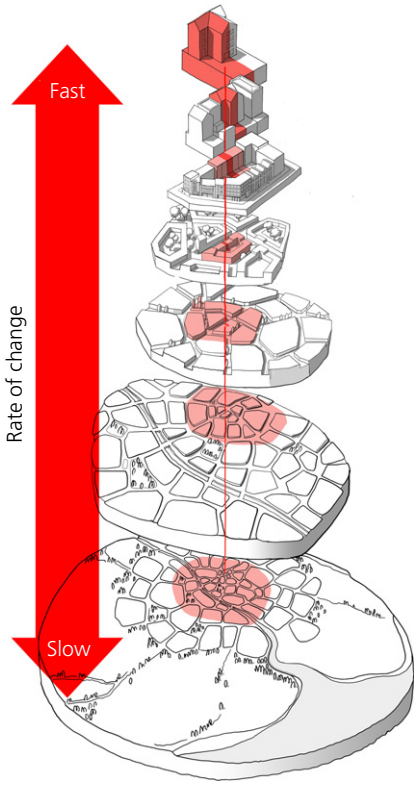

Figure 5. Urban design deals with varying rates of change. Urban design allows streets, plots, edges, blocks, neighbourhoods, towns, cities to change as appropriate, at different paces, across different timescales, but maintains the whole they create functional, efficient and beautiful

that can shape, incorporate change and reshape the built environment. Urban design deals with the physical structures that exist in these variable political, economic and social systems, but often live beyond them (social, political and economic systems change more frequently than physical ones) and are maintained relevant by many, well beyond the design profession.

Urban design must enable places to function and support quality of life through these alterations and adapt *in a parsimonious but responsive way.* Resilience is the 'bandwidth' within which change occurs without dissolving the system itself, therefore it does constitute the major element that urban design must consider in contributing to both existing and new places, as well as its theoretical framework with regard to: (*i*) the combination of physical elements and their relationships in time and (*ii*) its interaction with external systems such as social, economic and political. While urban form has an identity of its own which is value-free in essence, it gets *consistently contextualised in time* by users and as such, *must*

be able to embed values that change over time. Similarly, urban form adopts the sustainable goals of the very time in which these are set. What was sustainable yesterday (e.g. public transport pre-Covid-19) might not be today (one was temporarily encouraged to drive); the forms that support those values must be able to deal with and perform across these transitions without losing functionality and quality. This is where the multidisciplinarity of urban design comes into play. Places are, indeed, 'compromises in time' (Krieger, 2020).

3.3.2 Spatial elements of resilience: the panarchy of urban form

As a system of physical parts, urban design operates from the scale of the plot to the scale of the region; its field of action includes the plot, the building type, the street edge, the urban block, the street network and the ecological system of connections and spaces, the normal and the special elements of what gets build. This does not mean it deals with an infinite number of 'moving parts'. The way these individual elements are and interact, their relationships, are precise and fairly consistent, shaping places which are at the same time recognisable and unique in character. Thanks to good urban design, a familiar order is recognisable at a distance, and astounding variety close-up; observers, visitors and inhabitants are reassured and rewarded.

This logic between scales coordinates densities and uses, modulates privacy and publicness, manages how people move and what they see, how they meet and keeps them apart when incompatible. Urban design is a *precise, defined and unique design field* in itself, which ties scales and the individual elements appropriate to each scale, enhances single values combining efficiently what is related, and distributes benefits and strengths through the proximity, interaction and combined effort of its individual elements (Figure 6). *Needless to say, not every urban form system works this way to the same degree.*

3.3.3 Integrative elements of resilience: informal participation and urban form

Good urban design allows the spatial scales to synchronise with social networks and economic patterns and retain sustainability, efficiency and justice (Ravetz, 2020). This happens when the physical system is coherent between its parts and the responsibility for their conception, delivery and management is coherent with the competence, capacity and interests of the

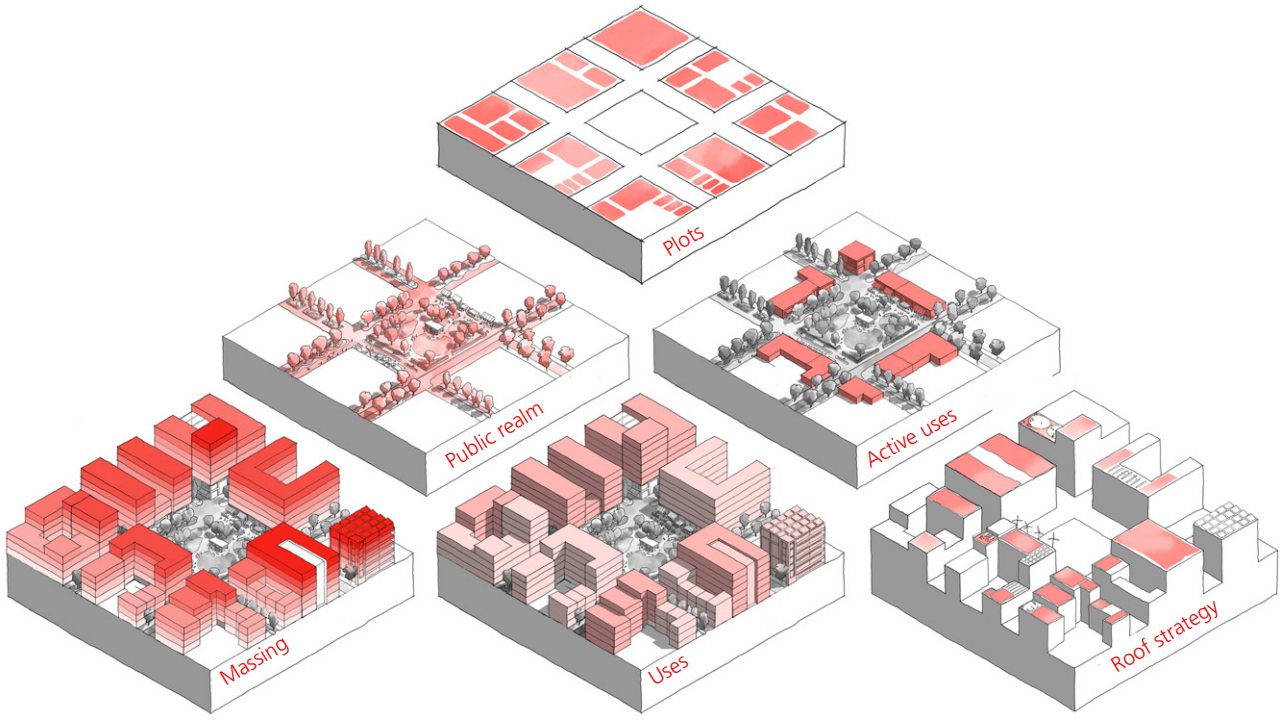

Figure 6. Urban design is more than just the design of built form. Place is set in such a way that all its components accommodate life in ways that are efficient and responsive; they do so individually and through organised complexity. Masterplanning in fact creates rounded places; from the layout and public realm to the massing and urban scale, active ground floor uses, other land uses and roofscapes. Each of these draws on different professions and the discipline of urban design involves marshalling this complex of layers

many different actors involved. Organised complexity can be useful, democratic and efficient: sharing responsibility does not equate to chaos (Akbar, 1998). Urban designers should acknowledge that the participation of individual citizens, families, small–medium organisations and society at large to the continuous adaptation of the built environment occurs *mostly at an informal level*. This *informal kind of participation* is the genius of places, it is what makes them flourish and allows their very special kind of beauty to emerge in time. In this sense, urban design is truly a functional art (Marshall, 2016). When that happens, it is because appropriate conditions are set that maximise informal participation in any given community; part of those conditions are *purely spatial*, and that part is what urban design should be about in the first place.

Once again, not every *urban form,* intended as a system, that is or was in place is able to work this way. For example, when the appropriate links between scales are missing, the ability of informal participation to emerge in all its subtle and unpredictable ways is likely to fail, and when that happens it is unlikely the place will mature into something beautifully working and socially rich (Figure 7). Planning works at a large scale, missing by necessity the intricacies of the local; it satisfies itself with identifying locations for development, and remains often subjective to policies and set numerical targets.

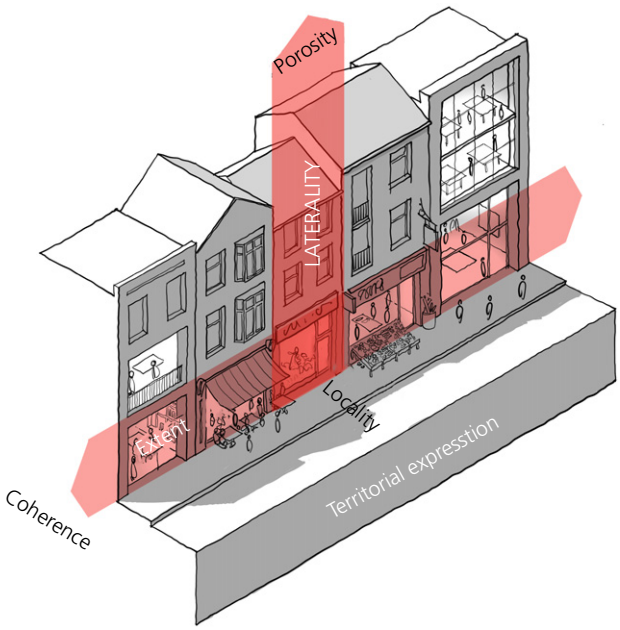

Figure 7. Elevation and occupation. Integration of material, spatial and social dimensions of urban streets conceptualised as transitional edges. As socio-spatial urban forms, transitional edges need coherence and adaptability (extent), spatial porosity (laterality) and territorial expression (locality) {Thwaites, 2020 #1632}

Architecture deals with the local but does not engage with wider urban systems and even at local scale, it often does not recognise or adhere to the subtle logic with its immediate scales. Landscape architecture focuses on the design of space at variable scales but less on the built form that defines that space. Traffic engineering prioritises efficiency and safety over quality of experience. All four disciplines address specific components of urban systems, but miss out their overall complexity, and yet each treats urban design as an extension or sub-set of their core. In dealing with the complexity between realms as both object and relationship, urban design allows all others to play to their own strengths.

3.4 Base of knowledge: urban morphology, social sciences and urbanism

Following on with this argument, the *knowledge base of urban design* should include the precise, critical understanding of the individual elements of urban form and urbanism, how they impact/have impacted on each other, interact/have interacted with each other both at scale and across scales in time, and their implications on all other realms of urban life.

In effect, it is necessary to move away from a notion of urban design as the design of 'outstanding', 'bold' new design 'statements'. Exceptions and special places are necessary and ubiquitously present in all great places in history, but the precondition for the exception to work as such is that it does stand out *on a tapestry of ordinary.* This ordinary framework is what counts the most and is most disregarded, even though it makes for nearly the totality of any city's built stock: it is the biggest portion of the enduring culture of place. It is the backbone of urban design as art, and urban designers truly practice it as an art when they learn to read the forms of places through their catalogue of states. Actually, because places are shaped by people in time, urban design is in this sense collective art, where creativity is shared by the professional and users (Marshall, 2016).

Therefore, before learning to 'think out of the box', a reliable understanding of how the box works and what designers can do for it is required. To get this understanding, one needs to focus on: (*a*) what places share and (*b*) what in them has remained recognisable through time and change (Porta *et al.*, 2016). Very simply, when talking of places, what lasts matters – be this useful, beautiful, efficient or logical and constitutes what urban design practice should seek to understand (Figure 8).

Designing for resilience needs this (different) type of knowledge. It is this dimension of the ordinary, the recurrent patterns of its configuration across cases, the way these patterns change in time and how they relate to non-spatial historical dynamics that fits well for the new discipline of urban design that the authors are advocating. *Urban morphology*, as the discipline

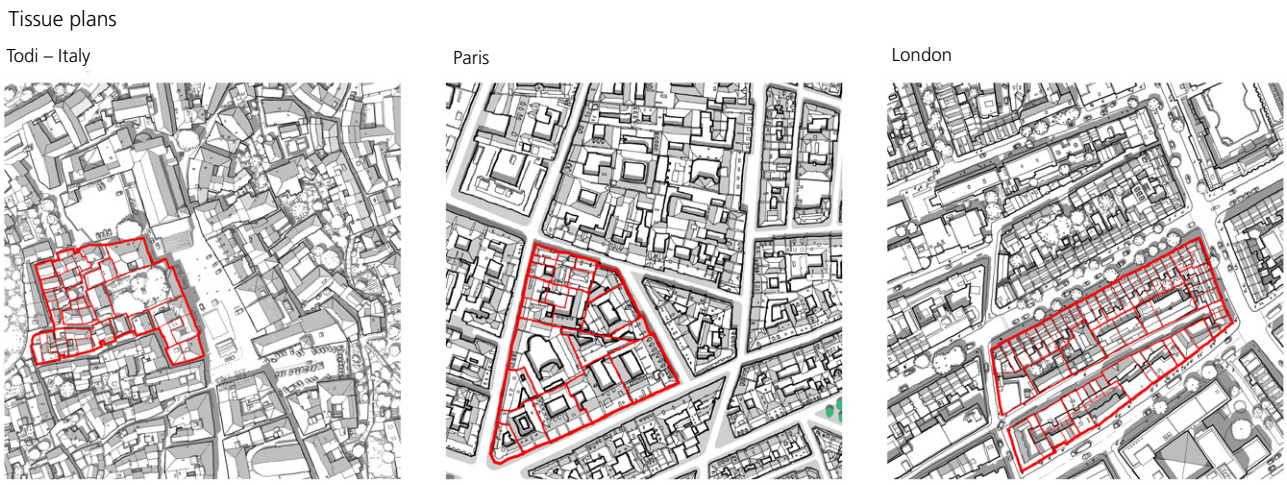

Figure 8. Urban form varies hugely. Three tissue plans of Todi (Italy), Paris and London are shown. Developed at different times, independently, by different cultures and needs, they share remarkable similarities, which they each made their own. This gives cities around the world diversity and familiarity at the same time, a sense of discovery and comfort

that has studied the form of human settlements and their changes in time, is a key source of this knowledge.

Other fundamental areas of scholarship that have also made strides in acquiring aspects of this knowledge and must help create the base of knowledge of urban design are environmental psychology, urban economics, neuroscience and more. Yet, while their importance is recognised, practice still struggles to use them to substantiate and help design: their findings get generalised to the point that design fails to make them operative; the authors embrace them in policy and guidance in broad statements hard to deny but equally hard to use to assess or support design; they get disregarded as frustrating creativity; it is often hard to access and interpret them. What is fundamentally missing to bridge the gap between what these fields are offering and how to use them at best, is a consistent and systematic way to link all their own knowledge to urban form that matters (here the distinction between scales in urban form and the relationship is fundamental, because these studies refer to specific scales and their connections) and under the perspective of adaptivity {Venerandi, 2017 #58; Porta, 2012 #3; Romice, 2017 #8} Urban Morphology is advanced in this as it studies the transformations of form across social, economic and cultural conditions, 'and conceptualises the concept of resilience' (Romice *et al.*, 2020). In this perspective, disciplines such as social and urban geography and ecology, which are also versed in using evolutionary concepts are also essential in interpreting the meaning of those interactions.

Overall, urban design needs to combine the work in these areas, building as well on recent advances in the measurement and comparison of urban form (urban morphometrics) and analytics so that urban designers can tie abundant and precise knowledge in health, poverty, energy consumption to urban form and vice versa. While rich, the 'actionable' portion of this knowledge (what urban design needs to act) is manageable: the range of physical elements that shapes urban form is relatively limited (Kropf, 2017), and so are their possible combinations in recognisable urban form types. These then vary immensely in how they are expressed on the ground in the places experienced on a daily basis, when they meet cultures, economies and geographies. Design codes become essential then for urban design and masterplanning.

> *Design codes* are the key tool to inform masterplans with urban design knowledge. The main purpose of a design code is to establish *a time/space-related regulatory framework for the development of set areas*, to achieve a range of set desirable outcomes in a managed way. If evolution is the co-presence of unity and change (Savage, 1963), design codes recognise that masterplans must make a place successful *after the design phase.* They must therefore put design in the condition to retain a *degree of control* in time while allowing cross-scales influences, and thus avoid a patchwork of unrelated individual occurrences. In order to set the spatial conditions for a long-lasting, ever regenerating and consistent standard of quality, design codes work by instructing, regulating and advising on physical development. They aim to be both *efficient* and *effective*: *efficient* because they establish development principles to be applied *to more than* (*beyond*) *a specific case* (although they can be adapted to respond to precise locations), meaning that they have a general applicability. *Effective* because they provide the mechanism to *guide*, *monitor and control*

development, by setting the general goals to achieve. Their efficiency in application grows when they are based on an *equally efficient starting point*: an understanding of the range of links between urban form and social, environmental and economic performance. In other words, how other types of urban form have performed under similar circumstances as the ones needing to be implemented. This is the base of evidence that should be owned by urban design but is, in fact, a still largely unexplored avenue of scientific research.

4. Applying the new discipline in urban design education policy and practice

So far the paper has argued the need to (*a*) find an agreement around the object of urban design; (*b*) clarify its purpose and (*c*) fund its knowledge base on what places share rather than what makes them unique, in terms of urban form. All these – object, purpose and substance – come from the essence of the place itself, and its life in time.

In regard to the first point, urban design was presented as the study and design of *urban forms*, where each element exists in relation to all others across scales and in the context of all aspects of the urban environment or settlement. In a wonderful culturally rich narrative, Elshater (2015) argued for adding 'urban design', an umbrella term catching all human settlements to urban design in recognition of the fact that the latter, at least in Egypt, mainly deals with cities, thus leaving the multitude of culturally and artistically rich villages and settlements in the country outside its remit. Under the authors' perspective, urban design is also urban design, as it deals with human settlements in their entirety. In regard to the second point, its goal is the *pursuit of adaptive change*, based on designing with *place resilience* in mind. This entails that the products of urban design are not only a designers' responsibility, but a shared endeavour of those using them in the post-design phase, with deep implications, from conceptual to practical, for the design profession. The third point demands the consolidation of an *urban morphology avenue* within the 'new science of cities' advocated by Michael Batty (Batty, 2013), so that observable patterns of change in cities are used to create a solid, efficient, evidence-based ground for urban design practice.

4.1 Implications for education

This paper proposes and provides below a list of skills and principles that should form the basis for urban design as a distinctive discipline to achieve all three points listed above. They have been prepared following discussions with urban design schools in the UK, together with members of UDG and AoU. They cover the knowledge base and skills required to practice urban design and are quite distinct from other built environment professions (although there is overlap of course). These are the essential areas that should need to be coherently agreed on and taught in urban design courses and through continuing professional development.

A detailed understanding of:

(*a*) *The physical form of places* and their historical and current development (structures and elements, including streets networks), the ability to identify them and appreciate their diversity, relationships and behaviour in the urban systems. In short: urban morphology in a new descriptive science of places.
(*b*) *The social, economic and environmental functions and impact* of spatial systems at each of its scales (from city to town to village, across their scales).

A detailed understanding of, and capacity to implement:

(*c*) The *principles and design of adaptive places*, how they can be shaped and organised across scales, and the ability to apply them in masterplanning, spatial frameworks, regeneration strategies, place design.
(*d*) The *processes* to establish and maintain synchronism between urban form and life, supporting quality, efficiency, justice.
(*e*) The *assessment of how places perform* as a combination of spatial components and their relationships with non-spatial systems.

An appreciation of:

(*f*) The *economic, social and environmental trends* that shape current and future cities and their relationship with physical form.
(*g*) *Development* and the workings of the property market, the role of other professions, viability and property law.
(*h*) *Stakeholders, communities (social capital) to include* the process of consultation, participation and co-creation as appropriate to each scale of the spatial system.
(*i*) *Regulations, design codes* and the workings of planning systems.
(*j*) Need for the core professional (built environment) facilitators to address the very broad range of *skills* (i.e. social competences like communication, problem-solving, creativity, adaptability, work ethic etc).

Such a range of skills and principles should be embedded in a framework of foundations for a reformed urban design education. This range takes as a starting point the ethos of Jacobs and Appleyard's (1987) work undertaken with students

from the University of California (Berkeley), which began to set out what they hoped would become an emergent manifesto for urban design and then further developed by many others. Their focus of attention was to give an intrinsically human and social emphasis to what places ought to be. Theirs and our socially oriented vision for urban design transcends the principal focus of attention on material fabric and spatial organisation characterised by other built environment disciplines, and yet is made possible by treating the built environment as a physical system, which allows to account for the holistic nature of the human–environment relationship. From a pedagogical viewpoint, our vision relies on a combination of critical inquiry, process-based and social-constructs approaches, within flexible and adaptive contexts, aims and outcomes (Salama and Osborne Burton, 2022). Furthermore, the learning process will be cumulative across years: each learning experience becomes an element of the following starting points, as part of learning process is in fact about adding to the knowledge base of urban design.

Urban design education ought to be taught across a significant timescale, to account for the principles, theories and tools listed above. A two year post graduate course, provided it is preceded by a set of design and theory prerequisites might suffice in the UK. This could for example be combined with a Part 1 ARB/RIBA accreditation. Undoubtedly, there is also a strong argument for urban design to be taught at undergraduate level as a complete course, followed by specialisms for example in conservation, urban analytics, planning and so on. In current courses of architecture and planning, urban design should be taught throughout the course, from start to end, in the same way technology, design, cultural studies; and policy, economics and geography are. The legacy of urban design is the longest that one can leave. It must be taught as if it matters.

4.2 Implications for policy and practice

A central concern for this emergent manifesto for urban design is *how to deliver its own aspirations*. This relies on two specific yet related areas:

(*a*) To conceive and shape urban environments as a mutually interdependent whole of their material, spatial and social dimensions. This is necessary to overturn a prevailing professional culture that detaches the shaping of materiality and space from the social dimensions of the human experience of urban spaces, too often leading to a placeless urban fabric that is often sculptural and functional, rather than 'human'.

(*b*) To develop a better balance of top-down and bottom-up agencies of change, and make them operational at different levels of scale through specific roles. Currently, top-down and bottom-up agencies of change exist in almost polar opposition and are in consequence often in conflict with one another, with top-down being the dominant force in much of the delivery of urban environments. It is necessary to better define the specific roles that top-down and bottom-up actors play and the specific scales they should be in charge of.

The first point is made possible by a form of plot-based urbanism, with a large base of plots that are small, independent from each other but spatially linked up to the higher scales. Urban design distinguishes between what should be 'designed' (top-down) and what should be left for emergent and evolutionary processes of self-organisation (bottom-up), and *puts the former to the service of the latter*. It is acknowledged to this regard the important role that land ownership and market forces have on the applicability of this distinction and that this impact cannot be overlooked. Development in the UK has been market-led since the 1980s (AlWaer, 2013) with the residential market dominated by volume housebuilders leading to the build-out of high value homes on greenfield sites growth areas in single ownership, leaving rural areas and regeneration sites behind (Scottish Land Commision, 2021). What Gulliver and Tolson (2013) noted almost 10 years ago: 'What often passes for 'developments' these days is the rather placeless, single-use housing development characterised by poor estate layout, over-engineered roads, dominant parking, poor amenity space, lack of connectivity and bereft of planting and local facilities' (ibid: p. 3), Carmona has just picked up again {Carmona, 2020 #22}. Tied into this picture are perennial issues with land value, as Rudlin and Hemani (2019) reproach: 'failure to deal with land value issues has created a structural flaw … planners are constantly fighting a losing battle against land interests, who have an economic interest in dumbing down the quality of new development'. Since ownership and form can have distinct timescales of change, the discussion here refers to form only, assuming this will engage with a range of ownership types.

The second point resonates with the notion of 'forms of submission' (Akbar, 1998) and 'levels of control' (Habraken, 2000), as characteristic of the 'structure of the ordinary'. For Akbar, the extent of responsibility (varying between ownership, use and control) enjoyed by parties who have a stake on the environment affects its state: the more detached one is from it, the less responsible she feels towards it. Similarly, Habraken sees environments as hierarchies of control, where people consistently try, by occupation, to clarify *form* into *places* belonging to each level in this hierarchy through experiences and relationships (*understanding*). Accounting for this intrinsic need to assert individuality on territory, while remaining reconciled with commonly accepted norms is fundamental for urban design, and replaces deterministic view of places as material

structures with a more humanistic emphasis on them as expressions of different forms of territorial culture. From this perspective top-down agencies of change should be understood as those that are about the delivery of *form*, *starting from above* the scale of the plot that result in plot-based frameworks of urban fabric. They must be conducive to empowerment of bottom-up agencies *starting from below* the scale of the plot: *understanding*. This way, the agencies of change blend top-down processes from the urban to the plot scale with bottom-up processes that establish localised, context-specific expressions, where the meeting point between the two is somewhere in between depending on local conditions. What is important in this scheme, is that *design*, which is inherently concerned with fixed images of the future, does integrate a structural focus on longer-term and slowly changing urban form with a mission to let the *informal participation* of families, small–medium organisations and society at large self-organising the actual expression of everything else. The resolution at the lower scales is what then establishes the *sense of place*. In short, the 'job' of urban design is not to intervene prescriptively at these latter scales, but instead to set the structural conditions (infrastructure, road and green-blue networks and spaces, densities, location of key services) – that enable informal dynamics to step in from the bottom up, and keep doing that in time, together with the 'rules of engagement' that synchronise them (Figure 9). Local identity, diversity, adaptability, resilience and so on all depend to an extent on localised agencies of change to be welcome and empowered, rather than be dictated by external professional top-down agencies. The knowledge base of urban design, which brings together the relationships between urban form and social, cultural and economic systems, guides urban designers in setting the conditions for localised agencies to act under the best possible conditions.

This gives urban design an *identity* which distinguishes it from other built environment disciplines in that its core purpose lies with the design of conditions and opportunities rather than the prescription of outcomes. One of the main features of this facilitating definition of urban design is understanding when to stop intervening (limit to top-down) so that localised context-specific decision making can take root and grow (encouragement and empowerment of bottom-up), meaning that urban design deals predominantly with adaptive and evolutionary *essence* rather than prescriptive *detail*. Crucially this requires understanding, acceptance and operationalisation of material, spatial and social aspects of urban realm as interdependent dimensions of an integrated *whole system* and cannot be properly understood as discrete things.

5. Conclusions

The urban design 'makeover' (Figure 10) described requires a mind shift in theoretical development, education and practice that emphasises the importance of:

- A more explicit and systematic understanding of the human–environment relationship as mutually interdependent and mutually transforming at the heart of approaches to research, teaching and practice. The study of urban form in time – that is, urban morphology, should constitute the knowledge base of a new master planning professionalism, and sits at the core of urban design's signature pedagogy. Disciplines such as environmental psychology, urban geography, economics must be integrated with urban morphology, with the help of expanding urban analytics capabilities, to move beyond anecdotal towards empirical large-scale evidence of how urban forms interact with

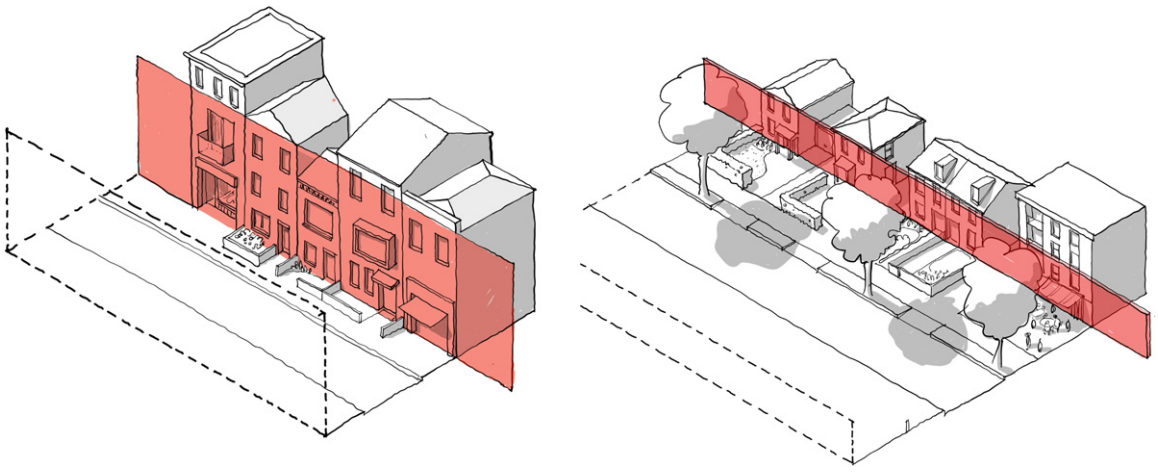

Figure 9. Design codes help places mature in ways which are coherent but flexible

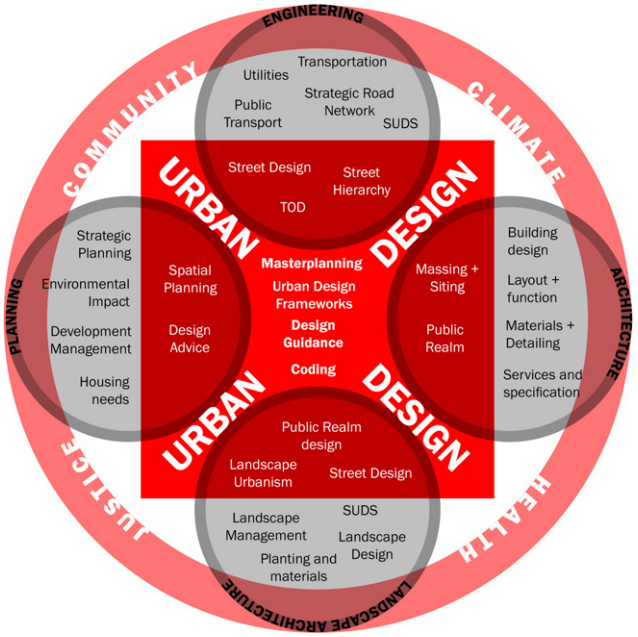

Figure 10. Meeting of professions

life. Design is then informed of by this combined knowledge.

- Recognition of the interdependency of urban form and social, political and economic processes, to better inform integration of professional, top-down processes with community-led processes and, crucially, across-scales dynamics of informal participation in urban place making, management and adaptation.
- Emphasis on the need for accessible and inclusive forms of communication capable of overcoming professional and community boundaries and discipline specific boundaries.
- Development of new readings of the urban realm more closely related to territorial functioning and in particular the need for a better balance between professional intervention and occupant self-organisation.
- Reorientation of practice and policy to include localised and context-specific patterns (knowledge base) emphasising the importance of longitudinal, time-sensitive partnership working (Thwaites *et al.*, 2013).

Our proposition has three potential implications:

First, the significance of urban form and its impacts on highly sensitive political goals of our age, suggests that international coordination and clear accountability are priorities that cannot be further deferred. This calls for a *concerted accreditation effort at national and international level*. While for most built environment disciplines professional accreditation has generally preceded the development of academic programmes, in the case of urban design, at least in the form proposed in this paper, the establishment of its own profession is only now realistic and meaningful, as predicated on a knowledge base and motivation that was not available before. However, establishing it now, would allow to efficiently align current academic provisions globally, and contribute efficiently to the global dimension of climate change, social justice and health (Loukaitou-Sideris, 2020).

Second, the relational nature of urban design suggests that, perhaps more than for any other design fields, it can *engage a range of other disciplines* in the study of social, economic, health and environmental urban processes on the ground. Urban design shares natural links with urban morphology and some of its current developments in urban form analytics, such as urban morphometrics. These are providing increasingly sophisticated platforms to expand the evidence-based knowledge that urban design needs; they will generate new questions and new principles when urban form is studied in great detail as a system itself and put in relation with others for which sophisticated detailed knowledge at large spatial and temporal scales is already available. In this sense, urban design can be truly, innovatively trans-disciplinary.

Third, these together allow for a *more reliable study, monitoring and understanding of urban environments,* which is essential to deliver responsible and sustainable place and tackle issues that require global coordination. This answers an important call, now 20 years old for 'a globally integrated content linked to a reflexive process […] across all of our learning in order to meet the challenges that lie ahead' (Cuthbert, 2001: p. 297), and a more recent reminder for a better system of validation and critical assimilation of scientific knowledge (Marshall, 2012).

While this paper is a theoretical proposition, the authors are working in practice, policy and academia, implementing these ideas on a daily basis to demonstrate that it is indeed possible to apply this new conceptualisation of urban design in both practice and policy. The aim of this paper is to stimulate further debate and collaborations with colleagues across the globe on these matters, especially with the aim of developing an international set of principles for knowledge production, monitoring and implementation. As the substance of what has been advocated is evolutionary, so are the ideas around it, which will require much collaborative efforts to be refined, shared and hopefully adopted.

Acknowledgements

The authors thank Dr. Ian Cooper, Eclipse Research Consultants, and Barbara Illsley, former senior lecturer from University of Dundee, for their critical reviews and technical advice on the earlier versions of this paper, and the three

anonymous reviewers for their important suggestions that have eventually helped shape the paper in this final format.

REFERENCES

Adams D and Tiesdell S (2012) *Shaping Places: Urban Planning, Design and Development*. Routledge, London, UK.

Akbar J (1998) *Crisis in the Built Environment: The Case of the Muslim City Singapore*. Concept Media Pte Ltd, Singapore.

Aldrich VC (1968) Visual metaphor. *The Journal of Aesthetic Foundation* **2(1)**: 73–86.

Alexander C (1965) *A City is Not a Tree*. Architectural Forum, Durham, USA, Vol. 122, No 1, pp. 58–62.

AlWaer H (2014) Improving contemporary approaches to the master planning process. *Proceedings of the Institution of Civil Engineers-Urban Design and Planning* **167(1)**: 25–34.

AlWaer H and Illsley B (2017) *Rethinking Masterplanning: Creating Quality Places*. ICE Publishing, London, UK.

AlWaer H, Bickerton R and Kirk D (2014) Examining the components required for assessing the sustainability of communities in the UK. *Journal of Architecture and Planning Research* **31(1)**: 1–26.

Batty M (2013) *The New Science of Cities*. MIT Press.

Bentley I (1985) *Responsive Environments: A Manual for Designers*. Routledge, London.

Berke EM and Vernez-Moudon A (2014) Built environment change: a framework to support health-enhancing behaviour through environmental policy and health research. *Journal of Epidemiology & Community Health* **68(6)**: 586–590.

Building Better-Building Beautiful Commission (2020) *Living with Beauty-Promoting Health, Well-Being and Sustainable Growth*. London, UK.

Carmona M (2010) *Public Places Urban Spaces: The Dimensions of Urban Design*. Architectural Press, Oxford, UK.

Carmona M and Giordano V (2017) *Design skills in English local authorities* (Alliance, U.D.G.A.T.P. (ed.)). UCL Bartlett School of Planning, London, UK.

Carmona M and Giordano V (2021) *The Design Deficit: Design Skills and Design Governance Approaches in English Local Authorities*. Report for Place Alliance, Urban Design Group, Design Council, London, UK.

Carmona M, Alwarea A, Giordano V, Gusseinova A and Olaleye F (2020) *A Housing Design Audit for England*. London, UK.

Cheapelianskaia O (2019) Why should Asia build unique cities? In *Planning for Metropolitian Area, ISOCARP 2019* (Hanzl, M. (ed.)), International Society of City and Regional Planners, Jakarta-Bogor, Indonesia, pp. 183–201.

Cic UVE (2012) *Guide to Neighbourhood Planning*. Stoke-on-Trent, UK. See http://c-cluster-110.uploads.documents.cimpress.io/v1/uploads/7aaeb3ec-baab-4ba4-bf10-199eeec8eb6b~110/original?tenant=vbu-digital (accessed 14/07/2022).

Cic UVE (2016) *Constructing a Better Future Achieving Quality and Best Value in the Built Environment*. CIC Standards London Construction Industry Council, Stoke-on-Trent, UK.

Cole C (1990) A conspiracy against the laity. *Canadian Review of American Studies* **21(1)**: 85–89.

Cooper I and AlWaer H (2017) Built environment professionals and the call for a 'new' professionalism. In *Rethinking Masterplanning: Creating Quality Places* (Husam A and Barbara I (eds)). ICE Publishing, London, UK, pp. 209–222.

Cozzolino S, Polívka J, Fox-Kämper R, Reimer M and Kummel O (2020) What is urban design? A proposal for a common understanding. *Journal of Urban Design* **25(1)**: 35–49.

Cuthbert A (2001) Going global: reflexivity and contextualism in urban design education. *Journal of Urban Design* **6(4)**: 297–316.

Cuthbert AR (2007) Urban design: requiem for an era – review and critique of the last 50 years. *Urban Design International* **12**: 177–223, https://doi.org/10.1057/palgrave.udi.9000200.

Descartes R (2006) *A Discourse on the Method of Correctly Conducting One's Reason and Seeking Truth in the Sciences*. Oxford University Press, Oxford, UK, p. 12.

Dovey K (2019) Urban design as a contested field. *Journal of Urban Design* **25(1)**: 14–16.

Elshater AM (2015) Urban design redux: redefining a professional practice of specialization. *Ain Shams Engineering Journal* **6(1)**: 25–39.

Elshater A and AlWaer H (2022) Editorial. *Proceedings of the Institution of Civil Engineers – Urban Design and Planning* **175(1)**: 1–4.

Feliciotti A, Romice O and Porta S (2018) *From System Ecology to Urban Morphology: Towards a Theory of Urban Form Resilience*. International Forum in Urbanism, UIC, Barcelona, Spain.

Gosling D (2002) *The Evolution of American Urban Design: A Chronological Anthology*. John Wiley & Sons, Chichester, UK.

Gulliver S and Tolson S (2013) Delivering great places to live. In (Cabe (ed.)). University of Glasgow and RICS, Glasgow. 28 pp. See https://issuu.com/deliveringgreatplaces/docs/creating_and_delivering_great_places_to_live_web/3 (accessed 14/07/2022).

Habraken NJ (2000) *The Structure of the Ordinary, Form and Control in the Built Environment*. MIT Press, Cambridge, London, UK.

Hill S, Lorenz D, Dent P and Lutzkendorf T (2013) Professionalism and ethics in a changing economy. *Building Research & Information* **41(1)**: 8–27.

Holling CS (1973) Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics* **4**: 1–23.

Holling CS and Goldberg MA (1971) Ecology and planning. *Journal of the American Institute of Planners* **37(4)**: 221–230.

House of Lords (2016) *Building Better Places*. Authority of the House of Lords, London, UK.

Inam A (2002) Meaningful urban design: teleological/catalytic/relevant. *Journal of Urban Design* **7(1)**: 35–58.

Jacobs J (1961) *The Death and Life of Great American Cities, Vintage Books*. A Division of Random House, Inc., New York, NY, USA.

Jacobs A and Appleyard D (1987) Toward an urban design manifesto. *Journal of the American Planning Association* **53(1)**: 112–120.

Krieger A (2006) *The Territories of Urban Design. Urban Design Futures*. Routledge, London, UK.

Krieger A (2020) The various territories of urban design. *Keynote Lecture at 1st International Urban Design Conference: Young Researchers Forum@Re-Discovering Urban Design (IUDC2020@YRF) November 2020*.

Kropf K (2017) *The Handbook of Urban Morphology*. John Wiley & Sons, Chichester, UK.

Lang J (2005) *Urban Design: A Typlogy of Procedures and Products*. Routledge, London, UK.

LeCorbusier (1929) *The City of Tomorrow and Its Planning*. Dover Architecture, New York, NY, USA.

LeCorbusier (1973) *Verso Una Architettura*. Longanesi & C, Milan, Italy.

Loukaitou-Sideris A (2020) Responsibilities and challenges of urban design in the 21st century. *Journal of Urban Design* **25(1)**: 22–24.

Marshall S (2012) Science, pseudo-science and urban design. *Urban Design International* **17(4)**: 251–271.

Marshall S (2016) The kind of art urban design is. *Journal of Urban Design* **21(4)**: 399–423.

Moudon AV (1992) A Catholic approach to organizing what urban designers should know. *Journal of Planning Literature* **6(4)**: 331–349.

Mumford E (2009) *Defining urban design: CIAM architects and the formation of a discipline, 1937–1969*. Yale University Press, New Heaven, CT, USA.

Palazzo D (2014) *Pedagogical Traditions. Companion to Urban Design*. Routledge, London, UK.

Porta S, Rofe Y and Vidoli M (2016) *The Production of Cities: Cristopher Alexander and the Problem of 'System A' at Large Scale. Pursuit of Pattern Languages for Societal Change: Designing Lively Scenarios in Various Fields*. Pursuit of Pattern Languages for Societal Change. PURPLSOC Publications, Krems, Austria.

Ravetz J (2020) *Deeper City: Collective Intelligence and the Pathways From Smart to Wise*. Routledge, London, UK.

Riboldazzi R (2010) *La Costruzione Della Città Moderna. Scritti Scelti Dagli Atti dei Congressi Dell'Ifhtp (1923–1938)*. Jaca Book, Milano, Italy.

Romice O, Porta S and Feliciotti A (2020) *Masterplanning for Change: Designing the Resilient City*. RIBA Publishing, London, UK.

Rosen G (2015) *A History of Public Health*. John Hopkins University Press, Baltimore, MD, USA.

RTPI, Baddeley M and Tolley M (2019) *Planning and Design Quality: Creating Places Where We Want to Love, Work and Spend Time*. Royal Town Planning Institute, London, UK.

Rudlin D and Hemani S (2019) *Climax City: Masterplanning and the Complexity of Urban Growth*. RIBA Publishing, London, UK.

Salama AM and Osborne Burton L (2022) *Urban Design and Planning* **175(1)**: 5–21.

Scottish Land Commission (2021) *Land for Housing Review: Towards a Public Interest Led Approach to Development*. Inverness, UK.

Sepe M (2020) Shaping the future: perspectives in research on, and the teaching of, urban design. *Journal of Urban Design* **25(1)**: 28–31.

Sert JL (1942) Can our cities survive?: An ABC of urban problems, their analysis, their solutions; based on the proposals formulated by the C.I.A.M. *International Congresses for Modern Architecture, Congrès Internationaux D'architecture Moderne*. Harvard University Press, H. Milford, Oxford University Press, Cambridge, London, UK, 259pp.

Shulman LS (2005) Signature pedagogies in the professions. *Daedalus* **134(3)**: 52–59.

Tang Y and Hack G (2017) Transforming urban design education at Tsinghua University. *Urban Design and Planning* **170(3)**: 107–120.

Taylor R and Rieger A (1985) Medicine as social science: Rudolf Virchow on the typhus epidemic in Upper Silesia. *International Journal of Health Services* **15(4)**: 547–559.

Thwaites K, Porta S, Romice O and Mark G (2007) *Urban Sustainability Through Environmental Design: Approaches to Time-People-Place Responsive Urban Spaces*. Taylor & Francis, London, UK.

Thwaites K, Mathers AR and Simkins I (2013) *Socially Restorative Urbanism: The Theory, Process and Practice of Experiments*. Routledge, London, UK.

Urban Task Force (1999) *Towards an Urban Renaissance – The Report of the Urban Task Force Chaired by Lord Rogers of Riverside*, London, UK.

UDG (Urban Design Group) (2022) *Urban Design as a Career*. UDG, London, UK.

Weaver W (1948) Science and complexity. *American Scientist* **36**: 536–544.

How can you contribute?

To discuss this paper, please email up to 500 words to the editor at journals@ice.org.uk. Your contribution will be forwarded to the author(s) for a reply and, if considered appropriate by the editorial board, it will be published as discussion in a future issue of the journal.

Proceedings journals rely entirely on contributions from the civil engineering profession (and allied disciplines). Information about how to submit your paper online is available at www.icevirtuallibrary.com/page/authors, where you will also find detailed author guidelines.