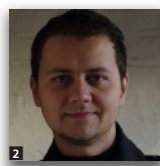# Rethinking social inclusivity: design strategies for cities

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Cities have become more fragmented due to the increasing urbanisation of many parts of the world. There is more inequality and a growing complexity of social life in cities that leads to social exclusion and increasing social differentiation. This study approaches social inclusivity within the context of universal urban design and defines it as a vehicle for promoting human wellbeing, environmental wholeness and principles of participatory democracy. Mat urbanism – an urban form concept that is more organic and fluid than other urban forms and models – is proposed, alongside a universal design approach, to achieve the goals of sustainable communities and enhance quality of life. The relationship of mat urbanism to the features of high-quality environments and sustainable developments is questioned and illustrated with simple diagrams. The paper concludes with the importance of universally designed sets of regulatory practices regarding sustainable architecture and urban development – from individual buildings to the district and city-scale level. The contribution of this study is not only to explore the potentials of Smithson's configurations theoretically but also to open new means through which towns and cities can be planned in the future in order to promote social inclusivity, environmental responsiveness, sustainability and universal urban design.

1. Introduction

Barrier-free design on an urban scale has been dealt with for over 40 years, but traditionally has been focused more on designing for one particular disability type and/or satisfying physical legislations rather than addressing the social, physical and psychological needs of all people and creating better designs in terms of sustainable development. Researchers are mostly interested in physical barriers, the phenomenology of disability (Imrie, 1996), disabled people's everyday life experiences (Butler and Bowlby, 1997), their access to the built environment (Imrie and Hall, 2001), the creation of a barrier-free city (Neumann and Uhlenkueken, 2001), accessibility assessments and subjective ratings of usability in housing environments (Fange and Iwarsson, 2003). However, in the 21st century the definition of inclusivity has begun to change as public awareness of sustainable practices has increased. So, public governance and spatial scientists, including geographers, urban planners and architects, are confronted with the push for new definitions and design strategies for designing sustainable cities that are not just about people with

traditionally acknowledged disabilities but about all people regardless of age, size and ability (Fletcher, 2002). Achieving a universal design approach, enhancing quality of life for everyone and social inclusion in cities have thus been the more pressing issues characterising contemporary cities (Sharp et al., 2005). Design approaches regarding non-discrimination, equal opportunity and personal empowerment within cities have also become essential (Hastings and Thomas, 2005). In response to this prevalence, a worldwide movement, called universal design, has evolved out of the new demographic and social reality (Danford and Tauke, 2001; Fletcher; 2002; Marley, 2001; Ostroff, 2001).

However, the development of new design strategies to achieve sustainable cities is still in its infancy. Therefore, this study highlights how mat urbanism (Smithson, 1974) as a design strategy of formal organisation can feed into current urban design to create universally designed sustainable cities. First, it provides the definition of universal design and social inclusivity within the context of universal urban design. Then, it rereads

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town planning ideas of mat urbanism with reference to Stan Allen's essay 'Mat urbanism: the thick 2D' (2001) and explores the correspondence between mat strategies and universal design principles by constructing two-dimensional/three-dimensional diagrams. 'Matrices', 'fields', 'carpets' and 'networks' are synonyms for mat urbanism. 'Front–rear', 'internal–external', 'upper–lower' and 'public–private' are structural hierarchies and spatial relationships used in the mat typology. Finally, it discusses the difference of mat urbanism from other urban models and concludes with the importance of universally designed sets of regulatory practices, indicators, measurements and priorities regarding sustainable architecture and urban development – from individual buildings to the district and city-scale level. In this respect, the goal of the study is to analyse and synthesise these synonyms and relationships as a design vehicle for achieving the requirements of sustainable cities for all people regardless of age, ability and size. The contribution of the study is not only to explore the potentials of Smithson's configurations theoretically but also to open new means through which towns and cities can be planned to promote social inclusivity, environmental responsiveness, sustainability and universal urban design.

2. Thinking of everyone: universal design approach

'The origin of universal design movement has resided in the pioneering actions and achievements of disability community' (Weisman, 2001, p. 69.6). The prohibition of discrimination against disabled people and providing equal access to education, transportation, recreation and other facilities began in the 1950s with barrier-free design approaches (Moore, 2001). Diverse user needs for accessible homes, workplaces, transportation, education settings and other recreation facilities brought forth accessibility standards and barrier-free design in urban planning and architecture. In this respect, the right of everyone to full participation in society has played an important role in the outcome of universal design. The concept of universal design was first used in the 1970s and was reinterpreted by the American architect Ronald Mace in 1985. Since then, it has become a widely accepted design approach that is also known as 'inclusive design' and 'design for all'. Many legislative acts focus on accessibility and adaptability issues by only offering specialised design solutions. However, universal design differs from them in its capability to address everyone's need without creating any sense of separatism. In universal design 'separate is not equal' (Moore, 2001; Ostroff, 2001). Unlike other disability approaches, it also combines aesthetics and function by taking into account that 'successful design for human use is a creative compromise between utility and aesthetic, between engineering and art' (Mueller, 1995, p. 19). For Mace (1991), it includes not just people in wheelchairs, but also people with mobility impairments, speech and hearing impairments, cognitive impairments, and with all diminished

abilities, either temporary or permanent, that can occur over a person's lifespan, such as advanced age and pregnancy. It aims for the inclusion of all ages, cultures and diversities and 'offers a powerful rationale for responding to the broad diversity of users who have to interact with the built environment', children, the young, older people with greater vulnerability, possible frailty and a range of limitations, women, ethnic minority groups, and so on (Sandhu, 2001, p. 3.4). Reviewing the literature showed that there are various universal design attempts, projects and models exploring what is meant by the inclusion of these different/disparate groups and how to achieve their needs, demands and expectations. Some insight into the implications of universal design practice for these groups can be listed as follows: new housing developments for an ageing population where they have easy access to services and public transportation; universally designed outdoor gardens and parks serving children and people with all types of impairments; the development of government policies and laws for sustainable social development; assistive technologies to support people with dementia, and so on. In this framework, universal design and its seven principles yield accessible, adaptable and affordable built environments for all people. Table 1 illustrates these principles with their brief definitions. Universal design with the seven principles places users at the heart of the design, planning and policy-making process.

In addition to these principles, there are also a number of concepts and practices that support how a universal design approach could improve the sustainable urban experience across a broad range of communities. Lifetime homes, streets for life and lifetime neighbourhoods are the most well-known examples of the concepts underpinning universal design. These concepts are based on creating environments that stimulate and enhance quality of life, personal identity and human interactions throughout the lifespan. The lifetime homes concept was developed by the Joseph Rowntree Foundation in 1991 to promote high-quality housing design for all, as well as to support flexibility and independence among all ages, abilities and sizes (Lifetime Homes, 1990). According to Hanson (2001a, 2001b), the lifetime home concept with 16 key design features is a macro approach to the built environment aiming at the elimination of all architectural barriers and the production of a more enabling housing environment for everyone. Streets for life and lifetime neighbourhoods are the outdoor equivalent of lifetime homes.

The streets for life concept is developed by Burton and Mitchell (2006) through their ongoing research at the Wellbeing in Sustainable Environments research unit at Warwick University. This concept with six key design principles – familiarity, legibility, distinctiveness, accessibility, comfort and safety – is a mechanism for achieving the goals of universal design at the neighbourhood scale and enabling outdoor

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Principle	Definition
P1. Equitable use	The design is useful and marketable to people with diverse abilities rather than segregating or stigmatising any users
P2. Flexibility in use	The design accommodates a wide range of individual preferences and abilities
P3. Simple and intuitive use	Use of the design is easy to understand regardless of the user's experience, knowledge, language skills, or current concentration level
P4. Perceptible information	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities
P5. Tolerance for error	The design minimises hazards and the adverse consequences of accidental or unintended actions
P6. Low physical effort	The design can be used efficiently and comfortably and with a minimum of fatigue
P7. Size and space for approach and use	Appropriate size and space is provided for approach, reach, manipulation and use, regardless of the user's body size, posture or mobility

Table 1. Seven principles of universal design (Centre for Universal Design, 1997)

environments to be as dementia-friendly as possible (Burton and Mitchell, 2006). The urgent need for sustainable communities and policies has stimulated the promotion of lifetime streets (Burton and Mitchell, 2006). According to the UK government's Planning Policy Statement 1 (ODPM, 2005) usable, durable and acceptable places have a huge impact on sustainable development and high quality design and are considered to be a key component for sustainable communities. A long-term action plan was thus launched by the UK government to encourage designers, planners and architects to design sustainable urban areas, reuse brown fields and encourage new developments in high densities (ODPM, 2003).

However, it is still not clear what a sustainable community means in practice. There is a lack of knowledge on the part of designers, planners and architects in how to create sustainable urban areas for all people. So developing appropriate design strategies and theories is essential in order to achieve the goals of universal design for sustainable cities and to support social equality and personal empowerment. For this purpose, this article proposes a design strategy for promoting social inclusivity beginning from the initial stages of the design, planning and policy-making process. The next section deals with social inclusivity within the context of universal urban design, which plays a significant role as a basic government policy to cope with the benefits and drawbacks of urbanisation.

3. Social inclusivity within the context of universal urban design

Cities become more fragmented due to the increasing urbanisation of many parts of the world. There is more inequality and a growing complexity of social life in cities that leads to social exclusion and social differentiation (Vranken, 2003). Moreover, the demographics of the developed world are changing in terms of age and ability. Longer life expectancies and reduced birth rates are resulting in an increasing proportion of older people within the adult population. Furthermore, there is a decline in capability. The number of disabled people has increased compared with 20 years ago. However, 'the built environment is basically designed for the average human being, plus or minus half a standard deviation' (Hahn, 1986, p. 273). Both the physical configuration of cities and the social development process, particularly in outer city areas, are not sustainable but rather are problematical for both disabled and non-disabled people. These changes in social structures cause the separation of people from each other and their ecological place (McDonough and Partners, 2000). So there is a need for the development of sustainable communities that maximise independence and the full participation of all people in all aspects of society. The provision of a universal platform for self-fulfilment and individual dignity is also an essential element in the evolution of universal design (Sandhu, 2001). Although the essence of sustainable development lies at interfaces between its three dimensions, the environmental, economic and social, 'the social dimension has commonly been recognised as the weakest "pillar" of sustainable development' (Lehtonen, 2004, p. 199). One of the main reasons for this is, first, the interaction between the environmental and social is still uncharted. Quality of life needs to be optimised in environmental and social terms and the social fabric should be enjoyed by all (McDonough and Partners, 2000). A close interconnectedness of nature and the social domain is essential for a sophisticated understanding and development of sustainability. Second, the social dimension cannot be approached in the same way as the environmental and economic dimensions because of its bipolar, reflexive and immaterial character (Lehtonen, 2004). Its bipolar nature means that it is characterised by two levels, the individual and the collective,

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which makes it difficult to analyse the social dimension from one perspective. Reflexivity causes behaviours to change by perceptions and interpretations of objective conditions and vice versa. As a result of this immateriality, analysing, grasping and working the social domain quantitatively and in a concrete manner is much more difficult than the environment and economic dimensions (Empacher, 2002).

Understanding the social process that takes place in cities is a prerequisite for managing urban change (Polese and Stren, 2000). This study thus approaches social inclusivity within the context of universal urban design, and defines it as a vehicle for promoting human wellbeing, environmental wholeness and the principles of participatory democracy. The needs, demands and expectations of diverse people should be considered with regard to social inclusivity. It is important to explore how everyone interacts in a social context and how all of these influence the sustainable development process of the cities where we live and which we create. Such an exploration can guide planners, architects, designers and policy-makers to develop innovative sustainable solutions that maximise equity, functionality, affordability, attractiveness, safety, effectiveness, efficiency and satisfaction. Tackling sustainability and social inclusivity in each aspect of urban design can save both the project budget and the required time, while ensuring a reduced error rate for the universal usage of cities.

4. Mat urbanism as a design vehicle for sustainable development

Mat urbanism is an urban form concept that is more organic and fluid than other urban forms and models. It can be defined as efficiency in land use, indeterminacy in size and shape and mixture in programme (Sarkis, 2001). Different from the other urban forms and models, mat urbanism develops new sustainable typologies in landscape and urban design. What is peculiar to the mat phenomenon is the incorporation of the time element as an active variable. Mat urbanism constructs a horizontal field of infrastructure as the most suitable medium through which planned, unplanned, imagined and unimagined complex urban activities are ordered over time (Allen, 2001). According to Lootsma (1999), it focuses on 'designing a compactness that leaves the surrounding landscape intact. The surrounding open space is then developed in various ecological, scenic, and recreational ways as compensation for the lack of public space in the building complex. The compactness of the building development is often realised by reducing gardens to enclosed patios and allowing for multiple ground use' (Lootsma, 1999, p. 259). However, what is more specific to mat urbanism is that it possesses the capacity to function for future possibility and appropriation. In this respect, cities in mat urban form provide flexible shells and planning zones for different social activities in contrast to rigid containers. Mat-like configurations support a

range of programmatic configurations, indeterminate and unknowable of future uses over time.

Mat urbanism is not a distinct object or organisational strategy. It is both city and building, both public and private, both structure and infrastructure (Sarkis, 2001). The characteristics of mat urbanism were first outlined by Smithson in 1974: 'it can be said to epitomise the anonymous collective; where the functions come to enrich the fabric and the individual gains new freedoms of action through a new shuffled order, based on interconnection, close knit pattern of association and possibilities for growth, diminution and change' (Smithson, 2001, p. 91). This definition of Smithson's of mat urbanism addresses a new approach to urbanism with the emphasis on interconnectivity, indeterminacy and a certain degree of unpredictability regarding future development. The world of 'new shuffled order' has been introduced to mean that every piece of urban fabric creates forms of configurative patterns and has characteristics to make its own visual renewal order, which can respond to the possible changes over time. 'Close knit pattern' refers to spatial configurations that provide an organisation based on a repetitive process of spatial diversity. It can be the form of systematic repetition of a set of elements and/or collective form as continuous systems. Sarkis (2001) reformulated Smithson's definition and highlighted mat urbanism's low-rise nature, dense character and its repetitive systematic elements. For Sarkis (2001) 'today mats are appearing everywhere. We call them fields, grounds, carpets, matrices' (p. 13). Hyde (2001) redefined mat urbanism as a flexible cellular structure rather than a rigid container, where architecture becomes urbanism to respond to diverse demands of programming and infrastructural accommodation.

In mat configurations there is a loose scaffolding based on the systematic organisation of parts, which gives way to create open spaces where the fullest range of activities can take place (Allen, 2001). Regarding mat urbanism's adaptability, changeability and flexibility, it is possible to approach the concept from the point of social inclusivity and sustainable development process. If adaptability, changeability and flexibility of infrastructures and structures could be achieved regardless of user experience, age, size and ability, then it would be possible to ensure equally sustainable cities (Eren, 2004). Addington *et al.* (2001) summarised the sustainable character of mat urbanism under the following five claims: (1) the interstitial, fluid and flexible spaces allow for greater adaptability in the use of space; (2) the high density of mats, the circulation networks and the courtyards use land efficiently; (3) reconfiguring the surrounding climate, natural light and solar heat through the courtyards conserves energy; (4) pedestrian zones as social spaces eliminate cars and reduce energy consumption and the overall need for transportation; (5) internal streets and outdoor environments create their own microclimate.

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The Amsterdam Municipal Orphanage (1955–60) was the first large building of mat urbanism to demonstrate how mat urbanism contributed to reduce social exclusion. It directly led to a number of other mat urban forms, such as Venice Hospital by Le Corbusier and Berlin Free University by Candilis, Josic and Woods (Mumford, 2001). The Venice Hospital project, starting from early sketches, took into account organising spaces according to its functional aspects and programme requirements with an emphasis on the relationship between man and city. The hospital embodied most of the attributes associated with mat urbanism, such as a one-to-two storey distributed configuration, the use of a highly flexible and remanufactured construction system, and allocation of functions along courtyards, as well as providing equitable care to all patients and treatment of nursing facilities. The horizontal network of shallow ramps and vertical cores within the hospital maintained better opportunities for a variety of patients, medical staff and healthy society. The hospital also created its own interior sub-environments in the form of wards that were centred around courtyards and were supposed to extend the residential areas of the city into the water (Sarkis, 2001). So rather than being closed as a whole, the shape of the hospital supports the integration and full participation of all people within society by creating an open embellishment to the water side (Allard, 2001). The hospital was an attempt to get close to the city and deliver essential services to everyone who needs them.

4.1 History of mat urbanism

'Mat urbanism emerges in architectural consciousness around the late 1950s and early 1960s through Team 10 debates within CIAM as a challenge to segregation between architecture and urbanism and a way to generate more social interaction across segregated uses' (Sarkis, 2001, p. 15). In the ninth congress of Congrès internationaux d'architecture moderne (International Congresses of Modern Architecture (CIAM)), words such as 'association', 'neighbourhood', 'cluster', organic analogies for growth and change, were introduced in contrast to the idea of functional zoning (Curtis, 1996). With these words it was intended to express a more complex image of the city and its social context. This new language has yielded to mat urbanism with the main emphasis on human association in order to create an environmentally responsive architecture and urbanism (Eren, 2004). By giving prominence to social issues, there was a particular emphasis on the relationship between physical form and social interaction. In mat urbanism, low-density building types, internal streets, courtyards and overall circulation patterns and internal spaces were articulated in a way to allow the building to respond to the changing requirements of its users and to sustain social events over time (Allard, 2001).

4.2 Revival of mat urbanism

In the late 20th century, it was possible to observe the revival of mat urbanism in the USA, where a new city form, less controlled and more extensive, was developed compared with postwar English and European suburbs (Allen, 2001). 'Cities like Los Angeles have developed as vast, mat like fields, where scattered packets of density are knit together by high speed, high volume roadways' (Allen, 2001, p. 124). In this respect, Los Angeles is concomitant with the Smithson mat approach. Although Los Angeles is a good example of mat urbanism, it is a bad example of sustainable development. The main reason for this is the lack of social cohesion and social inclusion created by the urban landscapes, which is a key aspect of sustainable communities. Metropolitan Los Angeles is busy with the undesirable effects of global concerns (congestion, pollution and social stress). The complexity of rapid urbanisation makes the union of landscape with urbanism difficult (Corner, 2005). Landscape has the capacity to provide fields, ecological surfaces and matrices as a relief from the deleterious effects of urbanisation. However, this separateness hinders landscape from driving the process of city formation and social change in terms of sustainable development. This evidence suggests that the focus of mat urbanism should be on promoting a sense of community and supporting socially cohesive behaviour. A close interconnectedness of the social and mat-like configurations can be identified as a fundamental necessity for the quality of built environments.

In the cities of Brazil, where pedestrian activity becomes important, mat urbanism has been developed in buildings with the use of varying conditions of openness, interconnected ramps and continuous spatial flow (see Faculty of Architecture at the University of Sao Paulo; Mumford, 2001). Moreover, compared with European cities, Islamic cities of North Africa correspond with Team 10 and Smithson's mat approach by providing a casbah concept, which is defined as an organisation principle based on a low-density, contiguous, multi-functional building form with repetitive processes of spatial diversity in opposition to Le Corbusier's radiant city (Oxman et al., 2002). There are also other examples of mat urbanism in other cities from the 1950s to the present. In the 1950s Louis I. Kahn proposed a traffic-movement pattern for Philadelphia's city centre, through which traffic congestion and parking lots were solved by reordering streets according to a functional hierarchy. According to Kahn, streets are the mechanism of a city (Arkaraprasertkul, 2008). In his proposal different tempos of traffic were connected in different zones by organising horizontal surfaces, such as the girdle of expressways and parking towers circling the city centre (McQuaid, 2002). In the early 1960s there were urban systems proposed by Candilis, Josic and Wood that gave prominence to social issues and human association through the creation of low-density, contiguous and multifunctional building forms, internal courtyards, repetitive structures and configurative urban patterns (Tzonis and Lefaivre, 1999). Another important example of mat urbanism is the Kuwait urban form study by

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the Smithsons in 1968–70, which is an urban form with a low profile raised on pilotis and has direct contact with the water of the Gulf (Smithson and Smithson, 2005). It aimed to meet the requirements of city centre activities by moving away from individually designed blocks to a fabric of repetition, connectedness and interchangeability over time. By the end of the 1970s, Rem Koolhaas's Delirious New York project signalled the role of mat urbanism for articulating the chance-like nature of city life and accommodating unexpected functions and human activities. Another important example of mat urbanism from the 1980s is Parc de la Vilette by Tschumi, where programmes, forms and surfaces were overlaid and overlapped to create a densely textured landscape (Hyde, 2001). The continuity of this urban form is also obvious in Yokohama Port Terminal by Foreign Office Architects, where a porous mat of movement and waiting spaces was created by means of warped and folded steel plates to support an adaptive social ecology (Allen, 2001). All these built examples suggest the emphasis on high density, fluidity, speed, space articulation, respect for context and the need for change. In other words, they highlight the importance of the possibility of the reallocation of spaces for future uses (Sarkis, 2001).

What links today's architecture and urbanism to the 1960s mats is the importance of further exploring the ongoing dialogue of mat urbanism. Mat urbanism is now a much wider concept dealing with various sustainable issues. An important spur for the application of mat urbanism to different scales has been the social and environmental disasters of rapid urbanisation and the need for responding to this temporal change, transformation, adaptation and succession. As we know, the contemporary city is not a single thought but rather the result of diffused layers of different urban surfaces (Girot, 2005). The main reason why mat urbanism should be integrated into the instability, indeterminacy and flux of the contemporary city is that it is uniquely suited to the open-endedness and change demanded by current and future urban conditions (Waldheim, 2005). Another reason for mat urbanism's application to different scales is its capability of appearing in various urban forms, such as organised fields, sites, territories and networks, so that it fits well into different scales of operating spaces between buildings, infrastructural systems and natural ecologies. Allen (2001) explored further the significance of the 1960s mat-like configurations within the context of contemporary urban discussions and summarised it under the five objectives: '(1) a shallow but dense section activated by ramps and double-height voids; (2) the unifying capacity of the large open roof; (3) a site strategy that lets the city flow through the project; (4) a delicate interplay of repetition and variation; (5) the incorporation of time element as an active variable in urban architecture' (Allen, 2001, p. 121). The following section discusses in detail how mat urbanism with these five objectives can meet the requirements of social inclusivity and the seven principles of universal design.

5. The correspondence between mat strategies and universal design principles

In this paper, mat-like configurations with their five objectives are proposed as a design strategy to promote sustainable sub-urban/urban developments, create universally designed built environments and/or redevelop the existing ones. The mat vocabulary and its set of formal strategies has the potential successfully to achieve the objectives of social inclusivity and enhance quality of life (Eren, 2004). This section analyses further how mat urbanism with these five objectives can meet the requirements of the seven principles of universal design. It should be noted that the juxtaposition of universal design principles with the five objectives of mat urbanism does not mean that there is a one-to-one correspondence between them. Under each objective, the more related universal design principles are discussed. What is intended with this super-imposition is to establish a comparative context for the argument on the adaptability of mat configurations as a design strategy to the universal design approach. Their relationship to the features of high-quality environments and sustainable developments is questioned. Each objective is illustrated with simple diagrams in the following subsections.

5.1 A shallow but dense section activated by ramps and double-height voids

A mat section is defined as the product of weaving, warping, folding, oozing, interlacing, or knotting together rather than the accumulating of discrete layers as in a conventional building section (Allen, 2001). The dense section of mat urbanism refers to the 'thick 2d' of the forests, fields where a new sense of connection in different levels of outer suburbs, urban fringes and satellite settlements can be achieved by ramps and double-height volumes. This dense and differentiated mat section can also be treated as a response to fragmented outer city areas, which can be extended and organised through the horizontal surfaces. Shallow sections are ideal to unite the different characteristics of the contemporary city and different kinds of functions on two to three urban levels. They make communication, transportation and socialisation much more secure, safe, equitable and simple compared with the traditional planning patterns. According to Barton et al. (2003), safe and secure features are prerequisites for any positive social activity within a built environment. At the same time, density is a feature of a compact city and is accepted as an attribute of sustainable development (Williams et al., 2000). In this respect, unlike high-rise buildings, the compact nature of the mat section and its low-rise character take the advantage of providing accessible circulation networks, accommodating flexible movement patterns, minimising vertical movements and eliminating the confusion within the structure and infrastructure (Figure 1). Figure 1 illustrates a horizontal field of an infrastructure, where all sorts of urban activities are connected by ramps, in-between spaces, courtyards and other types of public open spaces. This dense interconnected structure

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has the potential to allow the use of spaces comfortably and provide a visible route for pathways both horizontally and vertically. According to Figure 1, different kinds of functions are articulated on two to three levels, which make for easier communication, flows of activities and the linkage of grounds and roofs. Moreover, through this objective the resultant spatial organisations have the flexibility to create a series of surfaces that can be appropriated, reconfigured and modified according to the diverse needs of communities. The shallow and dense sections also encourage social spaces and closely related social interaction patterns that can be used with low physical effort. Efficient and comfortable usage of a place is important in terms of its attractiveness, which is defined as a quality feature of a built environment (Dempsey, 2008). In this respect, six of the seven principles – equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error and low physical effort – tie in well with this objective. Through this objective it is then possible to achieve most of the goals of these principles in practice. West 8 Architects' redevelopment plan for Borneo and Sporenburg (West 8 Architects, 1996) in Amsterdam Harbour is a good example of this objective of mat urbanism. This project suggested the potential diversity of a shallow section through the insertion of small-scale courts and yards (Waldheim, 2005). New types of three-storey, ground-accessed houses were oriented in the great scale of the docks by creating an animated street elevation (http://www.west8.nl/projects/all/borneo_sporenburg/).

5.2 The unifying capacity of the large open roof

The unifying capacity of a roof structure provides the potential to organise the densely constructed section of internally differentiated spaces under a continuous fabric. The continuity and spatial wholeness of diverse elements are achieved under this structure while also respecting the identity of each element. The open roof of the horizontal space is defined as a low enclosure carried lightly above the user with a high degree of
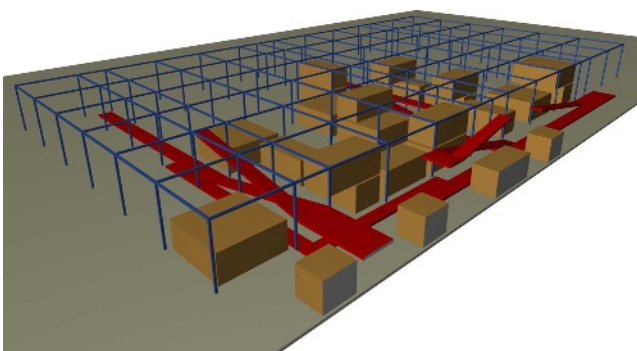

Figure 1. A horizontal field of an infrastructure connected by ramps, in-between spaces, courtyards and other types of public open spaces

connectedness (Allen, 2001). So the diversity of city life is accommodated by dividing, allocating and constructing various styles and various functions within an overall framework. This objective plays a key role in anticipating the future incorporation of changeable and unpredictable characteristics of the contemporary city. In this respect, the unifying capacity of the roof structure can combine diverse expectations of communities and influence their social activity in a positive way by providing equally accessible series of inner- and outer-town facilities underneath. New York High Line, which is an elevated New York City park, supports this objective. The High Line built in the early 1930s turned into a park as a response to sustainable use, conservation of biological diversity and fragile ecosystems. The disrepair condition of the line is designed by James Corner Field Operations and architects Diller Scofidio and Renfro to protect, preserve and renovate the line with naturalised plantings (High Line, The, 2009). Such an elevated steel structure can be seen as a green corridor with upper and lower public open spaces, through which the abandoned space is rehabilitated and the undesirable effects of New York's urbanisation reduced. The park is also proposed to extend the urban environment and its associated landscapes at a height that allows walking around the city from a different perspective.

Nodes, specific points, links, main and secondary circulation networks and horizontal dispositions of functions also become important within the overall framework of roof structures, which can help maximise legibility and perceptible information. Legibility is an important feature for enjoying and navigating a place (Kelly, 2001). According to Lynch (1960), legibility is crucial within the city setting and means 'the ease with which the parts of cityscape can be recognised and organised into a coherent pattern' (p. 2–3). Easily identifiable patterns, recognisable movement systems and a legible network of pathways allow people to communicate effectively, safely and securely. Moreover, this objective is also essential in terms of tying together a heterogeneous collection of urban spaces (Figure 2). Therefore, this objective clearly supports all the universal design principles. In particular, the capability of evolving above and under the roof structure can provide enough clear spaces for approach, reach, manipulation and use. It can also respond to permanent and temporary changes of the functional programme and the future life of a city.

5.3 A site strategy that lets the city flow through the project

A site strategy is an attempt to get close to the city. The closeness is achieved by the landscape element, which is an inclusive ground plane of a city. It is used to let the city flow and link scattered functions. In the mat phenomenon, landscape is a much wider concept than its simple definition as the spaces between buildings, parking lots, planted areas, green areas or recreational spaces (Wall, 1999). This ground plane
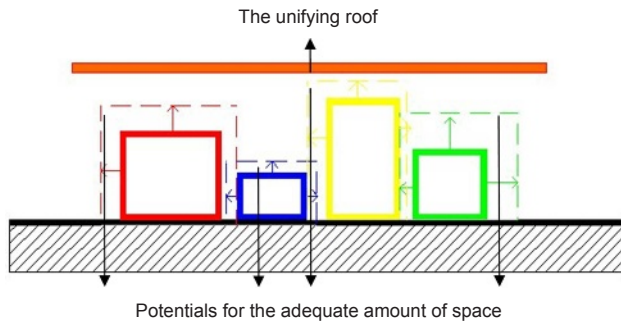
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Figure 2. The unifying capacity of the roof structure provides enough clear areas for the potential growth and change of diverse urban functions

plays an important role in organising and allowing the future extension of mat-like organisations into the urban fabric. It accommodates easy access and reach to services, facilities and green areas, which is a feature of good urban environments in urban villages, transit-oriented developments and sustainable developments (Talen, 2003). An uninterrupted continuation of the ground planes, horizontal surfaces and landscapes into spatial organisations can equally respond to the diverse needs of communities without any specialised design solutions. It allows people to move comfortably, safely and with low physical effort into services (Figure 3). 'An accessible route of travel is the key unifying element that facilitates the safe and independent use of a site and its buildings by all people … connects site arrival points, i.e. parking, bus stops, etc., with all exterior and interior amenities' (New Fair Multi-Family Housing, 1996, p. 13). Moreover, getting close to the city is important in terms of a positive sense of place attachment, satisfaction and enjoyment. In this context, this objective contributes mainly towards the realisation of equitable use, simple and intuitive use, tolerance for error, low physical effort and size and space for approach and use. The integration of
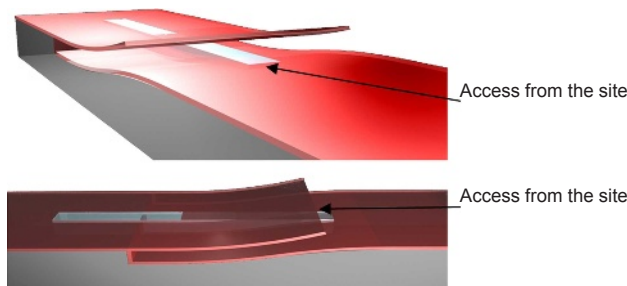
this objective with these principles can promote socially and environmentally sustainable spaces for all.

5.4 A delicate interplay of repetition and variation

A delicate interplay of repetitive and additive elements of mat urbanism enables the creation of an urban fabric through serial replications (Figure 4a). Hertzberger (2001) defined the image of an urban fabric in relation to warp and weft, which make up an indivisible whole. One cannot exist without the other. Like the warp and weft, the outer city areas, on which most of the new developments are focused, can be woven within repetitive structures of mat-like configurations to foster social interaction and influence quality of life in a positive way. This delicate interplay also provides a high degree of flexibility in the overall layout of complex systems (Sarkis, 2001). So repeating urban structures in a great variety makes the use of built environments easy to understand. Repetitive systems are capable of arranging essential information in a way that is consistent with its importance. They establish a well-connected network of routes, with clear, familiar and simple views. In this
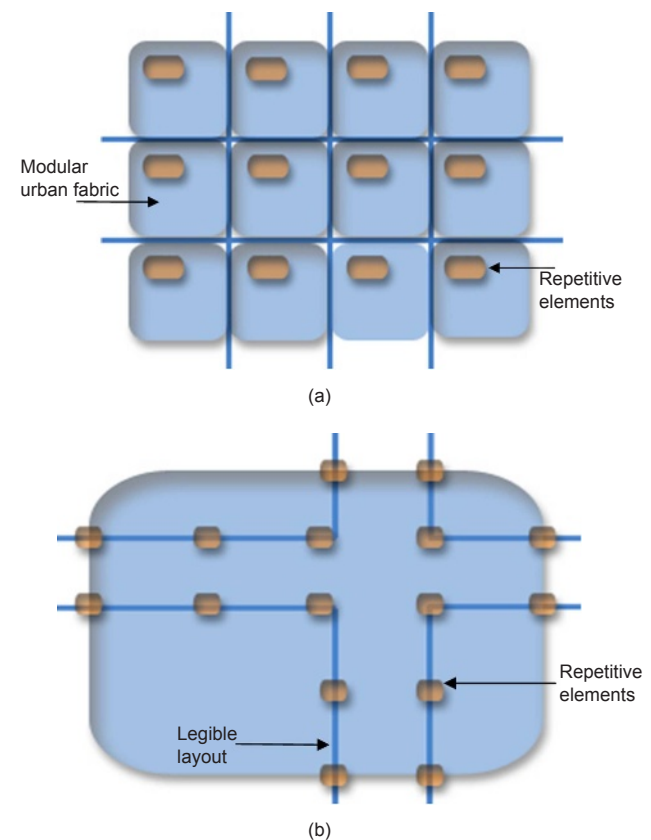

(a)

(b)

Figure 4. (a) The creation of urban fabric through serial replications, (b) Eliminating the unnecessary complexities through repetitive systems

Figure 3. An uninterrupted continuation of urban fabric provides easy access from the site

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respect, legibility and perceptible information are achieved through a delicately balanced relationship that exists between repetitions of individuals (Figure 4b). Moreover, variation provides distinctiveness, which is an essential characteristic of streets for life, to give their own identity and reflect the local character of an area (Burton and Mitchell, 2006). With all these features this objective also has the potential for arranging elements to minimise hazards and create a sense of security and safety. Therefore, this objective ties in well with all the principles of universal design. An urban site designed with variation and repetition can ensure universally designed communities and allow more users to participate in and experience that environment in a sustainable manner.

5.5 Incorporation of the time element as an active variable in urban architecture

'In urbanism there are not three but at least four dimensions, of which the time dimension is perhaps the most important' (Wagner, 1999, p. 21). Mat urbanism is based on the idea of loose scaffolding, in which space and time link together to respond to changing spatial patterns over time. The unconfined frameworks of mat urbanism not only arrange the future demands of spaces but are also capable of reconfiguring the built environments for new programmes and indeterminate urban futures. Figure 5 illustrates the process diagram of an urban infrastructure, which is intended to be anticipatory, open-ended and adaptable. The time element is incorporated into this process by demonstrating how new activities are installed into the existing ones as needs are changing over time. So, the three infrastructures in Figure 5 are developed based on the rules that grow out of the interaction of activities with systems of growth, variation and change. Such an infrastructure is capable of articulating relations between structures, public events and indeterminate urban futures. In this respect, this objective is defined as a 'plug-in' capability, which allows

new functions as well as new spaces to be readily inserted into the urban fabric. It increases the possibility of developing sustainable cities, extends the high-quality life of urban spaces and minimises the need to demolish and replace facilities (Addington et al., 2001). The incorporation of the time element thus plays a significant role for creating well-maintained universal urban areas as a means of positive social activity (CABE Space, 2005). A low-density layout, internal courtyards, clusters, patterns of growth and change and repetitive layering of functions are the key terms to achieve sustainable modifications and adaptations of spaces throughout the life cycle. UK policy, practice and research also identify the importance of organising sustainable towns and cities to accommodate the changes of the future (Dempsey et al., 2008). According to government policy, providing well-designed inner and outer urban areas for now and the future is an essential requirement for sustainable communities. Time and lifespan concepts are essential considerations for the universal design principles and also social inclusivity. The need for sites, territories, ecosystems, networks and infrastructures to be adaptable to different programmes can be met with a universally designed system in four dimensions. So successful implementation of the seven principles along this objective contributes to the development of high-quality, safe, comfortable, varied and attractive urban spaces for now and sustains them in the near future.

6. Discussion

Referring to the five objectives explained above, mat urbanism differs greatly from other urban design strategies, such as the compact city, new urbanism, ecotowns, in the manner that it is not a formal model; it is a model for process through which complex evolving arrangements of urban activities can be ordered (Allen, 2001). The compact city concept, which is generally described in relation to density, focuses on sustain-
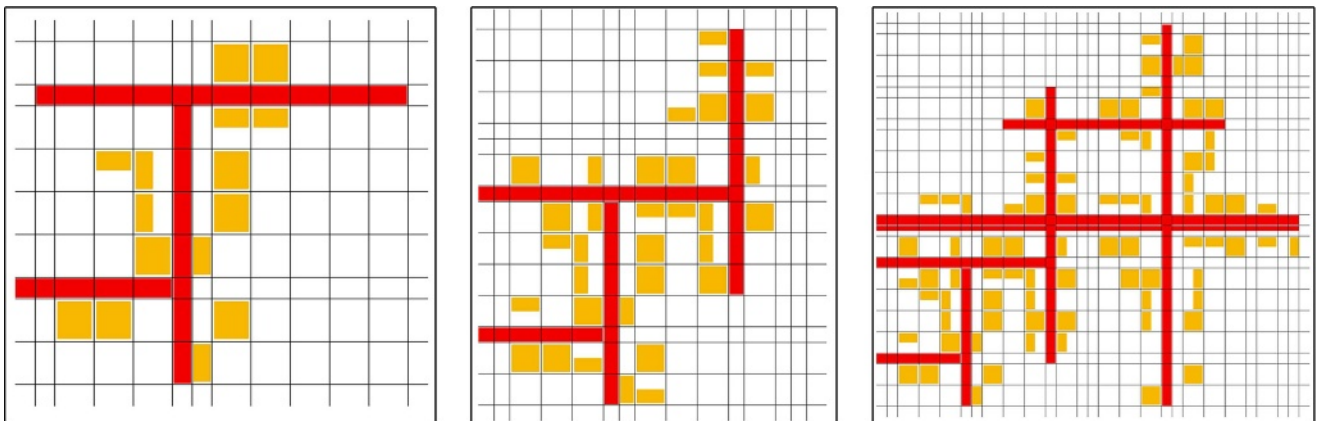

Figure 5. Mat urbanism is capable of reconfiguring spatial patterns in time and arranging built environments for new programmes

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able developments from the perspective of urban intensifica-tion (Burton, 2002), whereas mat urbanism approaches density from the perspective of structuring urban areas by means of connective systems, close-knit patterns and adaptable net-works. As explained in the previous sections mat urbanism has been applied to different scales for high-quality lives and strong supportive communities and is widely accepted in practice as a response to individual and collective responsi-bilities of urban infrastructures. Moreover, according to Williams *et al*. (2000), instead of concentrating on one particular solution, there is a need to recognise that the diversity of urban futures is likely to exist within a city so that urban compaction should only be seen as one way of achieving a sustainable urban form. Although the new urbanism model aims to create walkable neighbourhoods, enhance a sense of community, reduce automobile dependency and protect the open space (Berke, 2002), there is more to the mat urbanism approach than just stimulating social interaction and cohesion. Mat-like configurations constitute the sustainable urban fields where the form of the space itself offers physical, social and cultural opportunities for all people to adapt spaces according to possible changes over time. The idea of the blurring of boundaries, varying degrees of enclosure and the creation of self-adapting spaces is peculiar to mat-like organisations (Addington *et al*., 2001). In this respect, mat urbanism fits clearly with the universal design approach to fulfil its promises in delivering sustainability throughout the lifespan and stimulate interaction between its social and environmental dimensions.

It is important to remark that universal design requires a design strategy that allows its principles to be put into practice. It cannot be sufficient to refer only to universal design's built or proposed exemplary projects in order to improve existing urban spaces, provide a good quality of life and develop sustainable communities. It is also not possible to achieve sustainability by applying only one objective. Designers, architects, planners and policy-makers must consider a set of mat objectives along the seven universal design principles for maximising the overall performance of a sustainable design solution for diverse user needs, capabilities and expectations at any scale. The proposed mat urbanism not only provides designers with the relevant information on how to incorporate each universal design principle alongside the sustainability requirements, but also enables them to design a series of spaces and surfaces that are flexible enough to evolve, grow and develop over time. According to Burton and Mitchell (2006) sustainability can only be achieved if practitioners become aware of their social responsibilities and the importance of accessing user needs data and how to address it. Therefore, for the future promotion of mat urbanism it is necessary to highlight the following recommendations for practitioners and argue some critical issues. First, the practical and economic feasibility of what is

proposed throughout the article has not yet been explored in depth. Therefore, practitioners should think carefully about the costs and financial aspects of bringing the mat objectives in line with universal design principles. Second, the potential conflicts with other sustainability requirements and trade-offs between universal design principles need to be dealt with in a detailed and systematic manner. 'For example, providing energy through solar panels requires lower-density urban form, which might make facilities difficult to reach for older people' (Burton and Mitchell, 2006, pp. 158–9).

7. Conclusion

This paper highlights the necessity of appropriate design strategies related to organisations of town planning and production of urban environments by placing the concept of universal design and mat urbanism centrally in the social inclusion agenda of sustainable development. A better under-standing of the relationship between socially responsive urban design strategies and sustainable developments would be of value in promoting social inclusion and achieving a holistic approach in cities. The inclusion of universal design principles alongside mat urbanism strategies can contribute significantly to attain the objectives of social sustainability fully within a built environment and successfully respond to efficiency in land use and flexibility in inner and outer city areas. Rather than dinosaur cities losing their capabilities (Stein, 1976), this paper points out the importance of universally designed sustainable cities to answer the recurring calls for human diversity, equal opportunity and social interaction (Polese and Stren, 2000). Universal cities can also be considered as a part of the broader adaptability process as Gleeson (1999) suggested a lasting transformation of the political, economic, institutional and cultural forces. The creation of universal cities integrated with mat urbanism is thus more than providing or adapting part of a building or built environment. Universal cities can make the city life a shared experience by all people and help its population live in a high-quality sustainable built environment for now and the future.

To sum up, universal urban design embodied with mat phenomenology can be treated as a design response to sustainability through which designers, planners, policy makers and government can eliminate social exclusion, address the needs of the whole population, reduce timescales and produce better designs and increase user satisfaction. In reality, the true costs of bad, unusable and inequitable designs emerge later on in the life cycle and/or occupation phase of the built environment, and have the potential to exclude people, cause irreparable damage and unsustainable environments (Afacan and Demirkan, 2010; Afacan and Erbug, 2009; Clarkson *et al*., 2003). Post-occupancy evaluations can be too late to remedy the mistakes related to sustainable design and social inclusion. To avoid a diffused link between people and cities, there is a

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need to embark on design strategies and methods for revitalisation, requalification, renovation of existing built environments and redevelopment of brown field lands. Therefore, achieving a sustainable performance within cities is highly correlated with implementing an appropriate design strategy along an overall consideration of a range of environmental design concerns, such as ergonomics guidelines, accessibility standards, building codes and urban planning specifications. In this context, social inclusivity within mat urbanism can lead to the greater inclusion of many groups often neglected in the sustainable development process (Eren, 2004). It provides the possibility for responding to the requirements of sustainable development and the needs of communities from childhood to the ageing process (Clarkson et al., 2003; Danford and Tauke, 2001). Otherwise, inaccessible spaces, unusable facilities with barriers and declining cities prevent the physical and social participation of communities. In this respect, this paper's contribution to scientific knowledge is to open ways for adopting new urban design and planning principles and import creative ideas for supporting sustainable development and universal design's responsiveness to the current ever-changing global environment. Further studies can include the real implementation of the suggested mat urbanism objectives in urban design practice, which forms the authors' future research agenda.

REFERENCES

Addington M, Kienzl N and Intrachooto S (2001) Mat buildings and the environment: examination of a typology. In *Case: Le Corbusier's Venice Hospital and the Mat Building Revival.* (Sarkis H, Allard P and Hyde T (eds)). Prestel, New York, pp. 66–79.

Afacan Y and Demirkan H (2010) A priority-based approach for satisfying the diverse users' needs, capabilities and expectations: A universal kitchen design case. *Journal of Engineering Design* **21(2–3)**: 315–343.

Afacan Y and Erbug C (2009) Application of heuristic evaluation method by universal design experts. *Applied Ergonomics* **40(4)**: 731–744.

Allard P (2001) Bridge over Venice: speculations on cross-fertilization of ideas between Team 10 and Le Corbusier. In *Case: Le Corbusier's Venice Hospital and the Mat Building Revival.* (Sarkis H, Allard P and Hyde T (eds)). Prestel, New York, pp. 18–36.

Allen S (2001) Mat urbanism: the thick 2-D. In *Case: Le Corbusier's Venice Hospital and the Mat Building Revival.* (Sarkis H, Allard P and Hyde T (eds)). Prestel, New York, pp. 118–126.

Arkaraprasertkul N (2008) Toward modernist urban design: Louis Kahn's plan for Central Philadelphia. *Urban Design* **13(2)**: 177–194.

Barton H, Grant M and Guise R (2003) *Shaping Neighbourhoods: A Guide for Health, Sustainability and Vitality*. Spon Press, London.

Berke P (2002) Does sustainable development offer a new direction for planning? Challenges for twenty-first century. *Journal of Planning Literature* **17(1)**: 21–36.

Burton E (2002) Measuring the urban compactness in UK town and cities. *Environment and Planning B* **29(2)**: 219–250.

Burton E and Mitchell L (2006) *Inclusive Urban Design: Streets for Life*. Elsevier, Oxford.

Butler RE and Bowlby S (1997) Bodies and spaces: an exploration of disabled people's experiences of public space. *Environment and Planning D* **15(4)**: 411–433.

CABE Space (2005) *The Value of Public Space: How High Quality Parks and Public Spaces Create Economic, Social and Environmental Value*. CABE Space, London.

Centre for Universal Design (1997) *Principles of Universal Design*. NC State University (online). See www.design.ncsu.edu./cud/univ_design/udprinciples.htm (accessed 23/09/2003).

Clarkson J, Coleman R, Keates S and Lebbon C (2003) *Inclusive Design: Design for the Whole Population*. Springer-Verlag, London.

Corner J (2005) Terra fluxus. In *The Landscape Urbanism Reader* (Waldheim C (ed.)). Princeton, New York, pp. 21–35.

Curtis W (1996) *Modern Architecture since 1900*. Phaidon Press, London.

Danford GS and Tauke B (eds) (2001) *Universal Design New York*. A City of New York Office of the Mayor Publication, New York.

Dempsey N (2008) Does quality of the built environment affect social cohesion? *Proceedings of the Institution of Civil Engineers: Urban Design and Planning* **161(3)**: 105–114.

Dempsey N, Bramley G, Brown C and Watkins D (2008) *Understanding the Links between the Quality of Public Space and the Quality of Life: a Scoping Study*. Unpublished report commissioned by CABE Space, 2008.

Empacher C (2002) Die Sozialen Dimensionen der Nachhaltigkeit – Vorschlage zur Konkretisierung und Operationalisierung. Vortrag auf der ordentlichen Mitgliederversammlung des Doktoranden Netzwerk Nachhaltiges Wirtschaften, 26 April, Koln. Institut fur sozial-okologische Forschung (online). See http://www.isoe.de/ftp/kerpen.pdf (accessed 11/04/2010).

Eren Y (2004) *Exploring the Potential of Mat-building for the Creation of Universally Designed Environments*. Unpublished Master's thesis. Middle East Technical University.

Fange A and Iwarsson S (2003) Accessibility and usability in housing: construct validity and implications for research and practice. *Disability and Rehabilitation* **25(23)**: 1316–1325.

Fletcher V (2002) Universal design, human-centred design for

Urban Design and Planning
Volume 164 Issue DP2

Rethinking social inclusivity:
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the 21st century. *Design* February/March (online). See http://www.adaptenv.org/index.php?option =Resource&articleid=148 (accessed 23/12/2010).

Girot C (2005) Vision in motion: representing landscape in time. In *The Landscape Urbanism Reader* (Waldheim C (ed)). Princeton, New York, pp. 35–55.

Gleeson B (1999) Can technology overcome the disabling city? In *Mind and Body Spaces: Geographies of Illness, Impairment and Disability.* (Butler R and Parr H (eds)). Routledge, London, pp. 98–118.

Hahn H (1986) Disability and the urban environment: a perspective on Los Angeles. *Environment and Planning D* **4(3)**: 273–288.

Hanson J (2001a) *From Sheltered Housing to Lifetime Homes: An Inclusive Approach to Housing* (online). See http://eprints.ucl.ac.uk/3854/1/3854.pdf (accessed 01/03/2010).

Hanson J (2001b) From 'special needs' to 'lifestyle choices': articulating the demand for 'third age' housing. In *Inclusive Housing in an Ageing Society* (Peace SM and Holland C (eds)). Policy Press, Bristol, pp. 29–55.

Hastings J and Thomas H (2005) Accessing the nation: disability, political inclusion and built form. *Urban Studies* **42(3)**: 527–544.

Hertzberger H (2001) *Lessons for Students in Architecture*, 4th revised edn. 010 Publishers, Rotterdam.

High Line, The (2009) See http://www.thehighline.org/ (accessed 23/12/2010).

Hyde T (2001) How to construct an architectural genealogy: mat-building… mat-buildings… matted-buildings. In *Case: Le Corbusier's Venice Hospital and the Mat Building Revival.* (Sarkis H, Allard P and Hyde T (eds)). Prestel, New York, pp. 104–118.

Imrie R (1996) Equity, social justice, and planning for access and disabled people: an international perspective. *International Planning Studies* **1(1)**: 17–34.

Imrie R and Hall P (2001) An exploration of disability and the development process. *Urban Studies* **38(2)**: 333–350.

Kelly A (2001) *Building Legible Cities*. Bristol Cultural Development Partnership, Bristol.

Lehtonen M (2004) The environmental–social interface of sustainable development: capabilities, social capital, institutions. *Ecological Economics* **49(2)**: 199–214.

Lifetime Homes (1990) See www.lifetimehomes.org.uk (accessed 23/12/2010).

Lootsma B (1999) Synthetic regionalization: the Dutch landscape toward a second modernity. In *Recovering Landscape: Essays in Contemporary Landscape Architecture* (Corner J (ed.)). Princeton, New York, pp. 251–275.

Lynch K (1960) *The Image of the City*. MIT Press, Massachusetts.

Mace RL (1991) *Accessible Environments: Toward Universal Design*. The Centre for Universal Design Press, Raleigh, NC.

Marley S (2001) Creating an accessible public realm. In

Universal Design Handbook (Preiser WFE and Ostroff E (eds)). McGraw-Hill, New York, pp. 58.1–58.22.

McDonough W and Partners (2000) *The Hannover Principles: Design for Sustainability* (online). See www.mcdonough.com/principles.pdf (accessed 30/01/2004).

McQuaid M (ed.) (2002) *Envisioning Architecture: Drawings from the Museum of Modern Art*. The Museum of Modern Art, New York.

Moore PA (2001) Experiencing universal design. In *Universal Design Handbook* (Preiser WFE and Ostroff E (eds)). McGraw-Hill, New York, pp. 2.1–2.12.

Mueller J (1995) The case of universal design: if you can't use it, it is just art. *Ageing International* **22(1)**: 19–23.

Mumford E (2001) The emergence of mat or field buildings. In *Case: Le Corbusier's Venice Hospital and the Mat Building Revival* (Sarkis H, Allard P and Hyde T (eds)). Prestel, New York, pp. 48–66.

Neumann P and Uhlenkueken C (2001) Assistive technology and the barrier-free city: a case study from Germany. *Urban Studies* **38(2)**: 367–376.

New Fair Multi-Family Housing, The (1996) *A Design Primer to Assist in Understanding the Accessibility Guidelines of the Fair Housing Act*. North Carolina State University Press, North Carolina.

ODPM (Office of the Deputy Prime Minister) (2003) *Sustainable Communities: Building for the Future* (online). See http://www.communities.gov.uk/documents/communities/pdf/146289.pdf (accessed 23/12/2010).

ODPM (2005) *Planning Policy Statement 1: Delivering Sustainable Development* (online). See http://www.communities.gov.uk/planningandbuilding/publications/planningpolicystatement1/ (accessed 23/12/2010).

Ostroff E (2001) Universal design: the new paradigm. In *Universal Design Handbook* (Preiser WFE and Ostroff E (eds)). McGraw-Hill, New York, pp. 1.1–1.12.

Oxman R, Hadas S and Belferman E (2002) Casbah: a brief history of a design concept. *Urbanism* **6(4)**: 321–336.

Polese M and Stren R (eds) (2000) *The Social Sustainability of Cities: Diversity and the Management of Change*. University of Toronto Press, Toronto.

Sandhu J (2001) An integrated approach to universal design: toward the inclusion of all ages, cultures and diversity. In *Universal Design Handbook* (Preiser WFE and Ostroff E (eds)). McGraw-Hill, New York, pp. 3.1–3.13.

Sarkis H (2001) Introduction. In *Case: Le Corbusier's Venice Hospital and the Mat Building Revival* (Sarkis H, Allard P and Hyde T (eds)). Prestel, New York, pp. 12–17.

Sharp J, Pollock V and Paddison R (2005) Just art for a just city: public art and social inclusion in urban regeneration. *Urban Studies* **42(5–6)**: 1001–1023.

Smithson A (1974) How to recognize and read mat-building;

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mainstream architecture as it has developed towards the mat-building. *Architectural Design* **9 (September)**: 573–590.

Smithson A (2001) How to recognize and read mat building. In *Case: Le Corbusier's Venice Hospital and the Mat Building Revival* (Sarkis H, Allard P and Hyde T (eds.)). Prestel, New York, pp. 90–104.

Smithson A and Smithson P (2005) *The Charged Void: Urbanism*. Monicelli Press, New York.

Stein C (1976) Dinosaur cities. In *Planning the Fourth Migration* (Sussman C (ed.)). MIT Press, Cambridge, MA, pp. 65–74.

Talen E (2003) Measuring urbanism: issues in smart growth research. *Journal of Urban Design* **8(3)**: 195–215.

Tzonis A and Lefaivre L (1999) Beyond monuments, beyond zip-a-tone, into space/time. In *Free University, Berlin: Candilis, Josic Woods, Schiedhelm* (Feld G (ed.)). Architectural Association, London, pp. 118–141.

Vranken J (2003) *Social Inclusion, Urban Governance and Sustainability: Towards a Conceptual Framework*. Garant Publishers, Antwerp.

Wagner G (1999) Looking back towards the Free University, Berlin. In *Free University, Berlin: Candilis, Josic, Woods, Schiedhelm* (Feld G (ed.)). Architectural Association Press, London, pp. 14–23.

Waldheim C (2005) Landscape as urbanism. In *The Landscape Urbanism Reader* (Waldheim C (ed.)). Princeton, New York, pp. 35–55.

Wall A (1999) Programming the urban surface. In *Recovering Landscape: Essays in Contemporary Landscape Architecture* (Corner J (ed.)). Princeton, New York, pp. 233–249.

Weisman LK (2001) Creating the universally designed city: prospects for the new century. *Universal Design Handbook* (Preiser WFE and Ostroff E (eds)). McGraw-Hill, New York, pp. 69.1–69.19.

West 8 Architects (1996) *Borneo–Sporenburg*. See http://www.west8.nl/projects/all/borneo_sporenburg/ (accessed 09/03/2010).

Williams K, Burton E and Jenks M (eds) (2000) *Achieving Sustainable Urban Form*. E & FN Spon, London.