

Understanding Public Space Concepts as Key Elements of Sustainable Urban Design

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Abstract

Our paper focuses on two main observations. On the one hand, the form of human settlements play an important role in allowing (or not) a variety of situations, spaces and lifestyles. In the light of the new urban responsibilities of the sustainable paradigm, several are directly affected by the morphology structure of the city such as density, accessibility, permeability, centrality, mobility, urban sprawl, use of public spaces, energy efficiency, etc.

Therefore, it seems appropriate to analyze the existing 'good' urban spaces, products of urban history to guide professionals and urban designers to make public spaces more attractive and sustainable. This paper is based on urban morphology analysis, bioclimatic conditions and the consequent use of public spaces of three Mediterranean cities. Theoretically, this work focuses on the multiple uses of public spaces, often associated with "cultural reasons". This is also determined, or at least influenced, by the bioclimatic characteristics of these spaces. To develop this work, we decided upon a series of analyses that we would tackle, such as: (a) analysis of cartography of public spaces, (b) analysis of their uses (such as the routine use of the streets and squares as places to live and not as a mere place of passage), (c) analysis of climatic conditions prevailing in different seasons and their increase or decrease according to existing urban fabric.

Obviously, this study lies on the crossroads of several fields of knowledge. It discusses the concepts of eco-urban design and public space as generators for sustainable cities.

Keywords: *public space, urban design, sustainability, urban morphology, urban microclimate, social interaction*

1 Public Spaces and Sustainable Urban Design

This paper will debate two main issues: the city as the result of several processes of urbanization in light of urban models that have produced the physical space of cities like a patchwork resulting from philosophies, and especially a model of desired society. The urban models have shaped urban grain able to induce or challenge the role of social actors in their interactions, their manifestations in their daily lives - especially through movements and leisure. The modern movement, however, left deep marks in the physical space of the city and, of course, in the citizen's life. The insistence on grouped dwellings in towers, the zoning and the disappearance of streets, blocks and public spaces as such generate another type of city. The urban grain like figure-ground structure disappeared giving place to a great void - called "super quadras" - where architects have built "les Cités Radieuses". Social activities formerly carried out in the streets, squares and public spaces in general have become very weak as has the presence of people. The cities in terms of social exchanges disappear. This urban model has left the public spaces in the background, like the rest, the space between buildings. Commercial activities have migrated to shopping centres and urban entertainment has weakened.

As a result, contemporary architects and urban designers in their new projects try to create better places than those that have been produced in the recent past. The prospect of sustainable development is like a utopia that seeks to inhabit the planet otherwise, in the hope of developing a new society, more responsible, accountable and inclusive. As an urban model, the sustainable city seeks to go back and restore the role of the city as a place to live and not as an area to stack people. The principles of this model are about interaction and interdependence. They underline the responsibility to future generations and environment in which the concept of ethics plays a central role in the new approach. In light of these new concepts, we highlight the importance of downtown and city as the significant places of urban activities.

While urban sustainability's scope may be board and its boundaries often 'not clear', the heart of its concern is about making places for people to gather: this idea of 'living together' forms the essence of this paper. This concern leads to the second important matter: public urban spaces.

On this issue, the paper adopts a wide understanding on how city sustainability relies on the interaction of different characteristics of public spaces. According to Williams, Burton and Jenks (2000), a checklist of components or building blocks of sustainable form is established: urban size shape, density and compactness, urban block layout and size, housing type, green space distribution and various options such as intensification, extensification, decentralisation and new towns are explored.

Besides, in the objective to achieve more sustainable cities, public spaces play an important role in the climate control of the urban environment, through their opening to the sun and wind, through their green and wet areas. This control

affects near buildings, and furthermore the entire urban fabric. In this direction, several authors (Hunter and Mascarô (2008); Alexander (1977); Sattler (1992); Olgyay (2002)), defend the need for green areas or urban vegetation to ensure an urban microclimate which provides relaxation, human energy renovation and, eventually, physical and psychological health.

Another concern is about seeing urban design as more than simply the physical and visual form of development, and as “an integrative and integrating activity” (Carmona, 2003). Indeed, the vitality of the urban space depends on the overlapping activities. Therefore to understand cities, it is required to deal with combinations of uses as the ‘essential phenomena’ (Jacobs, cited by Carmona, 2003, p.180). The role of urban design is not just to manipulate form to make space as is done nowadays but to produce places through a synthesis of the components of the total environment: architecture, urban morphology, urban gathering, climate conditions and culture. Urban design now is aimed to be based on an “ecological approach” (term of Ian Mcharg, cited by Trancik, 1986) to make places which are derived from minimal interference in the social, environment and physical setting. So, the use of public spaces in the case studies can illustrate how the urban model, morphology and bioclimatic conditions can influence the quality of these spaces.

The aim for the future, therefore, is to design cities and urban places to work well, to be enjoyable and to have a positive environmental impact. In this sense, among those who are thinking on this issue, Breheny (1992), Evans et al. (2001), URBED (1997), Bentley (1990), Barton (1996), Haughton and Hunter (1994), Rogers (2000) and others have suggested concepts and strategies for sustainable development design. They all share main ideas: open space to improve health, quality of life and human contact; a framework of streets and squares; planting and landscape to ameliorate pollution; mixed uses and mixed forms; permeability; legibility; vitality; distinctiveness in landscape and culture; sense of place mixing new with old; public transport nodes; town centres revived; resilience and robustness; energy efficiency in using natural resources such as solar energy; concentration around movement to reduce travel; participation.

Providing an introduction to the concept of sustainable urban design, this paper is presented in three chapters. The first discusses the methodology of analysis. The second chapter focuses on case studies. Finally, the last chapter highlights the importance of public space in urban design. This paper is aimed to put forward key elements for city sustainability as thoughts for contemporary sustainable urban design.

2 Methodology

As regards social, environment and economic dimensions of sustainability, the methodology consists of exploring physical, environmental and social dimensions of three places according to their localization in the urban structure and their intensive uses. It is important to assess the various components of these

places in order to understand what makes them attractive and easily identifiable. The robustness in terms of their ability to support different uses and to offer a strong image to the city is the main concept of sustainability.

As far as urban design is concerned, the assessment also looks at a larger scale, working at a regional level. Indeed, examining three cities on both sides of the Mediterranean area (i.e. *Montpellier, Aix en Provence and Oran*) provides more knowledge on social and cultural relations between spaces and society.

The research methods are rooted on both iconographical and literature documents and direct observations. The data collected on each place included: morphological, perception and visual, social, functional and temporal dimensions. The analysis is based on theoretical frameworks which mainly focus on Trancik (1986), Carmona (2003) and Moughtin (2003) urban design and public space theories.

In fine, studying three major squares in each city could convey rich insights into how inner city core concepts could provide more sustainable urban space.

3 Case Studies

The squares examined in Montpellier, Aix-en-Provence (presented in the grid only) and Oran, are significant public realms which contribute to the urban dynamic and play different roles in the urban structure.

3.1 City of Montpellier (France)

3.1.1 Place de la Canourgue

Place de la Canourgue is one of the oldest squares in the city. It symbolizes an aristocratic past which the city likes to glorify as a part of its heritage. The space is quiet and remarkable like the façades which surround it on three sides. The fourth side on the north finishes in a terrace protected by an ironwork balustrade. The square overlooks a narrow escarped street leading to the Saint Pierre Cathedral. The centre of the square is occupied by a geometrical garden which ends with the fountain of “Licornes” statue. It constitutes the main decorative element of the space. A significant 18th century mansion building, now used as Courthouse annex, stands out from the whole area. One café and one restaurant situated on each side of the square extend their activity to the edge of the central garden which limits the use of the square. Very few shops and passers-by characterize this place which, from time to time, is disturbed by tourist groups who come to visit the square and mansions.

As regards the bioclimatic and the social practice analysis, this square is characterized by a solar position oriented northeast - southwest. In addition the height of the buildings make this square alternately half shaded except the northeast side, where the fountain is located – this receives a southerly sun – to develop some activities such as relaxation. Urban furniture such as benches seem to be arranged only on the sunny side – the comfortable part for winter activities

– which allow strollers, often students from surrounding colleges, to wander and relax. The inclusion of the square in a dense urban area protects users from wind and strong sunshine.

3.1.2 Place de la Comédie

Place de la Comédie is the major land mark of the city of Montpellier, but its importance stretches even further. It constitutes the heart of Languedoc region. Closed on its south-west side by a significant theatre building, this square is set as huge décor in the centre of the city. The facades which surround it are of exuberant 19th century neo-classical architecture whereas in its middle stand the “Trois Graces” fountain. The square is paved across its whole surface providing enough space for cafés and restaurant terraces to extend beyond their edges. Meanwhile the central walkway is left for pedestrians to move on between three main urban functions: the highly commercial pedestrian streets of the medieval city, the modern commercial building centre of the Polygone and the remarkable city park of the Champs de Mars. A permanent carousel and small tourist trains crossing the place enhance the pleasant dimension of the space. The tramway which passes along its southern edge reinforces its centrality. The Comédie is where everything converges but where one can move from a social vibrant scene of the mineral place to a social quiet space of the green Champs de Mars Park. This contrast endows the square and thus the city with a strong identity.

Regarding the great size and orientation of space, the place is exposed to severe wind conditions in the winter and hot sun exposure in the summer; both allow different uses and different geographic concentrations of people in different seasons.

3.1.3 Place Jean Jaures

In the centre of the medieval Ecusson, the square Jean Jaures whose statue embellishes its centre, contributes strongly to the urban dynamic. Surrounded mainly by “trendy” bars and cafés which occupy the entire square with their terraces, it is mainly used by young people from upper and middle class society. Approximately triangular in shape, it is tightly inserted into the medieval urban fabric. It’s perceived as it is closed on two sides whereas its third side is open to the main shopping street giving opportunities for watching people passing, called “passive engagement” by Whyte (1988, p.13). In addition, this condition is promoted by the solar position that exposes the place to the sun in the winter.

According to Zukher (1959) principles, the square constitutes a positive urban void which brings comfort for people using it. This comfort is enhanced by the range of trees which envelope the place and ensure the necessary shade for functions and leisure during hot months. Above all, this position, tightly near the main axes and protected from direct wind, is a major factor of fixation of passive urban activities as suggested by Mascaro (1996).

3.2 City of Oran (Algeria)

The process of conquest of urban space which formerly corresponded to other practices - those from the European culture - is a major issue for understanding the imagination involved in the construction of the ideal of 'preserving the historic city ' as a key element of city sustainability.

3.2.1 Place du 1st November 1954

Place du 1st November 1954 is the most important and monumental square of the city. Its great size, position and urban layout, make it a central focal point. Moreover, two significant buildings, the civic hall and the theatre of 19th century neo-classical architecture, provide the place with a strong image. It has come to symbolize the city and glorifies the Algerian revolution. Approximately square in shape, it is surrounded by four busy streets which isolate it from pedestrian movement. Nevertheless, the imposing fountain and obelisk in the middle of the square attract few people inside the space, especially those who want to visit it. The presence of benches allows old people particularly to rest and enjoy the place whereas the rest of the free space is used as a football playground for children and as terraces for two cafés located at the edge of the square.

The variety of land uses and activities depends on climate conditions. According to the site orientation, the square receives the maximum sunlight in the afternoon so that it is less used in the morning when the square is half shaded in the winter period. On the contrary, in the summer, it is used in the morning and particularly at the end of the day when it is cooler. The great fountain reinforces this atmosphere.

3.2.2 Place du Maghreb

Place du Maghreb seems to be designed to provide a framework for the Great post-office of Art Nouveau architectural style and the neo-classical Grand Hotel, as well as a square for the Holy Spirit Church. The square is of rectangular shape and modest proportions. Surrounded by traffic filled streets, it is defined by imposing rows of ficus trees. The central part is occupied by a circular flower bed and two rows of three palms. The building walls which enclose the square vary between four and six floors and give a relatively intimate feel to the space. This square is perceived as an enclosed space. Indeed, although the four corners of the square are open, the streets are so narrow that the eye-view does not escape out of the space.

Social practices of the square are influenced by the surrounding activities and by the way it is furnished. The expansion of commercial and service activities, especially the market of Aurès street, is deployed on the periphery of the square. Four multi kiosks, telephone boxes and public toilets share this space already provided with significant rows of trees and vegetal beds. This space, apparently crowded, has made the central part of the place inaccessible. It has become an area used mainly by "marginal people". In addition, the overshadowing of the space has emphasized its isolation.

3.2.3 Place Jeanne d'Arc

This square is built to serve as a forecourt to the "Sacré Coeur" Cathedral of Romano- Byzantin architectural style and as a framework for the equestrian statue of Jeanne d'Arc. Of rectangular shape, it is structured by two lateral traffic lanes connecting two main streets. It is bordered to the south by the cathedral which was converted into a municipal library in mid-1980s, to the north and east by a range of residential plots of three to four floors. The west is occupied by a garden of an outstanding cultural building. It is framed by two rows of ficus trees. The central part contains a small green area which is surrounded by four palm trees and where the statue of Jeanne d'Arc used to stand before the French moved it soon after independence.

Today, social practices are mainly related to the new function of the cathedral. The square is filled with constant users, especially young students. In the light of this new practice, extensions of commercial and leisure activities around have been observed. Indeed, a café terrace extends into the forecourt and two multi-service kiosks were added. The magnificent staircase of the cathedral offers the opportunity for students to relax. The west-facing cathedral's principal façade and the south and west facing the square, expose the space to maximum sunlight. This condition is balanced with rows of trees which provide a degree of shade in the summer and attenuate wind pace.

4 The Place of Public Space in Urban Design

4.1 The morphological and visual attributes

The configuration of urban form of the examined squares is referred to as 'traditional' urban space. It consists of urban blocks which define and enclose outdoor space. As ingredient elements in urban blocks, the building coverage is dense, thus giving shape to streets and squares. "Land uses, building structures, plot pattern and street pattern" are considered as the most important key elements of settlements (Conzen cited by Carmona, 2003, p.61). Buildings in the centre of different cities show the evidence of their narrow plots fronting a public space. Defined edges and forms, and diversity at street level, enhance their presence. Krier (1980) argues that "an outdoor space can be experienced as being an urban space only if it has legible geometrical and aesthetical characteristics" (p.6). Furthermore, each place has distinctive types of solids and voids which helps their perception; they are easily identifiable. This refers to the notion of 'imageability' quoted by Lynch (1960) and defined as "that quality in a physical object which gives it a high probability of evoking a strong image in any given observer" (p.9).

Both Canourgue and Jean-Jaures constitute positive urban voids because they are surrounded by a horizontal building mass where buildings are strongly tied and where the space looks like it is carved out of the mass. This physical arrangement creates a sense of spatial containment or focus (Booth cited by Carmona, 2003, p.139). On the contrary, in the case of the Comedie, the

perimeter of spaces and blocks are less articulated to establish a positive outdoor space. However, total enclosure is not the only quality of public space. 'Dominated' figures according to Zucker's archetypal shapes and a 'broad' space quoted by Sitte, could convey a strong sense of place. Indeed, the Comedie is dominated by both the theatre and the continuous and imposed neo-classical architectural walls which bring strong "imagibility" to the space and thus reinforce the sense of place. In addition, the central position where everything converges makes the square exceptionally permeable and accessible which endows it with a strong legibility.

Statues, fountains or other temporal decorative urban objects are significant landmarks which provide a sense of identity and character. Alexander and al. (1977) quote that "a square without a centre is quite likely to stay empty" (p.606). However, their size and position are important in terms of perception as focal points for people to gather. Indeed, such urban pieces can prompt the development of 'triangulation', a concept defined by Wythe (1988) as "the process by which some external stimulus provides a linkage between people and prompts strangers to talk to other strangers as if they knew each other" (p.94).

In this sense, the 'Trois Graces' of the Comedie allows opportunities for contact. Indeed, the symbolic, the imposed size and the central position of this fountain make it a significant meeting place for people of Montpellier. It seems to be a 'good' conducive for social interaction. However, the Jean-Jaures statue, even if it stands in the middle of the space, it is less perceived. Its small size and dark colour seem to be the main reasons. It fades into the background with the seated people and the colour of the paving.

4.2 The social and climatic conditions as attributes to sustainability

Place theory as suggested by Trancik (1986) represents one of three main principles of urban design theories. He argued that:

"The essence of place theory in spatial design lies in understanding the cultural and human characteristics of physical space. If in abstract, physical terms, space is a bounded or purposeful void with the potential of physically linking things, it only becomes place when it is given a contextual meaning derived from cultural or regional content" (p.112).

This quotation demonstrates that space and society are strongly related. Understanding the relationship between people and their environment is an important issue in urban design.

The social practices analysis reveals several levels of social dynamic in action, all different in terms of diversity, quantitative and temporal use. The symbolic and central places such as Comedie, Mirabeau and 1st November accommodate multiple users: those who stroll or cross to access different activities and streets around, those who, as tourists, visit and discover the city and its monuments, those who wait, near landmarks, for friends or relatives and those who sit in terraces adjacent to pedestrian flow, sipping a drink or meal and practicing

people-watching. The opportunities “allowing observers to watch people while avoiding eye contact” (Carmona, 2003, p.166) called “passive engagement” by Whyte (1988) are also provided by fountains, views, street arts and entertainment.

In addition, the two squares of Comedie and Mirabeau are punctuated by temporal, sometimes informal, commercial, entertaining, religious, cultural, sport, advertising, political and social gathering events which allow people to take part. These ‘active engagement’ provides opportunities for contact and social interaction.

The use of public spaces is dependent on their quality. This includes clearly their position in the urban grain, their hierarchy in urban activities and their bioclimatic condition. The quality of these spaces is closely related to their morphological build in the urban fabric, the environment structure and finally the type of paving, vegetations or urban furniture generating different bioclimatic in public spaces. In this sense, Hunter and Mascaró (2008), defend that the vegetation affects aesthetic and functional alterations which are related to a natural renovation process that allows diversity of textures, structures, colours and many forms throughout the year. These changes are able to alter the city aspects and urban microclimate such as solar irradiation and temperature, air humidity level and action of wind and rain. For the authors, the vegetation in urban public spaces contributes to physical and mental health through their uses for recreation.

In addition, the physical dimensions like width and length of public space in relation to the average height of its buildings are also responsible for the intensity and the amount of sunshine and wind pace inside. To illustrate this point, Mascaró (1996) demonstrates how the relationship between builds and voids urban design is capable of generating differences in urban microclimate, specially the movements and intensity of the wind. Urban morphology can produce effects of pipeline, deflection, obstruction and wind filtering, moisture and sun penetration.

Indeed, the length of time people stay in a public space is good indicator of its comfort. In this sense, some squares are better used than others. For example Mirabeau seems to be better socially used than Comedie or 1st November. The place of Mirabeau overlapped several elements: sufficient enclosure and dimensions with two long architectural façades, average surrounding heights, double row of trees, three fountains, and rough paving. These components make people stay longer and enjoy the place, especially on the north side where the northern façade receives maximum sunlight and where the main cafés and restaurant terraces are located.

Whereas the Comedie is provided with great dimensions and less enclosures, less vegetation, less urban furniture and bright paving which makes citizens stay less time because they are exposed to extreme climate conditions. This lack of microclimate is, however, balanced by owner’s actions like providing light-coloured roofs which cover cafés and restaurant terraces to protect either from

hot sunshine in the summer and strong wind in the winter and give a coloured contrast to intense sunlight.

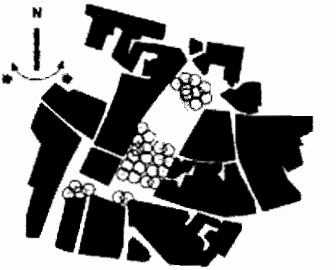
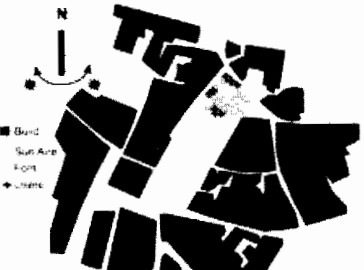

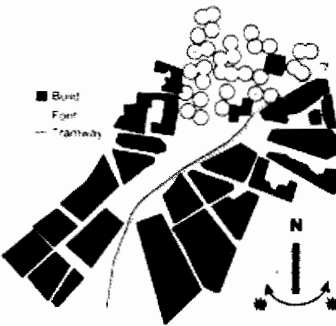


4.3 From inherited squares to the “invention” of public spaces in Oran

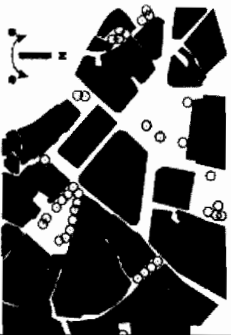


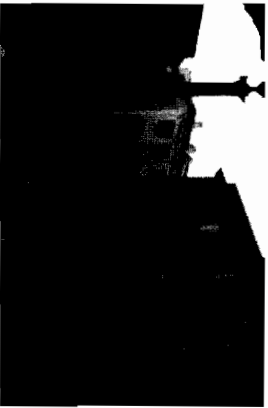
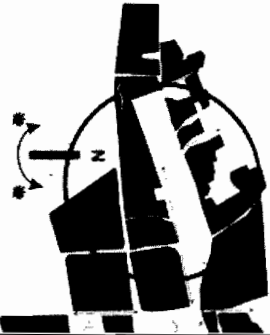
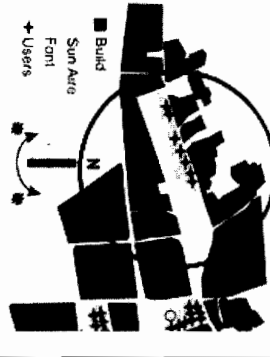
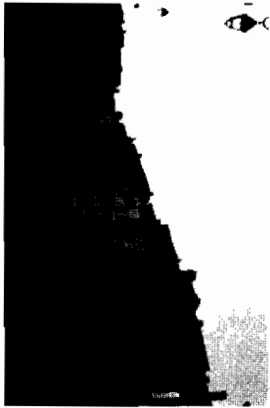
At first sight gathering and enjoying places seems to be much more related to north Mediterranean tradition than the southern part. This assumption is largely shared by theorists. In this sense, Navez-Bouchanine (1992-1993) asked in one of her papers: "Is there any public space in the Moroccan cities? (p.185). This question shows the importance in taking a distance from the "wisdom" referring to the idea that cities in the Arab world are poor in public places.

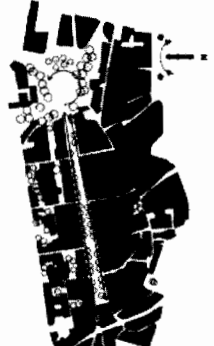


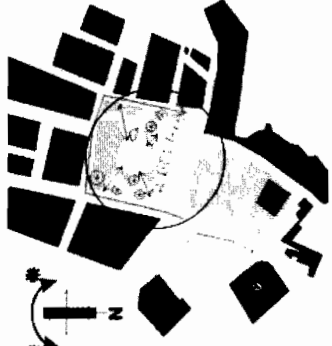
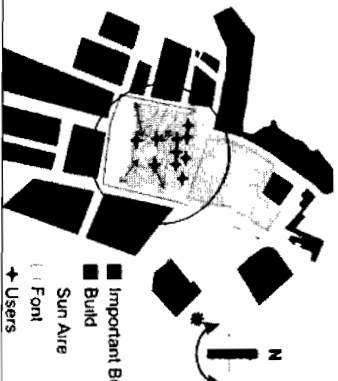

Squares in Oran are obviously used socially. However, fine observation illustrates that they are mainly used by poor people coming from nearby neighbourhoods, when no commercial and service activities are available to provide social mix. Indeed, upper and middle class people don't use these places. Our point view is that has nothing to do with culture. It can be explained by the lack of diversity of activities, modernization of space and pedestrian space which are considered as main ingredients for public space to be enjoyable.

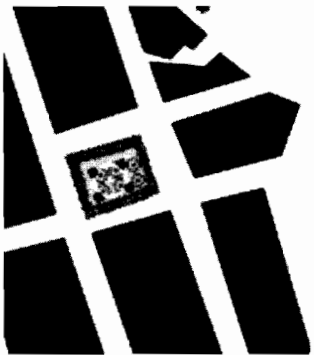
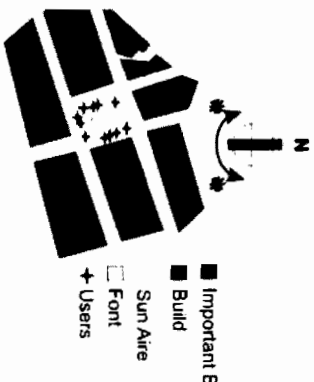




Despite their colonial origin, the central public squares in Oran are now places of consensus for all city stakeholders and residents. The conquest by the State (national) of squares and spatial objects inherited from the colonial period shows the willingness to re-create "places of memory" which are involved in "national imaginary". In this sense, the example of the appropriation of La Place du 1st November 1954 is particularly significant. Located at the junction of the Lower Town and Upper Town, its new name of 1st November 1954 (date of onset of the Algerian Revolution) and its redevelopment after independence tell us about the quest of Algerian society to develop landmarks, symbolic spaces and squares where to build new urban identities. The obelisk in the centre of the square, which is surmounted by a winged glory, appealing to French conquest, was carved at its base with the portrait of Emir Abdelkader, an emblematic figure of the Algerian resistance. The sustainability of buildings and the juxtaposition of symbols can be interpreted as evidence which reconcile the multiple legacies. This can be considered as progressive social adjustment on the colonial city and its public spaces.

Table: Squares analysis

<i>City/ public space</i>	<i>Urban morphology</i>	<i>Bioclimatic condition & use</i>	<i>Illustration</i>
<p><i>Montpellier</i> <i>Place de la Canourgue</i></p>		 <ul style="list-style-type: none"> ■ Build ■ Sun Area □ Foot → Users 	
<p><i>Montpellier</i> <i>Place de la Comédie</i></p>	 <ul style="list-style-type: none"> ■ Build □ Foot — Tramway 	 <ul style="list-style-type: none"> → Users ■ Build ■ Sun Area ▲ Pedestrian movement 	

<p><i>Montpellier</i> <i>Place Jean Jaures</i></p>			
<p><i>Aix-en-Provence</i> <i>Place de l'Hôtel de Ville</i></p>			
<p><i>Aix-en-Provence</i> <i>Place du Cardeur</i></p>			

<p><i>Avignon Provence Cours Mirabeau</i></p>			
<p>Orni <i>Place du 1^{er} Novembre 1954</i></p>		 <p> ■ Important Bu ■ Build Sun Acre Font + Users </p>	

<p>Orani <i>Place du Maghreb</i></p>			
<p>Orani <i>Place Jeanne d'Arc</i></p>			

5 Towards Future Sustainable Urban Design

There is a broad belief in that the sustainable city is not rooted in an idealized version of past settlements. Nevertheless, several attributes derived from inner city core can be exploited like morphological, perception and visual, social, functional and temporal characteristics of existing public spaces so that better places can be created. Many studies and debates on sustainability development have underlined how the ignoring of essential urban design considerations such as links, accessibility and mixed uses, can result in producing less sustainable, less socially equitable, and less economically viable urban forms.

In this direction, a balance must be looked for between achieving enclosure, and considerations such as permeability, legibility, and accessibility, which influence how well the space is used (Bentley et al., 1985). As put forward by Masbounqi (2008, p.139) urban design is the link, and the link, is the public space. Furthermore, a 'good' arrangement of different elements such as trees, sculptures, fountains, benches, transportation stops leads to better social use of public space. The analysis of squares shows how triangulation happens where there is something of interest. As suggested by Whyte (in Carmona, 2003, p.167), a sculpture, for example, creates a pretext for people to talk to one another.

Microclimate is another important matter to produce more comfortable spaces. This issue is however neglected in urban design. Designing for sun and shade to ensure good sunlight penetration and wind protection into urban places encourages outdoor activities and provides a free, readily natural source of energy (Carmona, 2003, p.185).

Successful public spaces support and facilitate activities and social interactions. Squares analysis can help to improve the existing ones or construct 'better' public spaces bearing in mind that it is possible to achieve quality and comfort without any additional cost. Since the structure of urban places matters, types of urban form have to be rethought and reviewed. The analysis showed that there is an obvious relationship between spatial and physical characteristics of city, and its social, functional and environmental qualities.

Regarding this new paradigm, it is important to highlight the key elements for a sustainable city. These are about looking at more than one attribute. The synergy and interaction between attributes should always be present in designing cities. As suggested by Kettaf and Gaïd (2007), "Today, it seems clear that environment sustainability encourages the retention of open space and valued habitats, thus enhancing social interaction" (p.1373).

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