Method for Assessing the Urban Comfort of Use in the Public Squares in Annaba -Algeria-

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Abstract

This reflection proposes to define a method of evaluation of urban comfort of use "ME UCU" in the public places, constituting a tool of aid to the decision and the design. The search for urban comfort in general is doubly inscribed in the sustainable urban development approach as well as in the political will of the country like Algeria, which dates back more than 20 years. The application of the intermediate phase method on the construction program of the public squares in Annaba – Town of eastern Algeria - is based on a best reading grid made up of evaluation indicators representative of the urban comfort of use in public places. It highlights the failures of the projects already carried out; and on the other hand, it improves the practices of the architectural design of public squares.

Keywords: urban comfort, public squares, sustainable urban development, best reading grid.

1. Introduction

While the design of public spaces in Algeria does not fully satisfy users in the absence of a frame of reference and an appropriate charter, we note the relative poverty of measurement tools to assess their comfort or quality.

In this modest reflection, our goal is to establish a simple decision-making and design tool to evaluate the level of comfort and even the quality of public spaces within the framework of a voluntarist policy and a national conscience that of to include Algerian cities in the context of sustainable development. Therefore, we propose a method of evaluation of urban comfort of use of public places “ME UCU” which is based on a grid of criteria and indicators of evaluation of urban comfort of uses of public places, scientifically valid and able to help designers, decision-makers and managers in their choices, from a perspective of sustainable urban development.

First, we present the ME UCU, applied for the exercise in the case of the public places created as part of the urban improvement9 in Annaba - Town of eastern Algeria. In a second step, we highlight the

9 The ongoing urban improvement operation was born from the national awareness of the consequences of a deterioration in the quality of life of urban populations and by extending the

conclusions of our analysis on the level of the urban comfort of use and put forward the contributions and the limits of the analytical efficiency of our method.

2.The method for assessing "ME UCU"

The implementation of the ME UCU multicriteria analysis method follows five steps: (1) to exceed the conceptual cleavage of the urban comfort of use to propose an applied research approach, (2) anchoring of the method in a repository of objectives from which a grid of dimensions, (3) choice of statistical indicators allowing to quantify these dimensions, (4) attribution of a value (note) for each indicator, (5) choice of a method of representation of the results.

2.1 Exceed conceptual cleavage of urban comfort of use:

At first, the definition of urban comfort of use arises as a milestone in the construction of the ME UCU. This step will distinguish this form of comfort from other forms such as thermal, acoustic and visual.

During the last decade, the assessment of urban comfort of the human being was much more closely linked to the climatic changes that were affecting and still affecting urban spaces (Radhi, 2013) & (Cotana, 2014).

However, research on urban spaces where many design standards and technological solutions are proposed, still focuses on the three forms of comfort: thermal, acoustic and visual (Castellani, 2014) & (Frascarolo, 2014).

A large number of these studies study urban comfort especially what is relative with the bioclimatic methods that consider the microclimate as an important factor in the use of space (Swaid, 1993), (Nikolopoulou, 2003) & (Spagnolo, 2003).

Therefore, a great deal of attention always focuses on the thermal aspects with the implication of the questions on the acoustic and visual aspects which all relate to the use and the activities that can have

challenges of sustainable urban development. This localized operation is in fact part of a national policy aimed at an urban transition of Algerian cities towards a qualitative development (Law n ° 10 -02, bearing the approval of the national spatial planning 2030); To do this, it mobilized institutional, legal and financial resources to make urban improvement operations successful. In this sense, the urban improvement operation was initiated to overcome the shortcomings of previous development policies. It is a response to this new global and national awareness of the environmental issue.

within the public space (Rossi,2015). These aspects are decisive in the degree of use, the forms and the performances of the activities (Cervera, 1999) & (Zacharias, 2001).

Nevertheless, we can not limit the degree of use as well as the performance of activities related to outdoor spaces as on acoustics, thermal or visual. There is another form, dependent on others, and strongly related to the use10.

The comfort of use is shared mainly between the physiological dimension which it calls on the kinesthetic comfort (Van Galen, 2007), and the quality of the space to be invited upstream and to supervise the smooth running and diversity of activities that lead to downstream recreation (Gehl, 2010).

This definition will make it possible to frame the ME UCU evaluation method in order to facilitate the use and increase the performance of the results. The dimensions and indicators defined later will thus be included in the field of kinesthetic comfort, including the quality of the spatial framework in which it takes part in the world of use.

2.2 Definition of a system of objectives and choice of a grid of dimensions

In a second step, the strategic objectives of the planning policy must be set. In itself, the ME UCU evaluation method does not carry a pre-established normative reference setting the conditions of an acceptable level of urban comfort: it is not a question of proposing a final, fixed evaluation grid, transposable to any local context, a position that would be open to criticism of the paternalism of scientific evaluation (SEN,1995).

In this research note, we anchor our approach on some of the themes of sustainable urban development11 related to public spaces, highlighted by a legal and instrumental arsenal:

10 Use includes any social activity : necessary, optional, social. These main acts are : talking / chatting, sitting down, standing, walking, listening, watching people and what's happening on the spot ; they all converge towards contact and exchange (Gehl, 2010).

11 Dating back to the year 2000, inscribed mainly in a voluntarist policy and a global conscious, the Algerian state aims to ensure the passage of the cities towards the threshold of the quality, the attractiveness, the competitiveness able to answer the needs of their users [Law n ° 01-02 / Law n ° 10-02]

a. Promote the attractiveness of the territory through the public space (Local Agenda 21 / Law n ° 06-06 art 9 / Territorial development plan PAT Annaba 2012 – Territorial action plan PAT n ° 01 / law n ° 10-02 - Territorial action plan PAT n ° 18),
b. improve the local environment through public spaces (law n ° 03-10 / law n ° 01-20, law n ° 10-02 / Territorial development plan PAT Annaba 2012 phase III),
c. Take care of the use in public spaces through the creation of a new organisation "the national observatory" whose purpose is the census and the evaluation (law n ° 06-06 art.26 / executive decree n ° 07 -05 art.02-05).

In order to inform these themes, we crossed the criteria coming from different approaches and references:

- Entry by the "universal actors": identification of criteria resulting from the state of knowledge (review of the scientific literature on the subject).
- Entry by the public space development guides (Pochon, 2012), (Broto, 2012) & (Gyejacquot, 2015) who propose dashboards of public spaces in a development project.
- Entry by local goals. In the case of Annaba, these objectives are determined after consultation with local planning documents: Urban Consistency Scheme (urban coherence schemata SCU), Wilayat d'Annaba Development Plan (WADP) 2012, Master Plan for Urban Planning and Development (PUPD) of Annaba 2008.

2.3 Assessment method of urban comfort of use of public places:

Based on these pluralistic approaches, we derive a short list of dimensions based on the frequency of their occurrence in the various sources. This choice of a short list of criteria is explained by the desire to facilitate the implementation of the ME UCU.

In this case (evaluation of the urban comfort of use associated with the public squares of the city of Annaba, we retain seven dimensions (see Table 1).

Table 1. The dimensions of urban comfort of use relating to legal and instrumental aspects

Sustainable Urban Development Themes Related to Public Spaces	*Main criteria*	*Dimensions*
• Promote the attractiveness of the territory through the public space	Degree of enclosure	Accessibility
	Accessibility for people with reduced mobility	
	Urban furniture	Ergonomics
		Security
		Hygiene
	The quality of the views	Visual perception
	the occupation of the ground floor	
	Sources of nuisance	The level of sound
	climatological condition (temperature, air and humidity)	Thermal comfort
• Improve the local environment through public spaces	Maintain	Hygiene
	Waste management	
	urban furniture	
• Treat the uses on the scale of public spaces	Urban comfort	This dimension encompasses the six dimensions mentioned below

2.4 Choice of statistical indicators specifying the dimensions

This step consists of translating the urban comfort of use as defined by these dimensions into measurable indicators, which are quality evaluation tools to meet sustainable development objectives in urban improvement projects. They make it possible to measure and evaluate the projects of places already realized.

The approach followed consists in establishing a matrix of indicators of evaluation of the urban comfort of use. In the case of the evaluation of the urban comfort of use associated with the public places in Annaba, we retain 21 indicators. These indicators must meet the objectives mentioned (see table .2) :

Table 2. The objectives relating to indicators of dimensions of urban comfort of use

Dimensions	**Goals**
1. Ergonomics	• Ensure primary use that fulfills a variety of sitting positions, • Satisfy the majority of users, • Fight against vandalism, • Reduce thermal effects,
2. Security	• protect users and space against parking, • Protect the users who sit down from injuries generally due to the structure and method of fixation of the public benches: Rupture of seat; Tipping following a loosening; Injuries on cut or splinters; Fingers or limbs stuck, pinched. • install a signaling and identification system distributed throughout the space, • Establish nightlife.
3. Hygiene	• Reduce odor nuisances, • Avoid waste processing, • Guarantee accessibility and cleanliness, • Ensure olfactory comfort, • Ensure durability of the components of space,
4. Accessibility	• Promote accessibility for all, • Reconcile use with people with reduced mobility (PRM)
5. Visual perception	• Promote a quality architecture, • Promote animation on the scale of the ground floor, • Reinforce the views with a well-studied urban furniture location,
6. The level of sound	• Reduce the sources of nuisances,
7. Thermal comfort	• Promote the use of green spaces, • Study the location, the material and the structure of the urban furniture of rest with respect to the climatic conditions,

2.5 Rating and values of indicators

After the indicators have been defined, they must be measured. The quantitative evaluation of the indicators makes it possible to identify comfort and discomfort thresholds in order to score the public place according to a rating scale.

In order to carry out the evaluations, each indicator has a qualitative and quantitative unit of measure. We use the nominal scale where we introduce presence-absence equivalent 1-0 (the value 1 means positive / existence / efficient, and the value 0 means negative / absence / low performance) according to Chancerel (1988) & Erahimzadeh (2016). The weight of each indicator is 01 (Angers, 1997) & (Talavera- Garcia, 2015).

The scoring exercise is, in essence, a subjective exercise, but one that is necessarily based on description, simulation, measurement and calculation. Once established, the "rated" value of the statistical indicators must be compared to a reference value (ratios, standards, examples, etc.).

For this, we need a multi-source repository from different bibliographic research and webographies, which will serve as a guide to urban comfort of use according to the dimensions and indicators selected.

2.6 Representation of results

The representation of all the results is done in graphical form of "radar" type. This presentation makes it possible to visually compare the levels of urban comfort of use of the various public places studied, in order to highlight its strengths and the aspects of its design, which should be improved.

3. Application of the case study method

3.1 Presentation of the case studies

Looking more closely at the public squares in Annaba, the capital city, there are three periods of evolution: pre-colonial, colonial and postcolonial. Each period has these own physical rules and social codes.

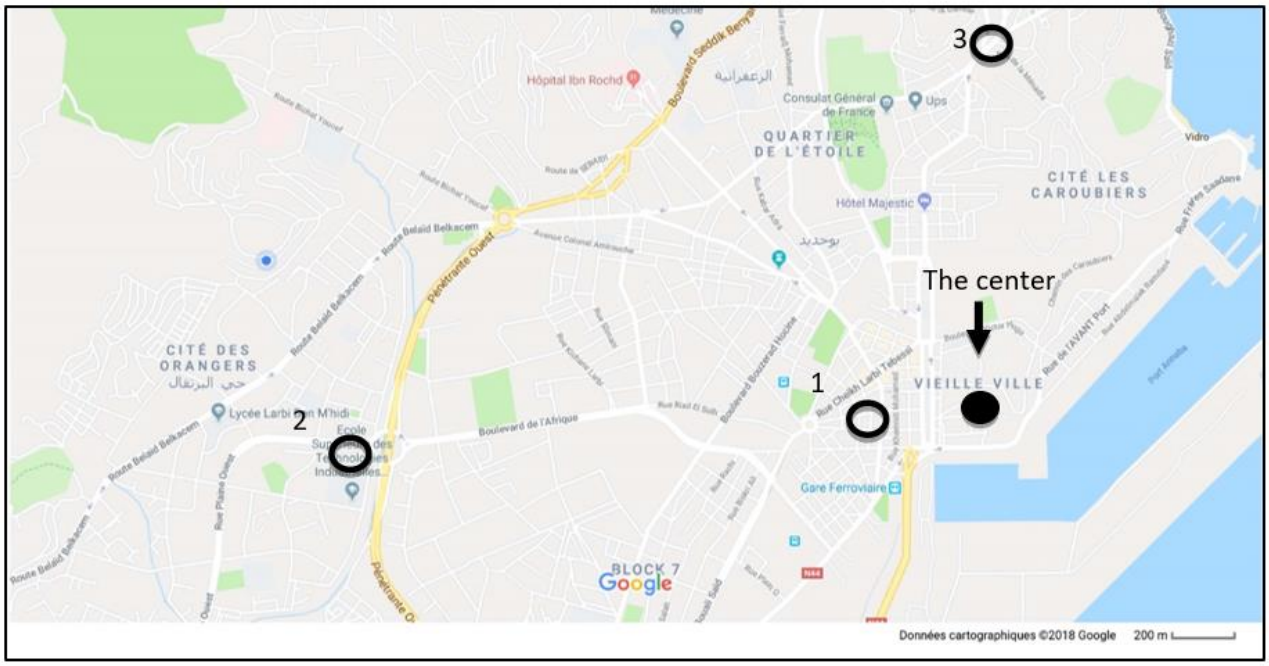
The majority of the postcolonial postings are carried out as part of the urban improvement operation launched in 2005. It seeks to respond to this new national and global awareness of the quality of life in general and the concerns city dwellers for their living environment in particular.

Compared to their location, there are three types of public places in relation to the functions: 50% public residential places, 33.33% public tourist places and public places for recreation 16.67% of all places built as part of urban improvement (see table.3).

Table 3. Characteristics of study cases

Study cases	Area (m²)	Degree of enclosure (%)	Average attendance rate (pers / day)12
1. *Theater's public place*	430	25.90	37
2. *The place of the 50 housing OPGI*	1509.4	56.04	56
3. *Menadia's public place*	820	88.92	37

The choice of samples was based mainly on the one hand the choice of a prototype of each existing function (tourist, residential and walk), and secondly the choice by the random method for the places of the same functions. This is the place of the theater (1), the place of 50 housing OPGI (2) and the public square Menadia (3) (see following plan 1).



Plan 1. Location plan (according to Google Map 2018).

12 These results are based on an ethnographic observation conducted in 2018 and included in a doctoral thesis in science still in progress.

3.2 Project evaluation and results

Tables 4, 5 and 6 below present the dimensions and indicators used in the application of the ME UCU method to selected public places. It should be noted that the constraints of locally accessible data must be taken into account in the selection of indicators, which must be accessible, available, measurable and legible, and must reflect the challenges of sustainable development and express the objectives to achieve urban comfort of use. In the end, we retain seven dimensions and 21 indicators.

Table 4. Evaluation of theater public place.

Dimensions	Indicators	Value of the indicator	Value (%)
1. *Ergonomics*	Satisfy the majority of users,	**10**	**66.67**
	Physical satisfaction: shape and size of the rest furniture		
	materials resistant to vandalism		
2. *Security*	Presence of security furniture	**06**	**75**
	How to fix the rest furniture		
	Functional lighting furniture		
	Presence of plant screens		
3. *Hygiene*	Composition and capacity of hygiene furniture	**05**	**71.42**
	Visibility of hygiene furniture		
4. *Accessibility*	Presence of path	**01**	**50**
	Accessibility to the people with reduced mobility		
5. *Visual perception*	The degree of openness of space	**3.5**	**87.50**
	Pedestrian and mechanical traffic rate		
	Occupation of the ground floor		
	The quality of visibility opposite to the rest furniture		
6. *The level of sound*	Presence of insulators	**02**	**60**
	The sound quality of the surrounding urban functions		
7. *Thermal comfort*	Conductivity of building materials to heat	**01.50**	**37.5**
	The shape, location, color and structure of the rest furniture		
	Mineral space / green space report		

Table 5. Evaluation of the public place of 50 dwellings OPGI.

Dimensions	Indicators	Value of the indicator	Value (%)
1. *Ergonomics*	Satisfy the majority of users,	**09**	**60**
	Physical satisfaction: shape and size of the rest furniture		
	materials resistant to vandalism		
2. *Security*	Presence of security furniture	**07**	**87.50**
	How to fix the rest furniture		
	Functional lighting furniture		
	Presence of plant screens		
3. *Hygiene*	Composition and capacity of hygiene furniture	**04**	**51.14**
	Visibility of hygiene furniture		
4. *Accessibility*	Presence of path	**01**	**50**
	Accessibility to the people with reduced mobility		
5. *Visual perception*	The degree of openness of space	**01**	**25**
	Pedestrian and mechanical traffic rate		
	Occupation of the ground floor		
	The quality of visibility opposite to the rest furniture		
6. *The level of sound*	Presence of insulators	**02**	**60**
	The sound quality of the surrounding urban functions		
7. *Thermal comfort*	Conductivity of building materials to heat	**02**	**60**
	The shape, location, color and structure of the rest furniture		
	Mineral space / green space report		

Table 6. Evaluation of the Menadia public place

Dimensions	Indicators	Value of the indicator	Value (%)
1. *Ergonomics*	Satisfy the majority of users,	**09**	**60**
	Physical satisfaction: shape and size of the rest furniture		
	materials resistant to vandalism		
2. *Security*	Presence of security furniture	**08**	**88.89**
	How to fix the rest furniture		
	Functional lighting furniture		
	Presence of plant screens		
3. *Hygiene*	Composition and capacity of hygiene furniture	**05**	**71.42**
	Visibility of hygiene furniture		
4. *Accessibility*	Presence of path	**01**	**50**
	Accessibility to the people with reduced mobility		
5. *Visual perception*	The degree of openness of space	**00**	**00**
	Pedestrian and mechanical traffic rate		
	Occupation of the ground floor		
	The quality of visibility opposite to the rest furniture		
6. *The level of sound*	Presence of insulators	**02**	**60**
	The sound quality of the surrounding urban functions		
7. *Thermal comfort*	Conductivity of building materials to heat	**02.5**	**83.33**
	The shape, location, color and structure of the rest furniture		
	Mineral space / green space report		

The results of the calculation of the scores obtained by the project in each of the dimensions are presented in the form of a radar in Figure 1. The value of each dimension is calculated according to the values obtained for each indicator. Subsequently, the final score of each dimension will be calculated based on the value of the indicators obtained divided on the total value of the indicators, expressed as a percentage (%). Subsequently, a comparative study is first initiated between the values of the dimensions with respect to the functions of a case study; secondly, between the values obtained

from each dimension relating to a case study the essential components of the urban comfort of use: the kinesthetic and the quality of the space.

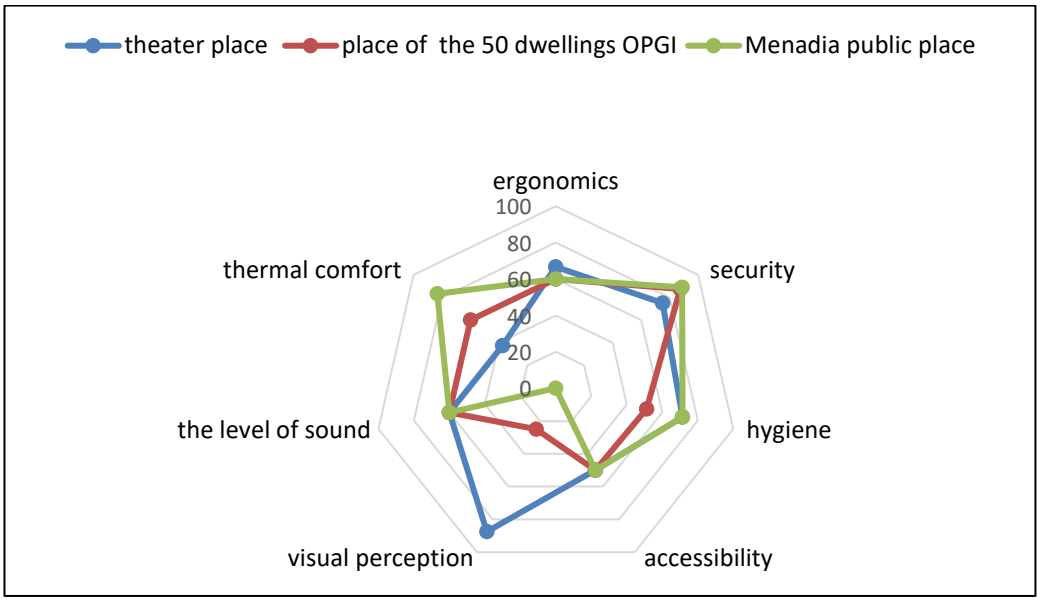


Figure 1. The level of the relative dimensions of the urban comfort of use of the case studies (developed by author)

Below the performance threshold (50%) (Figure 1.), dimensions such as thermal comfort - the case of the theater's place - visual perception - no place for 50 OPGI dwellings and the case of Place Menadia- are considered as non-performing.

The value of "thermal comfort" - the case of the theater square - is very low. This shows the negligence of urban actors (owners and project manager) in the face of climatic conditions for an urban stay. The consideration of this dimension is a fundamental component because on the one hand, any reflection on the urban stay is not established without the consideration of climatic data (Gehl, 2010); on the other hand, the openness of any public place does not allow this dimension to be excluded in any way. Deep enough, when the weather conditions of sun, wind and humidity are favorable, users can leave their homes and exercise maximum of necessary and recreational activities and vice versa.

Similarly, the value of "visual perception" - the case of Menadia Square - is low, although it represents an essential component in the walk function.

These low values mark the failings of the project which are not at all acceptable for its function or for its future. These values demonstrate, in the first place, the will of the project manager to consider the project of the public square as an entity in itself limited to its hold on the ground, without taking into account neither the character of the open space nor the function of the latter, and secondly, the

indifference of the project owner to the principles outlined by the political will to include cities in the framework of qualitative and even sustainable urban development

As for the other dimensions, "ergonomics", "security" and "sound level", their values are well above the threshold of performance in all cases. Accessibility for people with reduced mobility (PRM) for example does not in any case study integral part of the seating arrangements.

In summary, we can say that the evaluation of urban comfort of use in the public place, shared between the kinesthetic (ergonomics) and the quality of the place, shows that the latter is not to be rejected but to correct. Although it has certain qualities that adapt to the context of the environment, it nevertheless presents failures due mainly to the absence, upstream, of a set of specifications / implementation mechanism whose importance is summarizes in the definition study, in the formulation and in the process of decision support (either upstream, or for a possible correction or for a follow-up). This regulation must be accompanied by a charter of public spaces and a reference system, which is also part of a sustainable development approach.

4. Conclusion

The ME UCU, presented in this research note, is characterized by its ease of use and its flexibility. Its application leads to formulating recommendations, making corrections and developing or possibly improving the specifications

Moreover, because of its flexibility, its pragmatism and its voluntary simplicity, it can be mobilized to capture progress in correcting certain initial failures that it would have detected. It can also provide a nuanced comparison of the advantages and disadvantages of several competing development projects

This method reduces the reflection time of decision-makers by targeting faulty indicators that need to be acted upon. However, it has limitations because of the degree of subjectivity involved in the rating system. In addition, the quantity and accuracy of the information available affects the way in which the indicator is calculated.

One way to continue this work would be to turn the method into software, which could reduce thinking time and broaden the scope.

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