CULTURAL CENTER "STAVROS NIARCHOS FOUNDATION": A SOUND/SMELL-SCAPE APPROACH TO THE CRITICAL APPRAISAL OF THE ENVIROMENTAL RESPONSE OF THE SNFCC OPEN SPACES

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ABSTRACT

The paper analyses and evaluates the environmental response of the open space of the SNFCC, through a qualitative approach that involves the users of the park and the perceived quality of its acoustic and olfactory environment, in conjunction with the visual perception of the landscape. Starting from the identification and recording of environmental data for the open - outdoor areas of the SNFCC, the research extended to the detection of auditory olfactory stimuli that users/visitors are exposed to. The above preliminary data allowed the development of a questionnaire - based on the Swedish Soundscape Quality Protocol - and an olfactory mapping/notation tool which was then disseminated at five “key” locations. For each, the research sought to capitalize on a multifaceted appraisal of the SNFCC Park that correlates the aforementioned parameters of sound sight and smell, allowing insight to its visitors’ experiences. The particularity of the open space of SNFCC lies in the rare variety of acoustic stimuli that it can offer. Along with natural sound/olfactory sources, the park hosts installations with the intention of producing audio stimuli that give rise to participation, sociality and play, making it an interactive space. The analysis reaffirms the correlation between the perception of auditory and visual experiences. Furthermore, there are strong indications for the dominance of visual stimuli in the visitors’ appraisals of the open space. Pleasantness is equated to sound environments made up of predominantly natural sounds and sounds from anthropogenic activity. Nevertheless, a "bipolarity" appears in the SNFCC open space: two of the busiest locations, the Lighthouse and the Agora, do not evoke strong emotions but remain popular because of the strong visual experience. The different locations studied present different levels of soundscape, smellscape and overall environmental quality, while users' perceptions vary significantly between different locations, over different time periods.

KEYWORDS

SNFCC; Soundscape; Smellscape; Sensescape; Environmental design of open spaces

1. INTRODUCTION

Urban parks are among the most important public spaces for a sustainable urban environment, providing city populations with spaces to improve their physical and mental health [1]. In addition, urban parks can help maintain and promote the health of citizens who are frequently exposed to noise pollution and the stress of everyday life [2]. These benefits have spurred interest in the accurate

assessment and effective improvement of the quality of the urban parks. In the course of such research practices, the overall quality of an urban park is no longer dominated by vision; the acoustic environment and its quality, within the overarching concept of "landscape quality" [3] is attracting increasing attention from various disciplines, including science, design, architecture and environmental management.

The open space of the Cultural Center of the Stavros Niarchos Foundation (SNFCC), is located in the southern suburbs of Athens, in Kallithea, and covers an area of 210 acres, occupying 85% of the total area of the SNFCC [4]. At the southern end of the area, Syggrou Avenue and Poseidonos Avenue almost intersect. The design and construction of Stavros Niarchos Park, contributed to the remodeling of the area of Kallithea and the Faliraki front, giving life to an area that remained discredited for many years. It is now a reference point for Athens as it is one of the very few organised green areas of the Greek capital.

What stands out in this environment is that the design of both the building and the park is based on the principles of sustainability and bioclimatic design. After all, it is the trademark and self- characterization of the SNFCC, and rightly so, as a Node of Sustainability. In fact, the design has already been recognized internationally, with the platinum LEED certification received by the SNFCC; the most prestigious international distinction that a sustainable and environmentally friendly building can receive [4]. Moreover, a variety of native plant species, aromatic plants and trees, are hosted, enhancing the biodiversity of the region and reviving the Mediterranean landscape [4].

The paper analyses and evaluates the environmental response of the open space of the SNFCC, through a qualitative approach that involves the users of the park and the perceived quality of its acoustic and olfactory environment, in conjunction with the visual perception of the landscape. Five locations in the park were selected for study: the Lighthouse (1), the Agora (2), the Mediterranean Garden (3), the Music Garden (4), and the Playground (5).

Map 1: The five (5) distribution points of the questionnaires Background source: SNFCC, own editing

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2. METHODOLOGY

The methodology of the current work was founded on the literature review of the relevant bibliography and on the study of five case studies/research papers [5-9], which provided good practice guidelines for the application of the SQM methodology but also allow the comparative analysis of the current work to that of the aforementioned studies.

A method of triangulation was used in the current study [10]. The research included practices for observation (recordings audio/video), distribution of questionnaires, as well as measurements (SPL),

utilizing the combination of quantitative and qualitative approaches in order to ensure the validity of the research "through the control of the results of the qualitative method with the results of the quantitative method" [11].

The research embarked with soundwalks, which have been widely accepted as valid means for the assessment of the soundscape of urban environments [12]. During the walk, various data, photos, videos, and information were collected about the weather conditions of the day and the intensity of the park's use. The walks also allowed a first-hand approach of the olfactory environment; the wind of that day dispersed strong aromas from the aromatic plants and trees of the park; at certain locations one could also perceive the sea breeze. This influenced the aims of the research and therefore the methodological tools; it created a nuanced approach focusing on the use of "Sensewalks" as defined in the work of Southworth [12,13], for recording the perception of sound and smell.

Field recordings were performed using widely available media (LENOVO A2016a40 - ANDROID 6.0). The perception of smells and sounds in the urban environment was examined through a questionnaire according to the Swedish Soundscape Quality Protocol, adapted to the Greek language. Specifically, the questionnaire used in the research program: "Walking in the city of Thessaloniki" was taken as a model [14].

The questionnaire is a combination of the Swedish Soundscape Quality Protocol (SSQP) [15] and the DIY Manchester Smellwalk idea [16]. The SSQP has emerged from an interdisciplinary effort to develop a methodology for assessing sound perception in the environment and has been developed to be accessible to non- acousticians (architects - town planners) and has already been applied internationally, validating its suitability as a tool that could have a wide application [14].

It examines the make-up of the sound environment through specific sources: Traffic noise, Mechanical Noise, Other noise sources, human activity, Natural sounds, while for the study of the Music Garden, the category of Musical instruments was added. The participants are asked to score their perception of each type of sound on a five-point scale: 1 - do not hear at all, 2 – a little, 3- moderately, 4- a lot, 5 - dominant sound. Participants are also invited to select their degree of agreement (again on a 5-point scale) regarding the characterization of the sound environment as pleasant, chaotic, exciting, uneventful, calm, annoying, eventful, or monotonous,. Marks are also provided for the audio, visual, olfactory environments on a 5- point scale, ranging from 1 – very good, 2 - good, 3 – neither good nor bad, 4 – bad, and 5 – very bad). Finally the questionnaire also gauged the appropriateness of sound and olfactory environments to the specific context. The participants' evaluations are repeated for every location on a defined route.

The distribution of the questionnaires took place over a weekend (13, 14 April 2019), where temperatures ranged between 15°-22°, with mild precipitation – drizzle - on Saturday morning. These weather conditions led to interesting observations; the presence of people was increased in the Agora, although it was not sheltered, and mainly in the lighthouse. When the drizzle stopped, people moved to the Playground, but not to the Music and the Mediterranean Gardens. In other words, most people preferred to be stationary during rainfall. An important factor in the composition of the sound environment during the weekend was the event "No Finish Line" which took place at the SNFCC, including the addition of loud music, on both days, from 12:00 to 13:30.

The 273 responses were collected, distributed to approximately 54 questionnaires at each location, with a male/female ratio of 49/51, and a mean age of 39yrs, ranging between 15 to 73yrs. The largest percentage of participants, 60%, corresponds to residents of Athens, while the rest were visitors from the province, half of whom from Thessaloniki. This large number of non-Athenian visitors demonstrates the supra-local character of the

SNFCC and the uniqueness of the place.

3. ANALYSIS AND DISCUSSION

3.1. The typology of sound sources and the perception of the sound environment

Starting from the less perceptible sounds, mechanical noises seem to be moderately perceived by a relatively small percentage of the sample at the lighthouse, while in the other locations it is a *little* or *not perceived at all* by the larger percentage.

Other sources of noise, such as loud music from the "No Finish Line" event and the construction activity in the Faliro Delta, are more perceptible in the Lighthouse and Agora, by a large percentage, but not as dominant sounds. Regarding the the individual comments about the music, those who were dissatisfied attributed their dislike to loudness or taste, something reaffirmed also elsewhere- case-study No3 – Seoul [7].

Traffic noise seems to be the predominant sound, perceived by the majority of the sample, at the Lighthouse and the Agora. However, it does not seem to have significantly affected the overall assessment of the lighthouse environment, as the predominant sensory experience concerned the visual environment. These findings confirm previous cases where the quality of the sound environment does not directly influence a location's holistic appreciation as the visual impact of a setting is of outmost importance [17,18].

Mainly human activity and also traffic noise dominate the sound environments at all locations. Anthropogenic sounds are always present with varied intensity but always forming a main component of the open space of the SNFCC. It is important to note that especially at locations where human activity dominates the scene the soundscape was rated as highly appropriate by respondents.

Similarly the natural sounds vary from place to place: in the lighthouse are the gusts of wind, in the Mediterranean Garden it is the rustling of leaves and grasses and the sound of insects, and in the playground and the Music Garden are mainly the water jets, in combination with the chirping of birds and the sounds of insects. Only at the Agora, natural sounds are not perceived for the most part. Figure 1 presents a comparative analysis of perceived audio sources at all locations.

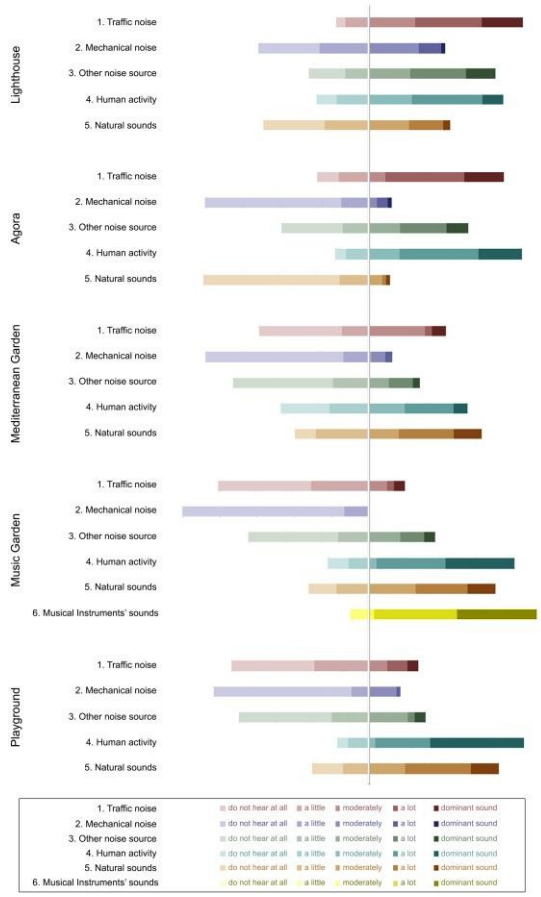

Figure 1. The comparative analysis of perceived audio sources in all positions

The analysis of the questionnaires shows that respondents found soundscapes dominated by natural sounds and sounds from human activity more pleasant: that is to say the triptych "Mediterranean Garden - Music Garden - Playground", which gathered with an average ranking close to 4 for all the positive features (pleasant, exciting, calm, eventful) and kept all the negatives (chaotic, uneventful, annoying, monotonous) at very low rankings (Figure 2).

A "bipolarity" appears in the open space of the SNFCC. Two of the busiest locations in the whole outdoor area, the Lighthouse and the Agora, both significantly more "urban" in feel, do not cause strong emotions but remain

popular, while the "triptych" as analyzed above, causes strong positive emotions from the participants.

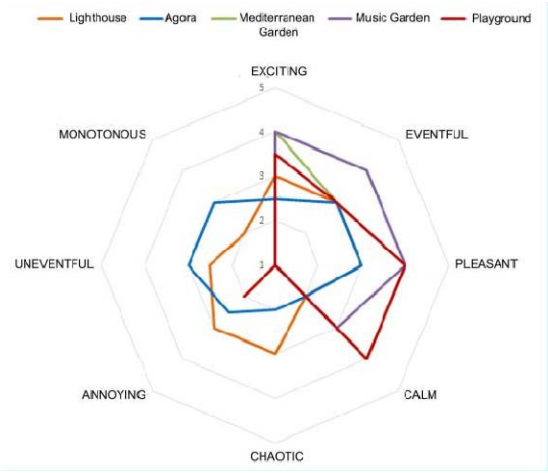

Figure 2. The emotional perception of the soundscape in the 5 selected locations

3.2. Comparative analysis of Sound, Visual and Olfactory Environments

The research found that the lowest quality sound environment was found in the Lighthouse and the Market, and the best in the Music Garden.

In the visual environment there were smaller fluctuations, giving values of absolute satisfaction to the lighthouse with the view to the sea and the city, to the Mediterranean Garden - a purely natural environment - and to the Music Garden, with the interesting musical arrangements. The positive evaluation values for the sound environment in the lighthouse may be affected by the quality of the visual. Viollon confirms that he found that "visual parameters have a more obvious influence on the evaluation of the sound environment of a single audiovisual environment" [19].

Strong variations appear in the overall appreciation of the olfactory environment, with the highest value of satisfaction found in the natural "triptych", with the aromas of aromatic plants, trees and flowers. Satisfaction is also noted at the lighthouse, where most participants stated that they felt the fresh air. The Agora seems to present an almost typical urban environment, as the perceived smells were no different from those of everyday life in the city, albeit the lack of any reference to the odors of garbage or fumes (human smell, coffee, food, etc).

In the wider area of the Mediterranean Garden, the audio-visual-olfactory environment is characterized by the majority of respondents from good to very good, demonstrating a positive impact of the multi-sensory experience. On the other hand, at the Lighthouse and the Agora, the public rates the overall and visual experience highly while rating the olfactory and sound environments as indifferent or poor.

4. CONCLUSIONS

The sensescape approach, involving sound/smellwalks, recordings and measurement, allows a coordinated methodology for the review of the multi-sensory experience of the urban realm. The methodology has proven to be effective in engaging the public but also in informing a comparative analysis of the nuances of the intangible qualities of public spaces that nevertheless constitute the overall experience of a place and are intrinsically connected to its design.

The current work informs the current research on the mapping of the environmental qualities and the potential of the sound/olfactory environments of open spaces. In the case of the SNFCC, this is influenced and shaped mainly by human activity. There is great variation in the sound / olfactory / visual qualities of the outdoor spaces; different locations have different levels of sound quality and overall environment, and users' perceptions of each natural sound source are significantly varied at each location. The highest rated locations are those that propose a *"natural setting"*, receiving high rating in visual olfactory and sound environment quality and appropriateness.

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